Ref #	Cycle #	Topic	Citation	Grade (see Grade tab below)	Fulltext or Citation Link	Abstract	Comments by Reviewer
Cycle 1: Disability due to osteoarthritis despite conservative therapy							
1	I / A / 1	Documentation of Disability; HOOS/KOOS	Davis AM. Perruccio AV. Canizares M. Hawker GA. Roos EM. Maillefert JF. Lohmander LS. Comparative, validity and responsiveness of the HOOS-PS and KOOS-PS to the WOMAC physical function subscale in total joint replacement for osteoarthritis. Osteoarthritis & Cartilage. 17(7):843-7, 2009 Jul. PMID:19215728	2/B		Abstract: OBJECTIVE: To evaluate the internal consistency of the Hip disability and Osteoarthritis Outcome Score-Physical Function Short-form (HOOS-PS) and the Knee injury and Osteoarthritis Outcome Score-Physical Function Short-form (KOOS-PS) in total hip replacement (THR) and total knee (TKR) replacement. Construct validity and responsiveness were compared to the Western Ontario McMaster Universities' Osteoarthritis Index (WOMAC) Likert 3.0 physical function (PF) subscale and the PF excluding the items in the short measures (PF-exclusions). METHODS: Participants completed the full HOOS or KOOS, measures of fatigue, anxiety, depression and the Chronic Pain Grade (CPG) pre-surgery and the HOOS or KOOS 6 months post-surgery. Internal consistency for the HOOS-PS and KOOS-PS was calculated using Cronbach's alpha. For construct validity, it was hypothesized that correlations between the HOOS-PS or KOOS-PS and PF and PF-exclusions with fatigue, CPG, anxiety and depression and HOOS/KOOS pain scales would differ by magnitudes of <0.1. Standardized response means (SRMs) were calculated for the HOOS-PS, KOOS-PS, PF and PF-exclusions and hypothesized to be >1. RESULTS: The THR group (n=201) had a mean age of 62.3 years; 53.2% were female. The TKR group (n=248) had a mean age of 64.5 years; 63.7% were female. Cronbach's alpha was 0.79 and 0.89 for the HOOS-PS and KOOS-PS, respectively, confirming that the measures represented a homogeneous construct. The correlation of the HOOS-PS to the PF and PF-exclusions was 0.90 and 0.86, respectively; r=0.90 (PF) and r=0.85 (PF-exclusions) for the KOOS-PS. The results supported the construct validity hypotheses. For THR, the SRM was 1.5, 1.7 and 1.7 for the HOOS-PS, PF and PF-exclusions; for TKR, the SRM was 1.4, 1.5 and 1.7, respectively. CONCLUSIONS: The short HOOS-PS and KOOS-PS represent homogenous short measures of PF with similar construct validity and responsiveness to the 17-item PF. The HOOS-PS and KOOS-PS are parsimonious, valid and responsive for evaluating PF in THR and TKR.	Validates KOOS and HOOS as a measure of patient function regarding total knee and total hip replacement.
2	I / B	Kellgren-Lawrence	Neogi T. Felson D. Niu J. Nevitt M. Lewis CE. Aliabadi P. Sack B. Torner J. Bradley L. Zhang Y. Association between radiographic features of knee osteoarthritis and pain: results from two cohort studies. BMJ. 339:b2844, 2009. PMID: 19700505	1/A			Strongly supports relation between Kellgren-Lawrence grade on x-ray and pain for patients with osteoarthritis of the knee.
3	I / B	Kellgren-Lawrence	Reijman M. Hazes JM. Pols HA. Bernsen RM. Koes BW. Bierma-Zeinstra SM. Validity and reliability of three definitions of hip osteoarthritis: cross sectional and longitudinal approach. Annals of the Rheumatic Diseases. 63(11):1427-33, 2004 Nov. PMID: 15479891	2/B			Supports relation between Kellgren-Lawrence grade on x-ray and pain for patients with osteoarthritis of the hip.
4	I / C	Conservative Therapy	NICE CG59. Osteoarthritis	VM Tier-1 Source	Quick Reference Guide: http://guidance.nice.org.uk/CG59/QuickRefGuide/pdf/English Full Guideline: http://guidance.nice.org.uk/CG59/Guidance/pdf/English	Highly regarded British source of clinical recommendations based on robust evidence appraisal	Guide to conservative therapy for patients with osteoarthritis.
5	I / C / 1	Conservative Therapy; Weight Loss	Christensen R, Bartels EM, Astrup A, Bliddal H. Effect of weight reduction in obese patients diagnosed with knee osteoarthritis:a systematic review and meta-analysis. Ann Rheum Dis. 2007 Apr; 66(4): 433-9. PMID: 17204567	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1856062/	This review aims to assess by meta-analysis of randomised controlled trials (RCTs) changes in pain and function when overweight patients with knee osteoarthritis (OA) achieve a weight loss. Systematic searches were performed and reference lists from the retrieved trials were searched. RCTs were enclosed in the systematic review if they explicitly stated diagnosis of knee OA and reported a weight change as the only difference in intervention from the control group. Outcome Measures for Arthritis Clinical Trials III outcome variables were considered for analysis. Effect size (ES) was calculated using RevMan, and meta-regression analyses were performed using weighted estimates from the random effects analyses. Among 35 potential trials identified, four RCTs including five intervention/control groups met our inclusion criteria and provided data from 454 patients. Pooled ES for pain and physical disability were 0.20 (95% CI 0 to 0.39) and 0.23 (0.04 to 0.42) at a weight reduction of 6.1 kg (4.7 to 7.6 kg). Meta-regression analysis showed that disability could be significantly improved when weight was reduced over 5.1%, or at the rate of >0.24% reduction per week. Clinical efficacy on pain reduction was present, although not predictable after weight loss. Meta-regression analysis indicated that physical disability of patients with knee OA and overweight diminished after a moderate weight reduction regime. The analysis supported that a weight loss of >5% should be achieved within a 20-week period--that is, 0.25% per week.	Supports weight loss as conservative therapy for patients with osteoarthritis of the knee.
6	I / C / 1	Conservative Therapy; Weight Loss	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	AAOS recommendation strength: "Moderate." "We suggest weight loss for patients with symptomatic osteoarthritis of the knee and a BMI ≥ 25." (see p. 19 Guideline)	Supports weight loss as conservative therapy for patients with osteoarthritis of the knee.

7	I / C / 1	Conservative Therapy; Physical Therapy; Exercise	Fransen M. McConnell S. Exercise for osteoarthritis of the knee. [Review] [116 refs]. Cochrane Database of Systematic Reviews. (4):CD004376, 2008. PMID: 18843657	1/A	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-03345&LSLINK=450&D=coch	BACKGROUND: Biomechanical factors, such as reduced muscle strength and joint malalignment, have an important role in the initiation and progression of knee osteoarthritis (OA). Currently, there is no known cure for OA; however, disease-related factors, such as impaired muscle function and reduced fitness,are potentially amenable to therapeutic exercise. OBJECTIVES: To determine whether land-based therapeutic exercise is beneficial for people with knee OA in terms of reduced joint pain or improved physical function. SEARCH STRATEGY: Five electronic databases were searched, up until December 2007. SELECTION CRITERIA: All randomized controlled trials randomising individuals and comparing some form of land-based therapeutic exercise (as opposed to exercises conducted in the water) with a non-exercise group. DATA COLLECTION AND ANALYSIS: Two review authors independently extracted data and assessed methodological quality. All analyses were conducted on continuous outcomes. MAIN RESULTS: The 32 included studies provided data on 3616 participants for knee pain and 3719 participants for self-reported physical function. Meta-analysis revealed a beneficial treatment effect with a standardized mean difference (SMD) of 0.40 (95% confidence interval (CI) 0.30 to 0.50) for pain; and SMD 0.37 (95% CI 0.25 to 0.49) for physical function. There was marked variability across the included studies in participants recruited, symptom duration, exercise interventions assessed and important aspects of study methodology. The results were sensitive to the number of direct supervision occasions provided and various aspects of study methodology. While the pooled beneficial effects of exercise programs providing less than 12 direct supervision occasions or studies utilising more rigorous methodologies remained significant and clinically relevant, between study heterogeneity remained marked and the magnitude of the treatment effect of these studies would be considered small. AUTHORS' CONCLUSIONS: There is platinum level evidence that land-based therapeutic exercise has at least short term benefit in terms of reduced knee pain and improved physical function for people with knee OA. The magnitude of the treatment effect would be considered small, but comparable to estimates reported for non-steroidal anti-inflammatory drugs.	Supports exercise as conservative therapy for osteoarthritis of the knee.
8	I / C / 1	Conservative Therapy; Physical Therapy; Exercise	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	AAOS recommendation strength: "Strong;" "We recommend that patients with symptomatic osteoarthritis of the knee participate in self-management programs, strengthening, low-impact aerobic exercises, and neuromuscular education; and engage in physical activity consistent with national guidelines." (see p. 19 Guideline)	Supports strengthening exercise and physical therapy as conservative therapy for osteoarthritis of the knee.
9	I / C / 1	Conservative Therapy; Exercise	Roddy E. et.al. Aerobic walking or strethening exercise for osteoarthritis: a systematic review. Ann Rheurm Dis, 2005 Apr; 64(4): 544-8. PMID: 15769914	1/A	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1755453/pdf/v064p00544.pdf	OBJECTIVE: To compare the efficacy of aerobic walking and home based quadriceps strengthening exercises in patients with knee osteoarthritis. METHODS: The Medline, Pubmed, EMBASE, CINAHL, and PEDro databases and the Cochrane controlled trials register were searched for randomised controlled trials (RCTs) of subjects with knee osteoarthritis comparing aerobic walking or home based quadriceps strengthening exercise with a non-exercise control group. Methodological quality of retrieved RCTs was assessed. Outcome data were abstracted for pain and self reported disability and the effect size calculated for each outcome. RCTs were grouped according to exercise mode and the data pooled using both fixed and random effects models. RESULTS: 35 RCTs were identified, 13 of which met inclusion criteria and provided data suitable for further analysis. Pooled effect sizes for pain were 0.52 for aerobic walking and 0.39 for quadriceps strengthening. For self reported disability, pooled effect sizes were 0.46 for aerobic walking and 0.32 for quadriceps strengthening. CONCLUSIONS: Both aerobic walking and home based quadriceps strengthening exercise reduce pain and disability from knee osteoarthritis but no difference between them was found on indirect comparison.	Strongly supports home-based aerobic or strengthening exercises to reduce pain in patients with osteoarthritis of the knee.
10	I / C / 1	Conservative Therapy; Bracing	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	AAOS recommendation strength: "Inconclusive." "We cannot recommend for or against." (see p. 19 Guideline)	Evidence neither supports nor refutes use of bracing for patients with osteoarthritis of the knee.
11	I / C / 1	Conservative Therapy; Shoe Modification	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	AAOS recommendation strength: "Moderate." "We cannot suggest that lateral wedge insoles be used for patients with symptomatic medial compartment osteoarthritis of the knee:" (see p. 19 Guideline)	Recommends against use of wedge insoles.
12	I / C / 1	Conservative Therapy; Assistive Devices	Jones A, et.al. Impact of cane use on pain, function, general health and energy during gait in patients with knee osteoarthrtiis: a randomised controle trial. Ann Rheum Dis, 2012 Fe; 71(2): 172-9. PMID: 22128081	2/B	http://ard.bmj.com/content/71/2/172.full.pdf+html	OBJECTIVE: To assess the impact of daily cane use during gait in relation to pain, function, general health and energy expenditure among patients with knee osteoarthritis. METHOD: Sixty-four patients were randomly assigned to an experimental group (EG) or control group (CG). The EG used a cane every day for 2 months, whereas the CG did not use a cane in this period. The first outcome was pain and the second were function (Lequesne and WOMAC), general health (SF-36) and energy expenditure (gas analysis during the 6-minute walk test (6MWT) with and without a cane). Evaluations were performed at baseline, 30 and 60 days. RESULTS: The groups were homogeneous for all parameters at baseline. Compared with the CG, the EG significantly improved pain (ES 0.18), function - Lequesne (ES 0.13), some domains of SF-36 (role physical, ES 0.07 and bodily pain, ES 0.08) and distance on the 6MWT with the cane (ES 0.16). At the end of the 6MWT with the cane, the EG significantly improved energy expenditure (ES 0.21), carbon dioxide production (ES 0.12) and metabolic equivalents (ES 0.15) compared with the CG. CONCLUSION: A cane can be used to diminish pain, improve function and some aspects of quality of life in patients with knee osteoarthritis. The prescription of a cane should take into account the substantial increase in energy expenditure in the first month of use, whereas energy expenditure is no longer a factor for concern by the end of the second month due to adaptation to cane use. The trial was registered in clinicaltrials.gov (NCT00698412	Supports use of cane to reduce pain and improve exercise performance in patients with osteoarthritis of the knee.

13	I / C / 2	Conservative Therapy; Medications; Acetaminophen	Towheed TE, Maxwell L, Judd MG, Catton M, Hochberg MC, Wells G. Acetaminophen for osteoarthritis. Cochrane Database Syst Rev. 2006 Jan 25;(1):CD004257. PMID: 16437479	1/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-03245&LSLINK=450&D=coch	BACKGROUND: Osteoarthritis (OA) is the most common form of arthritis. Published guidelines and expert opinion are divided over the relative role of acetaminophen (also called paracetamol or Tylenol) and non-steroidal anti-inflammatory drugs (NSAIDs) as first-line pharmacologic therapy. The comparative safety of acetaminophen and NSAIDs is also important to consider. This update to the original 2003 review includes nine additional RCTs. OBJECTIVES: To assess the efficacy and safety of acetaminophen versus placebo and versus NSAIDs (ibuprofen, diclofenac, arthrotec, celecoxib, naproxen, rofecoxib) for treating OA. SEARCH STRATEGY: We searched MEDLINE (up to July 2005), EMBASE (2002-July 2005), Cochrane Central Register of Controlled Trials (CENTRAL), ACP Journal Club, DARE, Cochrane Database of Systematic Reviews (all from 1994 to July 2005). Reference lists of identified RCTs and pertinent review articles were also hand searched. SELECTION CRITERIA: Published randomized controlled trials (RCTs) evaluating the efficacy and safety of acetaminophen alone in OA were considered for inclusion. DATA COLLECTION AND ANALYSIS: Pain, physical function and global assessment outcomes were reported. Results for continuous outcome measures were expressed as standardized mean differences (SMD). Dichotomous outcome measures were pooled using relative risk (RR) and the number needed to treat (NNT) was calculated. MAIN RESULTS: Fifteen RCTs involving 5986 participants were included in this review. Seven RCTs compared acetaminophen to placebo and ten RCTs compared acetaminophen to NSAIDs. In the placebo-controlled RCTs, acetaminophen was superior to placebo in five of the seven RCTs and had a similar safety profile. Compared to placebo, a pooled analysis of five trials of overall pain using multiple methods demonstrated a statistically significant reduction in pain (SMD -0.13, 95% CI -0.22 to -0.04), which is of questionable clinical significance. The relative percent improvement from baseline was 5% with an absolute change of 4 points on a 0 to 100 scale. The NNT to achieve an improvement in pain ranged from 4 to 16. In the comparator-controlled RCTs, acetaminophen was less effective overall than NSAIDs in terms of pain reduction, global assessments and in terms of improvements in functional status. No significant difference was found overall between the safety of acetaminophen and NSAIDs, although patients taking traditional NSAIDS were more likely to experience an adverse GI event (RR 1.47, (95% CI 1.08 to 2.00). 19% of patients in the traditional NSAID group versus 13% in the acetaminophen group experienced an adverse GI event. However, the median trial duration was only 6 weeks and it is difficult to assess adverse outcomes in a relatively short time period. AUTHORS' CONCLUSIONS: The evidence to date suggests that NSAIDs are superior to acetaminophen for improving knee and hip pain in people with OA. The size of the treatment effect was modest, and the median trial duration was only six weeks, therefore, additional considerations need to be factored in when making the decision between using acetaminophen or NSAIDs. In OA subjects with moderate-to-severe levels of pain, NSAIDs appear to be more effective than acetaminophen.	Favors NSAIDs over acetaminophen for pain in patients with osteoarthritis.
14	I / C / 2	Conservative Therapy; Acetaminophen	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	American Academy of Orthopedic Surgeons recommendation strength: "Inconclusive." "We are unable to recommend for or against the use of acetaminophen, opioids, or pain patches for patients with symptomatic osteoarthritis of the knee." (see p. 19 Guideline)	Neither supports nor refutes the use of acetaminophen for pain in patients with osteoarthritis of the knee.
15	I / C / 2	Conservative Therapy; Medications; Oral NSAIDs	Bjordal JM. Ljunggren AE. Klovning A. Slordal L. Non-steroidal anti-inflammatory drugs, including cyclo-oxygenase-2 inhibitors, in osteoarthritic knee pain: meta-analysis of randomised placebo controlled trials. [Review] [62 refs]. BMJ. 329(7478):1317, 2004 Dec 4. PMID: 15561731	2/B	http://www.bmj.com/content/329/7478/1317.pdf%2Bhtml	Abstract: OBJECTIVE: To estimate the analgesic efficacy of non-steroidal anti-inflammatory drugs (NSAIDs), including selective cyclo-oxygenase-2 inhibitors (coxibs), in patients with osteoarthritis of the knee. DESIGN: Systematic review and meta-analysis of randomised placebo controlled trials. STUDIES REVIEWED: 23 trials including 10 845 patients, median age of 62.5 years. 7807 patients received adequate doses of NSAIDs and 3038 received placebo. The mean weighted baseline pain score was 64.2 mm on 100 mm visual analogue scale (VAS), and average duration of symptoms was 8.2 years. MAIN OUTCOME MEASURE: Change in overall intensity of pain. RESULTS: Methodological quality of trials was acceptable, but 13 trials excluded patients before randomisation if they did not respond to NSAIDs. One trial provided long term data for pain that showed no significant effect of NSAIDs compared with placebo at one to four years. The pooled difference for pain on visual analogue scale in all included trials was 10.1 mm (95% confidence interval 7.4 to 12.8) or 15.6% better than placebo after 2-13 weeks. The results were heterogeneous, and the effect size for pain reduction was 0.32 (0.24 to 0.39) in a random effects model. In 10 trials that did not exclude non-responders to NSAID treatment the results were homogeneous, with an effect size for pain reduction of 0.23 (0.15 to 0.31). CONCLUSION: NSAIDs can reduce short term pain in osteoarthritis of the knee slightly better than placebo, but the current analysis does not support long term use of NSAIDs for this condition. As serious adverse effects are associated with oral NSAIDs, only limited use can be recommended. [References: 62]	Recommends limited use of NSAIDs for pain relief for patients with osteoarthritis of the knee.
16	I / C / 2	Conservative Therapy; NSAIDs	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	AAOS recommendation strength: "Strong." "We recommend nonsteroidal anti-inflammatory drugs (NSAIDs; oral or topical) or Tramadol for patients with symptomatic osteoarthritis of the knee." (see p. 19 Guideline)	Favors use of oral or topical NSAIDs for pain relief for patients with osteoarthritis of the knee.
17	I / C / 2	Conservative Therapy; Glucosamine	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	American Academy of Orthopedic Surgeons guideline. "We cannot recommend using glucosamine and chondroitin for patients with symptomatic osteoarthritis of the knee:" Strong recommendation. (see p. 19 Guideline)	Recommends against use of glucosamine.

18	I / C / 2	Conservative Therapy; Medications; Oral glucosamine	Towheed T, Maxwell L, Anastassiades TP, Shea B, Houpt JB, Welch V, Hochberg MC, Wells GA. Glucosamine therapy for treating osteoarthritis. Cochrane Database of Systematic Reviews 2005, Issue 2. Art. No.: CD002946.	1/A (against)	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-01942&LSLINK=450&D=coch	Background: Osteoarthritis (OA) is a common form of arthritis and is often associated with significant disability and impaired quality of life. This is an update of a Cochrane review first published in 2001 and previously updated in 2005. Objectives: To review randomized controlled trials (RCTs) evaluating the effectiveness and toxicity of glucosamine in OA. Search methods: We searched CENTRAL and the Cochrane Database of Systematic Reviews (*The Cochrane Library*), MEDLINE, PREMEDLINE, EMBASE, AMED, ACP Journal Club, DARE (to January 2008); contacted content experts, and handsearched reference lists and pertinent review articles. Selection criteria: RCTs evaluating the effectiveness and safety of glucosamine in OA. Data collection and analysis: Data abstraction was performed independently by two review authors and investigators were contacted for missing data. Main results: This update includes 25 studies with 4963 patients. Analysis restricted to studies with adequate allocation concealment failed to show any benefit of glucosamine for pain (based on a pooled measure of different pain scales) and WOMAC pain, function and stiffness subscales; however, it was found to be better than placebo using the Lequesne index (standardized mean difference (SMD) -0.54; 95% confidence interval (CI) -0.96 to -0.12). Collectively, the 25 RCTs favoured glucosamine with a 22% (change from baseline) improvement in pain (SMD -0.47; 95% CI -0.72 to -0.23) and a 11% (change from baseline) improvement in function using the Lequesne index (SMD -0.47; 95% CI -0.82 to -0.12). However, the results were not uniformly positive and the reasons for this remain unexplained. WOMAC pain, function and stiffness outcomes did not reach statistical significance. RCTs in which the Rotta preparation of glucosamine was compared to placebo found glucosamine superior for pain (SMD -1.11; 95% CI -1.66 to -0.57) and function (Lequesne index SMD -0.47; 95% CI -0.82 to -0.12). Pooled results for pain (SMD -0.05; 95% CI -0.15 to 0.05) and function using the WOMAC index (SMD -0.01; 95% CI -0.13 to 0.10) in those RCTs using a non-Rotta preparation of glucosamine did not reach statistical significance. Two RCTs using the Rotta preparation showed that glucosamine was able to slow radiological progression of OA of the knee over a three-year period (mean difference (MD) 0.32; 95% CI 0.05 to 0.58). Glucosamine was as safe as placebo in terms of the number of participants reporting adverse reactions (relative risk ratio 0.99; 95% CI 0.91 to 1.07). Authors' conclusions: Pooled results from studies using a non-Rotta preparation or adequate allocation concealment failed to show benefit in pain and WOMAC function while those studies evaluating the Rotta preparation showed that glucosamine was superior to placebo in the treatment of pain and functional impairment resulting from symptomatic OA.	Strong evidence against use of glucosamine in general, as well as a recommendation in favor of specific "Rotta" glucosamine preparation.
19	I / C / 2	Conservative Therapy; Medications; Oral glucosamine	Wandel S. Juni P. Tendal B. Nuesch E. Villiger PM. Welton NJ. Reichenbach S. Trelle S. Effects of glucosamine, chondroitin, or placebo in patients with osteoarthritis of hip or knee: network meta-analysis. [Review] [58 refs]. BMJ. 341:c4675, 2010. PMID: 20847017	1/A (against)	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2941572/pdf/bmj.c4675.pdf	Abstract: OBJECTIVE: To determine the effect of glucosamine, chondroitin, or the two in combination on joint pain and on radiological progression of disease in osteoarthritis of the hip or knee. Design Network meta-analysis. Direct comparisons within trials were combined with indirect evidence from other trials by using a Bayesian model that allowed the synthesis of multiple time points. MAIN OUTCOME MEASURE: Pain intensity. Secondary outcome was change in minimal width of joint space. The minimal clinically important difference between preparations and placebo was prespecified at -0.9 cm on a 10 cm visual analogue scale. DATA SOURCES: Electronic databases and conference proceedings from inception to June 2009, expert contact, relevant websites. Eligibility criteria for selecting studies Large scale randomised controlled trials in more than 200 patients with osteoarthritis of the knee or hip that compared glucosamine, chondroitin, or their combination with placebo or head to head. Results 10 trials in 3803 patients were included. On a 10 cm visual analogue scale the overall difference in pain intensity compared with placebo was -0.4 cm (95% credible interval -0.7 to -0.1 cm) for glucosamine, -0.3 cm (-0.7 to 0.0 cm) for chondroitin, and -0.5 cm (-0.9 to 0.0 cm) for the combination. For none of the estimates did the 95% credible intervals cross the boundary of the minimal clinically important difference. Industry independent trials showed smaller effects than commercially funded trials (P=0.02 for interaction). The differences in changes in minimal width of joint space were all minute, with 95% credible intervals overlapping zero. Conclusions Compared with placebo, glucosamine, chondroitin, and their combination do not reduce joint pain or have an impact on narrowing of joint space. Health authorities and health insurers should not cover the costs of these preparations, and new prescriptions to patients who have not received treatment should be discouraged. [References: 58]	Recommends against the use of glucosamine.
20	I / C / 2	Conservative Therapy; Intra-articular Corticosteroids	American Academy of Orthopedic Surgeons. Treatment of osteoarthritis of the knee: evidence-based guideline, 2nd edition. Adopted by AAOS Board of Directors, 18 May 2013.	VM Tier-2 Source	http://www.aaos.org/research/guidelines/guidelineoaknee.asp	AAOS recommendation strength: "Inconclusive." "We are unable to recommend for or against the use of intraarticular (IA) corticosteroids for patients with symptomatic osteoarthritis of the knee." (see p. 19 Guideline)	Neither supports nor refutes the use of intrarticular corticosteroid injections for pain in patients with osteoarthritis of the knee.

21	I / C / 2	Conservative Therapy; Medications; Intra-articular corticosteroids	Bellamy N, Campbell J, Robinson V, Gee T, Bourne R, Wells G. Intraarticular corticosteroid for treatment of osteoarthritis of the knee. Cochrane Database Syst Rev. 2006 Apr 19;(2):CD005328. PMID: 16625636	1/A	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-04318&LSLINK=450&D=coch	BACKGROUND: Osteoarthritis (OA) is a common joint disorder. In the knee, injections of corticosteroids into the joint (intraarticular (IA)) may relieve inflammation, and reduce pain and disability. OBJECTIVES: To evaluate the efficacy and safety of IA corticosteroids in treatment of OA of the knee. SEARCH STRATEGY: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (Issue 2, 2003), MEDLINE (to January (week 1) 2006 for update), EMBASE, PREMEDLINE (all to July 2003), and Current Contents (Sept 2000). Specialised journals, trial reference lists and review articles were handsearched. SELECTION CRITERIA: Randomised controlled trials of IA corticosteroids for patients with OA of the knee: single/double blind, placebo-based/comparative studies, reporting at least one core OMERACT III outcome measure. DATA COLLECTION AND ANALYSIS: Methodological quality of trials was assessed, and data were extracted in duplicate. Fixed effect and random effects models, giving weighted mean differences (WMD), were used for continuous variables. Dichotomous outcomes were analysed by relative risk (RR). MAIN RESULTS: Twenty-eight trials (1973 participants) comparing IA corticosteroid against placebo, against IA hyaluronan/hylan (HA products), against joint lavage, and against other IA corticosteroids, were included.IA corticosteroid was more effective than IA placebo for pain reduction (WMD -21.91; 95% confidence interval (CI) -29.93 to -13.89) and patient global assessment (the RR was 1.44 (95% CI 1.13 to 1.82)) at one week post injection with an NNT of 3 to 4 for both, based on n=185 for pain on 100 mm visual analogue scale (VAS) and n=158 for patient global assessment. Data on function were sparse at one week post injection and neither statistically significant nor clinically important differences were detected. There was evidence of pain reduction between two weeks (the RR was 1.81 (95% CI 1.09 to 3.00)) to three weeks (the RR was 3.11 (95% CI 1.61 to 6.01), but a lack of evidence for efficacy in functional improvement. At four to 24 weeks post injection, there was lack of evidence of effect on pain and function (small studies showed benefits which did not reach statistical or clinical importance, i.e. less than 20% risk difference). For patient global, there were three studies which consistently showed lack of effect longer than one week post injection. However, all were fairly small sample sizes (less than 50 patients per group). This was supported by another study which did not find statistically significant differences, at any time point, on a continuous measure of patient global assessment (100 mm VAS).In comparisons of corticosteroids and HA products, no statistically significant differences were in general detected at one to four weeks post injection. Between five and 13 weeks post injection, HA products were more effective than corticosteroids for one or more of the following variables: WOMAC OA Index, Lequesne Index, pain, range of motion (flexion), and number of responders. One study showed a difference in function between 14 to 26 weeks, but no differences in efficacy were detected at 45 to 52 weeks. In general, the onset of effect was similar with IA corticosteroids, but was less durable than with HA products. Comparisons of IA corticosteroids showed triamcinolone hexacetonide was superior to betamethasone for number of patients reporting pain	Supports use of short term intraartciular corticosteroid injections for pain relief in patients with osteoarthritis of the knee.
Cycle 2: Fitness for Surgery							
22	II / A	Peripheral vascular disease	Bozic KJ, Lau E, Kurtz S, Ong K, Berry DJ. Patient-related risk factors for postoperative mortality and periprosthetic joint infection in medicare patients undergoing TKA. Clinical Orthopaedics & Related Resarch, 2012 Jan; 470(1): 130-7. PMID: 21874391	2 / B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3237966/pdf/11999_2011_Article_2043.pdf	BACKGROUND: The impact of specific baseline comorbid conditions on the relative risk of postoperative mortality and periprosthetic joint infection (PJI) in elderly patients undergoing TKA has not been well defined. QUESTIONS/PURPOSES: We calculated the relative risk of postoperative mortality and PJI associated with 29 comorbid conditions in Medicare patients undergoing TKA. PATIENTS AND METHODS: The Medicare 5% sample was used to calculate the relative risk of 90-day postoperative mortality and PJI as a function of 29 preexisting comorbid conditions in 83,011 patients who underwent primary TKA between 1998 and 2007. RESULTS: The independent risk factors for 90-day postoperative mortality (in decreasing order of significance) were congestive heart failure, metastatic cancer, renal disease, peripheral vascular disease, cerebrovascular disease, lymphoma, cardiac arrhythmia, dementia, pulmonary circulation disorders, and chronic liver disease. The independent risk factors for PJI (in decreasing order of significance) were congestive heart failure, chronic pulmonary disease, preoperative anemia, diabetes, depression, renal disease, pulmonary circulation disorders, obesity, rheumatologic disease, psychoses, metastatic tumor, peripheral vascular disease, and valvular disease. CONCLUSIONS: We believe this information important when counseling elderly patients regarding the risks of mortality and PJI after TKA and risk-adjusting publicly reported TKA patient outcomes.	Supports the conclusion that patients with peripheral vascular disease undergoing total joint replacement have an increased risk of infection and mortality.
23	II / A	Peripheral vascular disease	Smith DE, McGraw RW, Taylor DC, Masri BA. Arterial complications and totla knee arthroplasty. J Am Acad Orthop Surg, 2001 Jul-Aug; 9(4): 253-7.	3/C		Arterial complications after total knee arthroplasty (TKA) are rare; however, the sequelae can be disastrous. Infection and the need for amputation or vascular reconstructive surgery are not uncommon. A thorough preoperative assessment can identify at-risk patients, many, if not all, of whom have preexisting peripheral arterial disease. In the presence of peripheral arterial disease, the use of a tourniquet during TKA has been implicated in subsequent arterial complications. Following the guidelines that have been established regarding preoperative assessment, the role of the vascular surgeon, and the use of a tourniquet before and during TKA can assist the orthopaedic surgeon in assessing candidates for TKA and reducing the risk of arterial complications	Not a research study but draws attention to risk of knee arthroplasty in patients with peripheral vascular disease.

24	II / A	Nutritional status	Lavernia CJ, Sierra RJ, Baerga L. Nutritional parameters and short term outcome in arthroplasty. Journal of the American College of Nutrition, 1999 Jun; 18(3): 274-8. PMID: 10376785	2/B		OBJECTIVE: Advances in surgical techniques and management of arthroplasty patients have contributed to a significant reduction in surgical complication rates. Preoperative nutritional status has a significant impact on surgical outcome. Studies have reported improved outcomes in burn and hip fracture patients receiving nutritional supplementation during their recoveries. Our objective was to assess the effects of preoperative nutritional status on the incidence of complications, resource consumption, and length of stay of patients undergoing hip and knee replacement surgery. METHODS: One hundred and nineteen patients were evaluated. Standard preoperative laboratory tests were performed on all patients. Medical severity of illness was assessed on all patients using the Charlson Comorbidity Index. Anesthesia and surgical time was recorded. Short term outcome was assessed utilizing hospital charges as a measure of resource consumption, length of stay (LOS), in-hospital consults and the presence and number of complications during hospitalization. Non-parametric Kruskall Wallis and chi-square statistical analyses were performed. A p value <.05 was considered significant. RESULTS: Mean age was 64.6 years +/-15.62. 52.9% had osteoarthritis (OA), 4.2% had rheumatoid arthritis (RA), 5.9% had osteonecrosis (ON), 9.2% had a hip fracture and 28% had a failed total knee arthroplasty (TKA) or total hip arthroplasty (THA). Mean albumin and total lymphocyte count (TLC) were 38.5 g/L +/-4.78 SD and 1884 cells/microL +/-762 SD, respectively. Patients with albumin levels less than 34 g/L had 32.7% higher charges ($50,108+/-8203 SE vs. $33,720+/-1128 SE, p<.006), higher medical severity of illness (p = .03) and longer LOS (8.6+/-1.7 SE vs. 5.2+/-.356 SE days, p<.001). Patients with TLC less than 1200 cells/microL had higher charges ($32,544+/-1050 SE vs. $42,098+/-3122 SE, p = .004), longer LOS (5.7+/-.531 vs. 5.4 days +/-.368, p = .004) and anesthesia (242.85+/-17.55 SE vs. 198.6 min. +/-6.06 SE, p = .02) and surgical times (177.14 min. +/-17.57 SE vs. 120.21 min. +/-6.22 SE, p = .002) when compared with patients with TLC higher than 1200 cells/microL. These findings were still significant when adjusted for medical severity of illness and age. CONCLUSIONS: Our data demonstrate that preoperative nutritional status is an excellent predictor of short term outcome. Serum albumin and TLC correlate with resource consumption, length of stay and operative time in patients undergoing joint replacement surgery. These parameters may be improved with nutritional supplementation prior to surgery..	Suggests decreased lymphocyte count and serum albumin are risk factors for poor outcomes for patients undergoing arthroplasty.
25	II / A	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.	Suggests reduced serum albumin and weight loss over previous six months predicts postoperative complications for elderly general surgery patients.
26	II / A	Reduced serum albumin	Pimlott BJ, Jones CA, Beaupre LA, Johnston DW, Majumdar SR. Prognostic impact of pre-opeartive albumin on short-term complications in patients with hip fracture. Archives of Gerontology & Geriatrics, 2011 Jul-Aug; 53(1): 90-4. PMID: 20684997	2/B		Low serum albumin may have prognostic value for morbidity and mortality in patients with hip fracture. The primary aim of the study was to evaluate the independent association between low serum albumin (<35 g/l) at hospital admission and short-term (in-hospital) mortality and post-operative complications of patients with hip fracture. We reviewed a prospective population-based cohort of 583 hip fracture patients who had pre-operative albumin values measured at hospital admission in one of the 3 tertiary hospitals in Northern Alberta, Canada. Patients with a primary diagnosis of hip fracture and 65 years or older were included. The primary outcomes were in-hospital mortality and any pre-specified post-operative complication. Mean serum albumin level was 33.8+/-4.5 g/l (+/-S.D.), and overall 55% (n=318) of patients had a low albumin. The in-hospital mortality was 8% (n=46) and rate of any non-fatal post-operative complication rate was 31/100. Mortality was 11% (n=35) among those with low albumin levels and 4% (n=11) for those with normal values (unadjusted odds ratio (OR) 2.86, 95% CI=1.42-5.74). After multivariate adjustment, the association between low serum albumin and mortality remained large and statistically significant (adjusted OR=2.44, 95% confidence interval (CI)=1.17-5.12). Low albumin levels were also significantly associated with post-operative medical complications (adjusted OR=1.96, 95% CI=1.36-2.83). We conclude that routine measurement of serum albumin provides valuable prognostic information for treating this frail population	Supports the conclusion that patients with low serum albumin and hip fracture are at increased risk for postoperative complications.

27	II / A	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		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.
28	II / A	Dementia	van Dortmont LM, Douw CM, van Breukelen AM, Laurens DR, Mulder PG, Wereldsma JC, van Vugt AB. Outcome after hemi-arthroplasty for displaced intracapsular femoral neck fracture related to mental state. Injury. 2000 Jun;31(5):327-31.	2/B		This study was performed to assess mortality and functional outcome after hemi-arthroplasty for displaced intracapsular femoral neck fractures in relation to mental state. Between 1991 and 1995, 202 consecutive patients over 70 years of age were followed for at least two years or until death. Thirty-nine patients were known with senile dementia at the time of admission. The four-month mortality rate was 11.7% for the mentally normal patients and 33.3% for the mentally impaired patients. After one year the mortality rate was 19. 6% for the mentally normal patients and 43.6% for the mentally impaired patients. This difference is statistically significant (p<0. 001). Of the 141 surviving mentally normal patients, who had been mobile before operation, 16 (11.3%) were not mobile four months after operation. Of the 24 surviving mentally impaired patients, who had been mobile before operation, 18 (75.0%) were not mobile four months after operation. This difference is statistically significant (p<0.001). The conclusion of our study is that mental state has a statistically significant effect on mortality and functional outcome after hemi-arthroplasty for displaced intracapsular femoral neck fractures. For demented patients, hemi-arthrplasty is a too major operation and less invasive methods of internal fixation should be considered.	Supports the conclusion that patients with dementia have worse outcomes following orthopedic surgery.
29	II / A	Pre-operative Exam; 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, not uncomplicated joint replacement.
30	II / A	Obesity & Surgical Complications	Kerkhoffs GM, Servien E, Dunn W, Dahm D, Bramer JA, Haverkamp D. The influence of obesity on the complication rate and outcome of total knee arthroplasty: a meta-analysis and systematic literature review. J Bone Joint Surg Am. 2012 Oct 17;94(20):1839-44. PMID: 23079875	2/B	http://jbjs.org/article.aspx?articleid=1372941	BACKGROUND: The increase in the number of individuals with an unhealthy high body weight is particularly relevant in the United States. Obesity (body mass index ≥ 30 kg/m2) is a well-documented risk factor for the development of osteoarthritis. Furthermore, an increased prevalence of total knee arthroplasty in obese individuals has been observed in the last decades. The primary aim of this systematic literature review was to determine whether obesity has a negative influence on outcome after primary total knee arthroplasty. METHODS: A search of the literature was performed, and studies comparing the outcome of total knee arthroplasty in different weight groups were included. The methodology of the included studies was scored according to the Cochrane guidelines. Data extraction and pooling were performed. The weighted mean difference for continuous data and the weighted odds ratio for dichotomous variables were calculated. Heterogeneity was calculated with use of the I2 statistic. RESULTS: After consensus was reached, twenty studies were included in the data analysis. The presence of any infection was reported in fourteen studies including 15,276 patients (I2, 26%). Overall, infection occurred more often in obese patients, with an odds ratio of 1.90 (95% confidence interval [CI], 1.46 to 2.47). Deep infection requiring surgical debridement was reported in nine studies including 5061 patients (I2, 0%). Deep infection occurred more often in obese patients, with an odds ratio of 2.38 (95% CI, 1.28 to 4.55). Revision of the total knee arthroplasty, defined as exchange or removal of the components for any reason, was documented in eleven studies including 12,101 patients (I2, 25%). Revision for any reason occurred more often in obese patients, with an odds ratio of 1.30 (95% CI, 1.02 to 1.67). CONCLUSIONS: Obesity had a negative influence on outcome after total knee arthroplasty.	Well-done systematic review of mixed quality prognosis studies. Supports the conclusion that obesity has a negative influence on outcomes following total knee replacement.

31	II / A	Obesity & Surgical Complications	Haverkamp D, Klinkenbijl MN, Somford MP, Albers GH, van der Vis HM. Obesity in total hip arthroplasty--does it really matter? A meta-analysis. Acta Orthop. 2011 Aug;82(4):417-22. PMID: 21657972	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3237030/pdf/ORT-1745-3674-82-417.pdf	BACKGROUND AND PURPOSE: Discussion persists as to whether obesity negatively influences the outcome of hip arthroplasty. We performed a meta-analysis with the primary research question of whether obesity has a negative effect on short- and long-term outcome of total hip arthroplasty. METHODS: We searched the literature and included studies comparing the outcome of hip arthroplasty in different weight groups. The methodology of the studies included was scored according to the Cochrane guidelines. We extracted and pooled the data. For continuous data, we calculated a weighted mean difference and for dichotomous variables we calculated a weighted odds ratio (OR). Heterogeneity was calculated using I(2) statistics. RESULTS: 15 studies were eligible for data extraction. In obese patients, dislocation of the hip (OR = 0.54, 95% CI: 0.38-0.75) (10 studies, n = 8,634), aseptic loosening (OR = 0.64, CI: 0.43-0.96) (6 studies, n = 5,137), infection (OR = 0.3, CI: 0.19-0.49) (10 studies, n = 7,500), and venous thromboembolism (OR = 0.56, CI: 0.32-0.98) (7 studies, n = 3,716) occurred more often. Concerning septic loosening and intraoperative fractures, no statistically significant differences were found, possibly due to low power. Subjective outcome measurements did not allow pooling because of high heterogeneity (I(2) = 68%). INTERPRETATION: Obesity appears to have a negative influence on the outcome of total hip replacement.	Lower quality than Kirkoffs citation, but still fits criteria for Tier-2 study. Supports conclusion that obesity has a negative influence on outcome of total hip replacement.
32	II / A	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	Study of elderly patients treated in hospital or acute care setting for medical or surgical conditions supports the conclusion that delerium is associated with poor outcomes..
33	II / A	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.

34	II / A	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.	Supports value of preoperative glycemic control in surgical patients. Note: 13% of patients were orthopaedic and cohort includes only male patients.
35	II / A	Glycemic Control	Marchant MH Jr, Viens NA, Cook C, Vail TP, Bolognesi MP. The impact of glycemic control and diabetes mellitus on perioperative outcomes after total joint arthroplasty. J Bone Joint Surg Am. 2009 Jul; 91(7): 1621-9. PMID: 19571084	2/B	http://jbjs.org/data/Journals/JBJS/962/1621.pdf	BACKGROUND: As the prevalence of diabetes mellitus in people over the age of sixty years is expected to increase, the number of diabetic patients who undergo total hip and knee arthroplasty should be expected to increase accordingly. In general, patients with diabetes are at increased risk for adverse events following arthroplasty. The goal of the present study was to determine whether the quality of preoperative glycemic control affected the prevalence of in-hospital peri-operative complications following lower extremity total joint arthroplasty. METHODS: From 1988 to 2005, the Nationwide Inpatient Sample recorded over 1 million patients who underwent joint replacement surgery. The present retrospective study compared patients with uncontrolled diabetes mellitus (n = 3973), those with controlled diabetes mellitus (n = 105,485), and those without diabetes mellitus (n = 920,555) with regard to common surgical and systemic complications, mortality, and hospital course alterations. Additional stratification compared the effects of glucose control among patients with Type-I and Type-II diabetes. Glycemic control was determined by physician assessments on the basis of the American Diabetes Association guidelines with use of a combination of patient self-monitoring of blood-glucose levels, the hemoglobin A1c level, and related comorbidities. RESULTS: Compared with patients with controlled diabetes mellitus, patients with uncontrolled diabetes mellitus had a significantly increased odds of stroke (adjusted odds ratio = 3.42; 95% confidence interval = 1.87 to 6.25; p < 0.001), urinary tract infection (adjusted odds ratio = 1.97; 95% confidence interval = 1.61 to 2.42; p < 0.001), ileus (adjusted odds ratio = 2.47; 95% confidence interval = 1.67 to 3.64; p < 0.001), postoperative hemorrhage (adjusted odds ratio = 1.99; 95% confidence interval = 1.38 to 2.87; p < 0.001), transfusion (adjusted odds ratio = 1.19; 95% confidence interval = 1.04 to 1.36; p = 0.011), wound infection (adjusted odds ratio = 2.28; 95% confidence interval = 1.36 to 3.81; p = 0.002), and death (adjusted odds ratio = 3.23; 95% confidence interval = 1.87 to 5.57; p < 0.001). Patients with uncontrolled diabetes mellitus had a significantly increased length of stay (almost a full day) as compared with patients with controlled diabetes (p < 0.0001). All patients with diabetes had significantly increased inflation-adjusted postoperative charges when compared with nondiabetic patients (p < 0.0001). CONCLUSIONS: Regardless of diabetes type, patients with uncontrolled diabetes mellitus exhibited significantly increased odds of surgical and systemic complications, higher mortality, and increased length of stay during the index hospitalization following lower extremity total joint arthroplasty.	Supports value of glycemic control in surgical patients. Note: level of diabetes control judged on basis of provider coding without correlation with blood sugar or A1C levels.
36	II / A	Fitness for Surgery; Opioids	Washington State Department of Labor & 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	Washington State agency guideline.	See pages 11-12 for discussion of peri-operative care for patients on chronic opioid therapy. Includes references without noting evidence grade.
37	II / A	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.

38	II / A	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 complication, RR 0.99 (95%CI 0.70 to 1.40) for wound complications). AUTHORS' CONCLUSIONS: There is evidence that preoperative smoking interventions including NRT increase short-term smoking cessation and may reduce postoperative morbidity. The optimal preoperative intervention intensity remains unknown. Based on indirect comparison s and evidence from two small trials, interventions that begin four to eight weeks before surgery, include weekly counselling, and use NRT are more likely to have an impact on complications and on long-term smoking	Supports the value of smoking interventions to reduce post-operative morbidity.
39	II / A	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.	Supports the conclusion that smoking cessation prior to surgery reduces postoperative complications if smoking discontinued as late as four weeks prior to surgery.
40	II / A	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.

41	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.	Supports use of shared decision-making to avoid surgery that the patient with otherwise not choose.
42	II / B / 2	Care partner					*Relevant citation unidentified as of 10/28/2013. Concensus supports recommendation of identifying a care partner.*
43	II / B / 3	Patient Education Pre-Surgery	Yoon RS, Nellans KW, Geller JA, Kim AD, Jacobs MR, Macaulay W. Patient education before hip or knee arthroplasty lowers length of stay. J Arthroplasty. 2010 Jun;25(4):547-51. PMID: 19427164	2 / B		From April 2006 to May 2007, 261 patients undergoing primary unilateral total hip arthroplasty or total knee arthroplasty were offered voluntary participation in a one-on-one preoperative educational program. Length of stay (LOS) and inpatient data were monitored and recorded, prospectively. Education participants enjoyed a significantly shorter LOS than nonparticipants for both total hip arthroplasty (3.1 +/- 0.8 days vs 3.9 +/- 1.4 days; P = .0001) and total knee arthroplasty (3.1 +/- 0.9 days vs 4.1 +/- 1.9 days; P = .001).	Supports pre-operative education for patients undergoing total knee or total hip replacement surgery. Unblinded, uncontrolled study.
44	II / B / 4	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.
45	II / C / 1	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	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 discussing preoperative evaluation.

46	II / C / 1	Nasal culture	Kim DH. Et.al. Institutional prescreening for detection and eradication of Methicillin-Resistant Staphylococcus aureus in patients undergoing elective orthopaedic surgery. J Bone Joint Surg Am 2010 Aug 4; 92(9): 1820-6. PMID: 20610773	2/B	http://jbjs.org/data/Journals/JBJS/190/1820.pdf	BACKGROUND: Surgical site infection has been identified as one of the most important preventable sources of morbidity and mortality associated with medical treatment. The purpose of the present study was to evaluate the feasibility and efficacy of an institutional prescreening program for the preoperative detection and eradication of both methicillin-resistant and methicillin-sensitive Staphylococcus aureus in patients undergoing elective orthopaedic surgery. METHODS: Data were collected prospectively during a single-center study. A universal prescreening program, employing rapid polymerase chain reaction analysis of nasal swabs followed by an eradication protocol of intranasal mupirocin and chlorhexidine showers for identified carriers, was implemented. Surgical site infection rates were calculated and compared with a historical control period immediately preceding the start of the screening program. RESULTS: During the study period, 7019 of 7338 patients underwent preoperative screening before elective surgery, for a successful screening rate of 95.7%. One thousand five hundred and eighty-eight (22.6%) of the patients were identified as Staphylococcus aureus carriers, and 309 (4.4%) were identified as methicillin-resistant Staphylococcus aureus carriers. A significantly higher rate of surgical site infection was observed among methicillin-resistant Staphylococcus aureus carriers (0.97%; three of 309) compared with noncarriers (0.14%; seven of 5122) (p = 0.0162). Although a higher rate of surgical site infection was also observed among methicillin-sensitive Staphylococcus aureus carriers (0.19%; three of 1588) compared with noncarriers, this difference did not achieve significance (p = 0.709). Overall, thirteen cases of surgical site infection were identified during the study period, for an institutional infection rate of 0.19%. This rate was significantly lower than that observed during the control period (0.45%; twenty-four cases of surgical site infection among 5293 patients) (p = 0.0093). CONCLUSIONS: Implementation of an institution-wide prescreening program for the identification and eradication of methicillin-resistant and methicillin-sensitive Staphylococcus aureus carrier status among patients undergoing elective orthopaedic surgery is feasible and can lead to significant reductions in postoperative rates of surgical site infection. LEVEL OF EVIDENCE: Therapeutic Level III. See Instructions to Authors for a complete description of levels of evidence.	Supports the use of pre-operative screening and eradication of carrier state for Staphylococcal aureus prior to elective orthopedic surgery. Note: cannot determine drop-out rate in control or experimental group.
47	II / C / 1	Nasal culture	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.	Supports treatment of patients with Staphylococcus aureus diagnosed by nasal swab PCR assay to reduce incidence of surgical site infections.
48	II / C / 1	Reducing nasal colonization; Reducing skin 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.	Supports the use of mupirocin nasal swabs and chlorhexidine bath to reduce surgical site infections after total joint surgery.

49	II / C / 1	Autologous Blood Donation	Hatzidakis AM, Medlick RM, McKillip T, Reddy RL, Garvin KL. Preoperative autologous donation for total joint arthroplasty. An analysis of risk factors for allogenic transfusion. J Bone Joint Surg, 2000 Jan; 82(1): 89-100. PMID: 10653088	2/B	http://jbjs.org/data/Journals/JBJS/799/JBJA0820100890.pdf	BACKGROUND: While autologous blood is commonly predonated to provide replacement of blood lost in orthopaedic procedures, few studies of patients managed with total joint replacement have addressed the problem of which patients are likely to benefit from an autologous blood-donation program. METHODS: A retrospective analysis of 489 consecutive patients who had had a total joint arthroplasty was performed to identify the risk factors for allogenic transfusion and to further define the indications for preoperative autologous blood donation. The operations included 247 total knee replacements (157 unilateral primary, thirty-two revision, and twenty-nine one-stage bilateral primary procedures) and 271 total hip replacements (163 primary and 108 revision procedures). Fifty-four percent (264) of the 489 patients donated a total of 527 units of blood (average, 2.0 units per patient) preoperatively. RESULTS: One hundred and ninety-one patients (39 percent) required a transfusion of autologous blood or allogenic blood, or both. One hundred and thirty-one patients (27 percent) received autologous blood, and eighty-two patients (17 percent) received a transfusion of allogenic blood; twenty-two patients (4 percent) received both autologous and allogenic blood. Neither form of transfusion caused serious complications. Fifty-six percent (295) of the 527 units of autologous blood were discarded. Autologous donation significantly decreased the requirements for allogenic transfusion (relative risk, 0.1; p<0.0001). It also caused the level of hemoglobin to decrease an average of 12.2 grams per liter from the time before donation to the time before the operation (p<0.0001). Factors that increased the risk for allogenic transfusion were a revision knee or hip procedure or a one-stage bilateral primary knee replacement (relative risk, 5.7; p<0.0001), an initial hemoglobin level of less than 130 grams per liter (relative risk, 5.6; p<0.0001), and an age of sixty-five years or older (relative risk, 2.8; p = 0.02). None of the sixty-seven patients who had a primary knee or hip arthroplasty and an initial hemoglobin level of 150 grams per liter or more required an allogenic transfusion. In addition, none of the sixty-three patients who had a primary arthroplasty, an initial hemoglobin level of between 130 and less than 150 grams per liter, and an age of less than sixty-five years required an allogenic transfusion. Eighty-three percent (115) of the 138 autologous units donated by the seventy patients in these two groups were discarded. These wasted units accounted for 39 percent of the 295 discarded units for the entire study sample. CONCLUSIONS: The efficiency of collection of autologous blood can be improved by identifying patients who have a very low risk of transfusion according to the type of arthroplasty, the initial level of hemoglobin, and age. Patients who have an initial hemoglobin level of at least 150 grams per liter or an initial hemoglobin level of between 130 and 150 grams per liter and an age of less than sixty-five years have a minimal risk of needing a transfusion during or after a primary total joint replacement. These patients should be apprised of their low risk so that they can make an informed decision regarding preoperative autologous donation	Does not support universal pre-operative autologous blood donation for patients undergoing total knee or hip arthroplasty.
50	II / C / 1	Autologous Blood Donation	Bong MR, Patel V, Chang E, Issack PS, Hebert R, Di Cesare PE. Risks associated with blood transfusion after total knee arthroplasty. J Arthroplasty. 2004 Apr;19(3):281-7. PMID: 15067638	2/B		A retrospective study of 1,402 patients who underwent primary total knee arthroplasty (TKA) (1,194 unilateral, 208 bilateral) was performed. The strongest predictors for allogenic transfusion after surgery were advancing age (P<.001), low preoperative hemoglobin (P<.001), and the use of low-molecular-weight heparin postoperatively (P<.01). Pre-donation of 1 unit of autologous blood before TKA decreased the allogenic transfusion rate from a baseline of 38% to 11%, whereas pre-donating 2 units lowered the rate of breakthrough transfusion of allogenic blood to 7%. A patient with a preoperative hemoglobin >150 g/L or who is younger than age 65 with a preoperative hemoglobin >130 g/L may not benefit from pre-donation, and a high rate of wastage may result.	Does not support universal pre-operative autologous blood donation for patients undergoing total knee or hip arthroplasty.
51	II / C / 2	Dental screening	AAOS. Prevention of orthopaedic implant infection in patients undergoing dental procedures. Evidence-based guideline and evidence report. 2012	VM Tier-2 Evidence	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.	Does not address issue of pre-operative dental screening, but recommends good dental hygiene in patients with joint implants.
52	II / C / 3	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.	Validates the PROMIS tool to measure patient-related outcomes. Test cohort reflected demographics proportional to US population, not individual aubsets of population.
Cycle 3: Surgical Repair of the Osteoarthritic Joint							

53	III / A / 1	Surgeon volume	Lau RL, Perruccio AV, Gandhi R, Mahomed NN. The role of surgon volume on patient outcome in total knee arthroplasty: a systematic review of the literature. BMC Musculoskeletal Dis, 2012 Dec 14; 13(): 250.	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3534547/pdf/1471-2474-13-250.pdf	BACKGROUND: A number of factors have been identified as influencing total knee arthroplasty outcomes, including patient factors such as gender and medical comorbidity, technical factors such as alignment of the prosthesis, and provider factors such as hospital and surgeon procedure volumes. Recently, strategies aimed at optimizing provider factors have been proposed, including regionalization of total joint arthroplasty to higher volume centers, and adoption of volume standards. To contribute to the discussions concerning the optimization of provider factors and proposals to regionalize total knee arthroplasty practices, we undertook a systematic review to investigate the association between surgeon volume and primary total knee arthroplasty outcomes. METHODS: We performed a systematic review examining the association between surgeon volume and primary knee arthroplasty outcomes. To be included in the review, the study population had to include patients undergoing primary total knee arthroplasty. Studies had to report on the association between surgeon volume and primary total knee arthroplasty outcomes, including perioperative mortality and morbidity, patient-reported outcomes, or total knee arthroplasty implant survivorship. There were no restrictions placed on study design or language. RESULTS: Studies were variable in defining surgeon volume ('low': <3 to <52 total knee arthroplasty per year; 'high': >5 to >70 total knee arthroplasty per year). Mortality rate, survivorship and thromboembolic events were not found to be associated with surgeon volume. We found a significant association between low surgeon volume and higher rate of infection (0.26% - 2.8% higher), procedure time (165 min versus 135 min), longer length of stay (0.4 - 2.13 days longer), transfusion rate (13% versus 4%), and worse patient reported outcomes. CONCLUSIONS: Findings suggest a trend towards better outcomes for higher volume surgeons, but results must be interpreted with caution.	Systematic review, lower quality but with patient-oriented outcomers. Suggests better outcomes for higher volume surgeons, but results must be interpreted with caution.
54	III / A / 1	Surgeon volume	Baker P, Jameson S, Critchley R, Reed M, Gregg P, Deehan D. Center and surgeon volume influence the revision rate following unicondylar knee replacement: an analysis of 23,400 medial cemented unicondylar knee replacements. J Bone Joint Surg Am. 2013 Apr 17;95(8):702-9. PMID: 23595068	2/B	http://jbjs.org/pdfaccess.ashx?ResourceID=5456518&PDFSource=19	BACKGROUND: Revision rates following unicondylar knee replacement vary among reporting institutions. Revision rates from institutions involved in the design of these implants and independent single-center series are comparable with those following total knee replacement, suggesting that higher operative volumes and surgical enthusiasm improve revision outcomes. METHODS: This registry-based cohort study involved the analysis of 23,400 medial cemented Oxford unicondylar knee replacements for the treatment of osteoarthritis. Total center and surgeon operative volumes were calculated over an eight-year time span since the inception of the registry (April 2003 to December 2010). The revision rate was calculated according to center volume and surgeon volume, each of which was grouped into five categories. The groups were compared with use of life tables, Kaplan-Meier plots, and Cox regression models that adjusted for variations in age, sex, and American Society of Anesthesiologists (ASA) grade among the groups. RESULTS: A total of 919 surgeons and a total of 366 centers performed at least one replacement, with the majority performing a small number of procedures. The revision rate for the centers with the lowest volume (fifty or fewer procedures over the eight-year study period) was 1.62 (95% confidence interval [CI], 1.42 to 1.82) revisions per 100 component years; this was significantly higher than the rate for the centers with the highest volume (more than 400 procedures), which was 1.16 (95% CI, 0.97 to 1.36) revisions per 100 component years. The five-year implant survival rate of 92.3% (95% CI, 91.2% to 93.3%) for the lowest-volume centers was significantly lower than the rate of 94.1% (95% CI, 93.0% to 95.2%) for the highest-volume centers. Similarly, the revision rate for the surgeons with the lowest volume (twenty-five or fewer procedures), 2.16 (95% CI, 1.91 to 2.41) revisions per 100 component years, was significantly higher than that for the surgeons with the highest volume (more than 200 procedures), 0.80 (95% CI, 0.62 to 0.98) revisions per 100 component years. The five-year survival rate of 90.1% (95% CI, 88.8% to 91.3%) for the lowest-volume surgeons was also significantly lower than the rate of 96.0% (95% CI, 95.0% to 97.0%) for the highest-volume surgeons. When center and surgeon volume were considered simultaneously, the hazard of revision was greater for lower-volume surgeons at lower-volume centers compared with higher-volume surgeons at higher-volume centers (hazard ratio = 1.87 [95% CI, 1.58 to 2.22], p < 0.001). CONCLUSIONS: High-volume centers and surgeons specializing in such procedures had superior results following unicondylar knee replacement compared with their low-volume counterparts. These results suggest that centers and surgeons should undertake a minimum of thirteen such procedures per year to achieve results comparable with the high-volume operators.	Cohort is unicondylar knee surgery patients. Supports association between higher volumes by surgeon and lower revision rates. Does not deal statistically with standard of fifty cases per year compared with less than fifty cases per year.
55	III / A / 3	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.	Supports starting surgeries during "business hours" rather than after-hours to reduce risk of complications. Note: does not deal with orthopedic surgery; cohort comprised of general and cardiovascular surgery in VA System.

56	III / A / 3	Time of surgery start	Peskun C, Walmsley D, Waddell J, Schemitsch E. Effect of surgeon fatigue on hip and knee arthroplasty. Can J Surg, 2012 Apr; 55(2): 81-6. PMID: 22269219	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3310761/pdf/0550081.pdf	BACKGROUND: There is growing support in the literature that patient outcomes are adversely affected by physician fatigue in operator-dependent cognitive and technical tasks. Recent increases in total joint arthroplasty caseloads have resulted in longer operative days and increased surgeon fatigue. We sought to determine if time of day predicts perioperative complications and outcomes in total joint arthroplasty. METHODS: The records of all total hip and knee arthroplasties (THA; TKA) performed for primary osteoarthritis in one calendar year at one large university hospital were retrospectively reviewed. Demographic data, surgery start time and duration, intraoperative complications, radiographic component alignment and functional outcome scores (SF-12 and Western Ontario and McMaster Universities Osteoarthritis Index) were collected and analyzed using linear and nonparametric rank correlation statistics. Data were corrected for sex, body mass index, surgeon and postcall operating days. RESULTS: In the THA cohort (n=341), a later surgery start time was significantly related to duration of surgery (p= 0.004, mean difference -7.1 min). There was a trend toward significance between a later surgery start time and intraoperative femur fracture (p= 0.05). Postoperative complications, component alignment and functional outcome scores were not significantly affected by surgery start time. There were no significant findings for any of the intraoperative or postoperative outcomes in the TKA cohort (n=292). CONCLUSION: Duration of surgery and incidence of intraoperative complications for THA may increase with later surgery start time; however, the relatively small statistical differences observed imply that they likely are not clinically significant.	Retrospective cohort study of prognosis; duration of surgery as patient-oriented outcome. Supports avoiding late surgical start times, but small statistical differences imply results are lilkely not clinically significant.
57	III / B / 1	Documentation of Disability; Opioids	Nüesch E, Rutjes AW, Husni E, Welch V, Jüni P. Oral or transdermal opioids for osteoarthritis of the knee or hip. Cochrane Database Syst Rev. 2009 Oct 7;(4):CD003115. PMID: 19821302	1/A	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00075320-100000000-02036&LSLINK=450&D=coch	Abstract -- BACKGROUND: Osteoarthritis is the most common form of joint disease and the leading cause of pain and physical disability in the elderly. Opioids may be a viable treatment option if patients suffer from severe pain or if other analgesics are contraindicated. However, the evidence about their effectiveness and safety is contradictory. OBJECTIVES: To determine the effects on pain and function and the safety of oral or transdermal opioids as compared with placebo or no intervention in patients with osteoarthritis of the hip or knee. SEARCH STRATEGY: We searched CENTRAL, MEDLINE, EMBASE, and CINAHL (up to 28 July 2008), checked conference proceedings, reference lists, and contacted authors. SELECTION CRITERIA: Studies were included if they were randomised or quasi-randomised controlled trials that compared oral or transdermal opioids with placebo or no treatment in patients with osteoarthritis of the knee or hip. Studies of tramadol were excluded. No language restrictions were applied. DATA COLLECTION AND ANALYSIS: We extracted data in duplicate. Standardised mean differences (SMDs) and 95% confidence intervals (CI) were calculated for pain and function, and risk ratios for safety outcomes. Trials were combined using inverse-variance random-effects meta-analysis. MAIN RESULTS: Ten trials with 2268 participants were included. Oral codeine was studied in three trials, transdermal fentanyl and oral morphine in one trial each, oral oxycodone in four, and oral oxymorphone in two trials. Overall, opioids were more effective than control interventions in terms of pain relief (SMD -0.36, 95% CI -0.47 to -0.26) and improvement of function (SMD -0.33, 95% CI -0.45 to -0.21). We did not find substantial differences in effects according to type of opioid, analgesic potency (strong or weak), daily dose, duration of treatment or follow up, methodological quality of trials, and type of funding. Adverse events were more frequent in patients receiving opioids compared to control. The pooled risk ratio was 1.55 (95% CI 1.41 to 1.70) for any adverse event (4 trials), 4.05 (95% CI 3.06 to 5.38) for dropouts due to adverse events (10 trials), and 3.35 (95% CI 0.83 to 13.56) for serious adverse events (2 trials). Withdrawal symptoms were more severe after fentanyl treatment compared to placebo (SMD 0.60, 95% CI 0.42 to 0.79; 1 trial). AUTHORS' CONCLUSIONS: The small to moderate beneficial effects of non-tramadol opioids are outweighed by large increases in the risk of adverse events. Non-tramadol opioids should therefore not be routinely used, even if osteoarthritic pain is severe.	Evaluates use of opioids and recommends against routine use.
58	III / B / 1	Nerve Block	Jenstrup MT. Jaeger P. Lund J. Fomsgaard JS. Bache S. Mathiesen O. Larsen TK. Dahl JB. Effects of adductor-canal-blockade on pain and ambulation after total knee arthroplasty: a randomized study. Acta Anaesthesiologica Scandinavica. 56(3):357-64, 2012 Mar. PMID: 22221014	2/B	http://onlinelibrary.wiley.com/doi/10.1111/j.1399-6576.2011.02621.x/pdf	AB BACKGROUND: Total knee arthroplasty (TKA) is associated with intense post-operative pain. Besides providing optimal analgesia, reduction in side effects and enhanced mobilization are important in this elderly population. The adductor-canal-blockade is theoretically an almost pure sensory blockade. We hypothesized that the adductor-canal-blockade may reduce morphine consumption (primary endpoint), improve pain relief, enhance early ambulation ability, and reduce side effects (secondary endpoints) after TKA compared with placebo. METHODS: Patients aged 50-85 years scheduled for TKA were included in this parallel double-blind, placebo-controlled randomized trial. The patients were allocated to receive a continuous adductor-canal-blockade with intermittent boluses via a catheter with either ropivacaine 0.75% (n=34) or placebo (n=37) (http://www.clinicaltrials.gov Identifier: NCT01104883). RESULTS: Seventy-five patients were randomized in a 1:1 ratio and 71 patients were analyzed. Morphine consumption from 0 to 24h was significantly reduced in the ropivacaine group compared with the placebo group (40+/-21 vs. 56+/-26mg, P=0.006). Pain was significantly reduced in the ropivacaine group during 45 degrees flexion of the knee (P=0.01), but not at rest (P=0.06). Patients in the ropivacaine group performed the ambulation test, the Timed-Up-and-Go (TUG) test, at 24h significantly faster than patients in the placebo group (36+/-17 vs. 50+/-29s, P=0.03). CONCLUSION: The adductor-canal-blockade significantly reduced morphine consumption and pain during 45 degrees flexion of the knee compared with placebo. In addition, the adductor-canal-blockade significantly enhanced ambulation ability assessed by the TUG test	Supports the use of adductor nerve block to improve post-operative mobilization.

59	III / B / 1	Nerve Block	Andersen, Henning Lykke MD; Gyrn, Jens MD; Moller, Lars MD; Christensen, Bodil RN; Zaric, Dusanka MD, PhD. Continuous Saphenous Nerve Block as Supplement to Single-Dose Local Infiltration Analgesia for Postoperative Pain Management After Total Knee Arthroplasty. Regional Anesthesia & Pain Medicine, 2013 Mar/Apr; 38(2):106-111. PMID: 23222363	2/B	http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&AN=00115550-201303000-00005&D=ovft&PDF=y	AB Background and Objectives: Local infiltration analgesia (LIA) reduces pain after total knee arthroplasty without the motor blockade associated with epidural analgesia or femoral nerve block. However, the duration and efficacy of LIA are not sufficient. A saphenous nerve block, in addition to single-dose LIA, may improve analgesia without interfering with early mobilization. Methods: Forty patients were included in this double-blind randomized controlled trial. All patients received spinal anesthesia for surgery and single-dose LIA during the operation. An ultrasound-guided saphenous nerve catheter was placed postoperatively in the adductor canal at midthigh level. Patients were randomized into 2 groups to receive 15-mL boluses of either ropivacaine 7.5 mg/mL or saline twice daily for 2 postoperative days. Results: Worst pain scores during movement on the day of surgery were significantly lower in the ropivacaine group (median [range] visual analog scale, 3 [0-7] vs 5.5 [0-10]; P < 0.050), as well as pain at rest (visual analog scale, 2 [0-8] vs 4 [0-8]; P = 0.032). Breakthrough pain occurred later in the ropivacaine group (10.5 [range, 0.5-48] hours vs 3.4 [range, 0.5-24] hours; P = 0.011). All patients in the ropivacaine group were able to ambulate on the day of surgery versus 13 patients in the control group (P = 0.004). Fewer patients had sleep disturbance on the first postoperative night in the ropivacaine group (P = 0.038). We found no differences in morphine consumption. Conclusions: The combination of a saphenous nerve block with single-dose LIA offered better pain relief on the day of surgery than LIA alone. (C)2013 American Society of Regional Anesthesia and Pain Medicine.	Supports use of saphenous nerve block to reduce pain without interfering with early mobilization. Single trial, reasonably well-done, but small sample size, same as for Jenstrup article.
60	III / B / 2	Reducing skin colonization; Chlorhexidine	Zywiel MG. Daley JA. Delanois RE. Naziri Q. Johnson AJ. Mont MA. Advance pre-operative chlorhexidine reduces the incidence of surgical site infections in knee arthroplasty. International Orthopaedics. 35(7):1001-6, 2011 Jul. PMID: 20563806	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3167398/pdf/264_2010_Article_1078.pdf	AB Surgical site infections following elective knee arthroplasties occur most commonly as a result of colonisation by the patient's native skin flora. The purpose of this study was to evaluate the incidence of deep surgical site infections in knee arthroplasty patients who used an advance cutaneous disinfection protocol and who were compared to patients who had peri-operative preparation only. All adult reconstruction surgeons at a single institution were approached to voluntarily provide patients with chlorhexidine gluconate-impregnated cloths and a printed sheet instructing their use the night before and morning of surgery. Records for all knee arthroplasties performed between January 2007 and December 2008 were reviewed to determine the incidence of deep incisional and periprosthetic surgical site infections. Overall, the advance pre-operative protocol was used in 136 of 912 total knee arthroplasties (15%). A lower incidence of surgical site infection was found in patients who used the advance cutaneous preparation protocol as compared to patients who used the in-hospital protocol alone. These findings were maintained when patients were stratified by surgical infection risk category. No surgical site infections occurred in the 136 patients who completed the protocol as compared to 21 infections in 711 procedures (3.0%) performed in patients who did not. Patient-directed skin disinfection using chlorhexidine gluconate-impregnated cloths the evening before, and the morning of, elective knee arthroplasty appeared to effectively reduce the incidence of surgical site infection when compared to patients who underwent in-hospital skin preparation only.	Supports evidence that chlorhexidine night before and morning of surgery can lower infection risk. Note: lack of double-blinded methodology.
61		Perioperative antibiotics	Parvizi J, Gehrke T. Proceedings of the International Consensus Meeting on Perioprosthetic Joint Infection. International Consensus Group LLC, 2013. ISBN: 978-1-57400-147-1.	VM Tier-2 Evidence	http://datatrace.com/flipbooks/MPJI/#p=1	Executive Summary: Periprosthetic joint infection (PJI), with its disastrous implications, continues to challenge the orthopaedic community. Practicing orthopaedic surgeons continue to invest efforts to minimize surgical site infection (SSI). Although high-level evidence may support some of these practices, many are based on little to no scientific foundation. This results in wide variation across the globe for prevention and management of PJI. To address this, The International Consensus Meeting on Periprosthetic Joint Infection was organized. Delegates from disciplines including orthopaedic surgery, infectious disease, and many others participated.	International consensus document on prevention of prosthetic joint infection. Numerous references of variable quality.
62		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 Evidence	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.
63	III / B / 2	Perioperative antibiotics	Hill C, Mazas F, Flamant R, Evrard J. Prophylactic cefazolin versus placebo in total hip replacement: report of a multicentre double-blind randomised trial. Lancet, 1981 Apr 11; 317(8224): 795-7. PMID: 6111670	1/A		The effect of five days of antibiotic prophylaxis with cefazolin injections (beginning just before surgery) on postoperative infections (beginning just before surgery) on postoperative infectious complications was evaluated in a double-blind, randomised, placebo-controlled trial in nine centres on 2137 patients undergoing hip replacement. Antibiotic prophylaxis reduced the number of hip infections significantly from 3.3% (placebo) to 0.9% (cefazolin). Positive peroperative blood samples and positive bacteriological examination of the drain were risk factors for hip infection but the prognostic value of obesity, diabetes, or previous hip surgery was not confirmed. Development of a urinary infection was not related to hip infection. Hip infections were less common in the four centres with hypersterile operating theatres, and the benefits of prophylactic antibiotics were restricted to patients having hip replacement operations in conventional theatres.	Supports use of antibiotics to reduce post-operative infection. Note: hip infection was reduced with cefazolin administration to patients with surgery in standard operating rooms, but no difference seen with or without cefazolin when laminar flow used in operating rooms.
64	III / B / 2	Perioperative antibiotics	Pavel A, Smith RL, Ballard A, Larsen AJ. Prophylactic antibiotics in clean orthopaedic surgery. J Bone Joint Surg Am, 1974 June; 56(4): 777-82. PMID: 4600111	1/A		A double-blind prospective study involving 1,591 clean orthopaedic surgical procedures was performed to test the effectiveness of preoperative and intraoperative antibiotics in reducing the postoperative infection rate. The antibiotic and placebo groups were analyzed for factors known to predispose to infection. A decrease in the over-all postoperative infection rate from 5 per cent in the placebo group to 2.8 per cent in the antibiotic group was found.	Supports the use of pre-operative and intra-operative antibiotics in reducing the rate of post-opertive infection. Proportion of cohort with knee and hip replacement surgeries is not stated. Study includes pediatric patients. Older study.

65	III / B / 2	Laminar Hoods	Evans RP. Current concepts for clean air and total joint arthroplasty: laminar airflow and ultraviolet radiation: a systematic review. Clin Orthop Relat Res. 2011 Apr;469(4):945-53. PMID: 21161744	2/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3048268/pdf/11999_2010_Article_1688.pdf	BACKGROUND: With the trend toward pay-for-performance standards plus the increasing incidence and prevalence of periprosthetic joint infection (PJI), orthopaedic surgeons must reconsider all potential infection control measures. Both airborne and nonairborne bacterial contamination must be reduced in the operating room. QUESTIONS/PURPOSES: Analysis of airborne bacterial reduction technologies includes evaluation of (1) the effectiveness of laminar air flow (LAF) and ultraviolet light (UVL); (2) the financial and potential health costs of each; and (3) an examination of current national and international standards, and guidelines. METHODS: We systematically reviewed the literature from Ovid, PubMed (Medline), Cochrane DSR, ACP Journal Club, DARE, CCTR, CMR, HTA, NHSEED, CINAHLPLUS, and Google Scholar published until June 2010 focusing on ultraclean air, ultraviolet light, and laminar air. RESULTS: High-level data demonstrating substantial PJI reduction of any infection control method may not be feasible as a result of the relatively low rates of occurrence and the expense and difficulty of conducting a large enough study with adequate power. UVL has potentially unacceptable health costs and the Centers for Disease Control and Prevention (CDC) recommends against its use. European countries have standardized LAF and it is used by the majority of American joint surgeons. CONCLUSIONS: Both LAF and UVL reduce PJI. The absence of a high level of evidence from randomized trials is not proof of ineffectiveness. The historically high cost of LAF has decreased substantially. Only LAF has been standardized by several European countries. The CDC recommends further study of LAF but recommends UVL not be used secondary to documented potential health risks to personnel.	Supports use of laminar air flow at surgery. Note: systematic review of mostly lower quality trials but with patient-oriented outcomes.
66	III / B / 3	Tranexamic acid	Ho KM, Ismail H. Use of intravenous tranexamic acid to reduce allogeneic blood transfusion in total hip and knee arthroplasty: a meta-analysis. Anaesth Intens Care, 2003; 31(5): 529-37. PMID: 14601276.	1/A		Total hip or knee arthroplasty is associated with significant blood loss. Techniques such as the use of antifibrinolytics or desmopressin, or normovolaemic haemodilution have been used to reduce the need for allogeneic blood transfusion. Tranexamic acid has been used to reduce blood loss and transfusion requirement for total hip and knee arthroplasty, with variable results. This meta-analysis aims to evaluate whether intravenous tranexamic acid, when compared with placebo, reduces blood loss and transfusion requirement in total hip and knee joint replacement surgery and whether it might increase the risk of thromboembolic complications. The literature search was based on MEDLINE, EMBASE, Cochrane Controlled Trials Register, and information from the pharmaceutical company that produces tranexamic acid (Pharmacia-Upjohn). We identified 15 clinical trials and 12 were considered suitable for detailed data extraction. Tranexamic acid reduces the proportion of patients requiring allogeneic blood transfusion (OR 0.16, 95% CI: 0.09-0.26), total amount of blood loss (WMD 460 ml, 95% CI: 274-626 ml), and the total number of units of allogeneic blood transfused (WMD 0.85 unit, 95% CI: 0.36-1.33). Tranexamic acid does not increase the risk of thromboembolic complications such as deep vein thrombosis, pulmonary embolism, thrombotic cerebral vascular accident, or myocardial infarction (OR 0.98, 95% CI: 0.45-2.12). Intravenous tranexamic acid appears effective and safe in reducing allogeneic blood transfusion and blood loss in total hip and knee arthroplasty.	Supports use of tranexamic acid to decrease transfusions and blood loss without increasing thromboembolic complications.
67	III / B / 3	Tranexamic acid	Panchmatia JR, Chegini S, Lobban D, Shah G, Stapleton C, Smallman JM, Kucheria R. The routine use of tranexamic acid in hip and knee replacements. Bull NYU Hosp Joint Dis, 2012; 70(4): 246-9. PMID: 23267449	2/B	http://www.nyuhjdbulletin.org/Mod/Bulletin/V70N4/Docs/V70N4_6.pdf	PURPOSE: Our aim was to determine whether the administration of intravenous tranexamic acid is a safe and effective means of reducing blood loss associated with hip and knee replacement surgery. METHOD: Sequential cohort study analysing hemoglobin titers, transfusion rates, and the occurrence of venous thromboembolism in patients undergoing hip and knee replacements with and without the administration of tranexamic acid at the time of induction. Finally, a cost benefit analysis was performed. RESULTS: Two hundred and seventy-three patients were included in our study. We demonstrated that 1 gram of tranexamic acid administered intravenously at the time of induction significantly reduces operative blood loss and transfusion rates ($p < 0.05$). Moreover, the use of tranexamic acid reduces the costs associated with surgery. CONCLUSIONS: The administration of 1 gram of intravenous tranexamic acid is a safe and effective means of reducing operative blood loss and blood transfusion rates in patients undergoing hip and knee replacements.	Supports use of tranexamic acid to reduce surgical blood loss. Note: therapy cohort study with patient-oriented outcomes.

68	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 Evidence	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 knee or hip arthroplasty.
69	III / B / 4	Anticoagulation	Falck-Ytter Y, Francis CW, Johanson NA, Curley C, Dahl OE, Schulman S, Ortel TL, Pauker SG, Colwell CW Jr; American College of Chest Physicians. Prevention of VTE in orthopedic surgery patients: antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Chest. 2012 Feb;141(2 Suppl):e278S-325S. PMID: 22315265	VM Tier-2 Evidence	http://journal.publications.chestnet.org/issue.aspx?issueid=23443	BACKGROUND: VTE is a serious, but decreasing complication following major orthopedic surgery. This guideline focuses on optimal prophylaxis to reduce postoperative pulmonary embolism and DVT. METHODS: The methods of this guideline follow those described in Methodology for the Development of Antithrombotic Therapy and Prevention of Thrombosis Guidelines: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines in this supplement. RESULTS: In patients undergoing major orthopedic surgery, we recommend the use of one of the following rather than no antithrombotic prophylaxis: low-molecular-weight heparin; fondaparinux; dabigatran, apixaban, rivaroxaban (total hip arthroplasty or total knee arthroplasty but not hip fracture surgery); low-dose unfractionated heparin; adjusted-dose vitamin K antagonist; aspirin (all Grade 1B); or an intermittent pneumatic compression device (IPCD) (Grade 1C) for a minimum of 10 to 14 days. We suggest the use of low-molecular-weight heparin in preference to the other agents we have recommended as alternatives (Grade 2C/2B), and in patients receiving pharmacologic prophylaxis, we suggest adding an IPCD during the hospital stay (Grade 2C). We suggest extending thromboprophylaxis for up to 35 days (Grade 2B). In patients at increased bleeding risk, we suggest an IPCD or no prophylaxis (Grade 2C). In patients who decline injections, we recommend using apixaban or dabigatran (all Grade 1B). We suggest against using inferior vena cava filter placement for primary prevention in patients with contraindications to both pharmacologic and mechanical thromboprophylaxis (Grade 2C). We recommend against Doppler (or duplex) ultrasonography screening before hospital discharge (Grade 1B). For patients with isolated lower-extremity injuries requiring leg immobilization, we suggest no thromboprophylaxis (Grade 2B). For patients undergoing knee arthroscopy without a history of VTE, we suggest no thromboprophylaxis (Grade 2B). CONCLUSIONS: Optimal strategies for thromboprophylaxis after major orthopedic surgery include pharmacologic and mechanical approaches.	Supports the use of anticoagulants post-operatively.
70	III / B / 4	Anticoagulation	Prandoni P. et al. Prolonged thromboprophylaxis with oral anticoagulants after total hip arthroplasty: a prospective controlled randomized study. Arch Intern Med, 2002 Sep 23; 162(17): 1966-71. PMID: 12230419	2/B	http://archinte.jamanetwork.com/article.aspx?articleid=213079	BACKGROUND: The optimal duration of thromboprophylaxis after major orthopedic surgery is controversial. Although oral anticoagulants are still widely used for the prevention of venous thromboembolism after hip replacement, to our knowledge no study has assessed the benefit of prolonging anticoagulation beyond the hospital stay. METHODS: Consecutive patients who had received warfarin sodium prophylaxis after total hip arthroplasty were randomized to stop taking the drug at the time of hospital discharge or to continue taking it for 4 more weeks. The rate of symptomatic and asymptomatic venous thromboembolic events (as shown by compression ultrasonography of the proximal-vein system) occurring during the study period was compared between the 2 groups. The study was prematurely terminated after the inclusion of the first 360 patients because a statistically significant and clinically relevant superiority of extended over short-term thromboprophylaxis was observed. RESULTS: Objectively confirmed venous thromboembolic complications were recorded in 10 patients: 9 (5.1%) in the group of 176 control patients, and 1 (0.5%) in the group of 184 patients who continued the warfarin treatment. The absolute difference in the incidence of events was 4.57% (95% confidence interval [CI], 1.15-7.99). The relative risk of venous thromboembolism developing in control patients compared with patients assigned to extended thromboprophylaxis was 9.4 (95% CI, 1.2-73.5). The number needed to treat was 22. Major bleeding developed in 1 patient who was randomized to the extended prophylaxis group (0.5%; 95% CI, 0.02-3.0) compared with none in the control group. CONCLUSION: Extending prophylaxis with warfarin for a few more weeks beyond the hospital stay has the potential to considerably improve the outcome of patients who undergo hip arthroplasty.	Supports the use of post-operative anticoagulants. Note: relatively small study, n=360, included only total hip arthroplasty.

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 / C	Surgical implant registry	Paxton EW, Kiley ML, Love R, Barber TC, Funahashi TT, Inacio MC. Kaiser Permanente implant registries benefit patient safety, quality improvement, cost-effectiveness. Jt Comm J Qual Patient Saf. 2013 Jun;39(6):246-52. PMID: 23789161	2/B		BACKGROUND: In response to the increased volume, risk, and cost of medical devices, in 2001 Kaiser Permanente (KP) developed implant registries to enhance patient safety and quality, and to evaluate cost-effectiveness. METHODS: Using an integrated electronic health record system, administrative databases, and other institutional databases, orthopedic, cardiology, and vascular implant registries were developed in 2001, 2006, and 2011, respectively. These registries monitor patients, implants, clinical practices, and surgical outcomes for KP's 9 million members. Critical to registry success is surgeon leadership and engagement; each geographical region has a surgeon champion who provides feedback on registry initiatives and disseminates registry findings. RESULTS: The registries enhance patient safety by providing a variety of clinical decision tools such as risk calculators, quality reports, risk-adjusted medical center reports, summaries of surgeon data, and infection control reports to registry stakeholders. The registries are used to immediately identify patients with recalled devices, evaluate new and established device technology, and identify outlier implants. The registries contribute to cost-effectiveness initiatives through collaboration with sourcing and contracting groups and confirming adherence to device formulary guidelines. Research studies based on registry data have directly influenced clinical best practices. CONCLUSIONS: Registries are important tools to evaluate longitudinal device performance and safety, study the clinical indications for and outcomes of device implantation, respond promptly to recalls and advisories, and contribute to the overall high quality of care of our patients.	Illustrates general value of registry for implants, no specific implant data provided.
73	III / C	Surgical implant registry	Australian Orthopaedic Association National Joint Replacement Registry. Annual Report. Adelaide:AOA; 2012	2/B	https://aoanjrr.dmac.adelaide.edu.au/annual-reports-2012	"In 2011, the Registry reported for the first time on ten year outcomes for both hip and knee replacement. This year the Registry presents data on an increased number of prostheses combinations that have reached this milestone. At ten years, 44.0% of all primary total hip and 24.2% all primary total knee prostheses combinations have greater than 95% survivorship. An entirely new area of analysis for the Registry included in this Report examines the effect of the average number of procedures performed by a surgeon each year on the outcome of both primary total hip and primary total knee replacement. Four groups of surgeons were identified, surgeons averaging 10 or less procedures per year, more than ten but less than or equal to 25, more than 25 but less than or equal to 70 and more than 70. Comparing outcomes of the four groups demonstrated a relationship between the number of procedures a surgeon averages and the subsequent rate of revision. In general, the group of surgeons averaging more than 70 procedures per year have the best outcome. There is however, a complex interaction between the average number of procedures performed and the prostheses used."	Registry of the Australian Orthopaedic Association.
74	III / C	Surgical implant registry	National joint registry for England and Wales. 9th Annual Report. NJR Centre, Hertfordshire, UK; 2012.	2/B	http://www.njrcentre.org.uk/njrcentre/Portals/0/Documents/England/Reports/9th_annual_report/NJR%209th%20Annual%20Report%202012.pdf		National joint registry of England and Wales reports outcomes and revision rates, specifying major brands.
Cycle 4: Post-operative Care and Return to Function							
75	IV	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.

76	IV	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.	Supports the value of a systematic approach to discharge process to reduce aggregate hospital readmissions. Study cohort is general medicine patients.
77	IV / A / 1	Physical Therapy	Chandrasekaran S. Ariaretnam SK. Tsung J. Dickison D. Early mobilization after total knee replacement reduces the incidence of deep venous thrombosis. ANZ Journal of Surgery. 79(7-8):526-9, 2009 Jul. PMID: 19694660	2/B		Abstract: Both chemical and mechanical methods of prophylaxis have reduced the incidence of thromboembolic complications following total knee replacement (TKR). Only a few studies have shown that mobilization on the first post-operative day further reduces the incidence of thromboembolic phenomena. We conducted a prospective study to verify not only if early mobilization but also whether the distance mobilized on the first post-operative day after TKR reduced the incidence of thromboembolic complications. The incidence of deep venous thrombosis and pulmonary embolism were compared in 50 consecutive patients who underwent TKR from July 2006 following a change in the mobilization protocol with 50 consecutive patients who underwent TKR before the protocol was instigated. The mobilization protocol changed from strict bed rest the first post-operative day to mobilization on the first post-operative day. Mobilization was defined as sitting out of bed or walking for at least 15-30 min twice a day. The distance mobilized was accurately recorded by the physiotherapists. All patients underwent duplex scans of both lower limbs on the fourth post-operative day. There was a significant reduction in the incidence of thromboembolic complications in the mobilization group (seven in total) compared with the control group (16 in total) (P= 0.03). Furthermore, in the mobilization group the odds of developing a thromboemobloic complication was significantly reduced the greater the distance the patient mobilized (Chi-squared linear trend = 8.009, P= 0.0047). Early mobilization in the first 24 h after TKR is a cheap and effective way to reduce the incidence of post-operative deep venous thrombosis.	Supports the value of early mobilization following surgery to reduce post-operative deep venous thrombosis. Note: small number of patients and primary outcome was ultrasound findings of venous thrombosis.
78	IV / A / 1	Physical Therapy	den Hertog A. Gliesche K. Timm J. Muhlbauer B. Zebrowski S. Pathway-controlled fast-track rehabilitation after total knee arthroplasty: a randomized prospective clinical study evaluating the recovery pattern, drug consumption, and length of stay. Archives of Orthopaedic & Trauma Surgery. 132(8):1153-63, 2012 Aug. PMID: 22643801	1/B	http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3400756/pdf/402_2012_Article_1528.pdf	Abstract: PURPOSE: To investigate fast-track rehabilitation concept in terms of a measurable effect on the early recovery after total knee arthroplasty (TKA). METHODS: This was an open, randomized, prospective clinical study, comparing the fast-track rehabilitation--a pathway-controlled early recovery program (Joint Care())--with standard postoperative rehabilitation care, after TKA. Overall, 147 patients had TKA (N = 74 fast-track rehabilitation, N = 73 standard rehabilitation). The fast-track rehabilitation patients received a group therapy, early mobilization (same day as surgery) and 1:1 physiotherapy (2 h/day). Patient monitoring occurred over 3 months (1 pre- and 4 post-operative visits). The standard rehabilitation group received individual postoperative care according to the existing protocol, with 1:1 physiotherapy (1 h/day). The cumulative American Knee Society Score (AKSS) was the primary evaluation variable, used to detect changes in joint function and perception of pain. The secondary evaluation variables were WOMAC index score, analgesic drug consumption, length of stay (LOS), and safety. RESULTS: After TKA, patients in the fast-track rehabilitation group showed enhanced recovery compared with the standard rehabilitation group, as based on the differences between the groups for the cumulative AKSS (p = 0.0003), WOMAC index score (<0.0001), reduced intake of concomitant analgesic drugs, reduced LOS (6.75 vs. 13.20 days, p < 0001), and lower number of adverse events. CONCLUSION: For TKA, implementation of pathway-controlled fast-track rehabilitation is achievable and beneficial as based on the AKSS and WOMAC score, reduced intake of analgesic drugs, and reduced LOS.	Supports the value of early mobilization to reduce anagesic use, improve WOMAC score, and decrease length of stay. Isolated study of a specific protocol; if study were repeated with similar results, evidence grade would be 1/A.

79	IV / A / 1	Physical Therapy	Pearse EO. Caldwell BF. Lockwood RJ. Hollard J. Early mobilisation after conventional knee replacement may reduce the risk of postoperative venous thromboembolism. Journal of Bone & Joint Surgery - British Volume. 89(3): 316-22, 2007 Mar. PMID: 17356141	2/B	http://www.bjj.boneandjoint.org.uk/content/89-B/3/316.full.pdf+html	Abstract: We carried out an audit on the result of achieving early walking in total knee replacement after instituting a new rehabilitation protocol, and assessed its influence on the development of deep-vein thrombosis as determined by Doppler ultrasound scanning on the fifth post-operative day. Early mobilisation was defined as beginning to walk less than 24 hours after knee replacement. Between April 1997 and July 2002, 98 patients underwent a total of 125 total knee replacements. They began walking on the second post-operative day unless there was a medical contraindication. They formed a retrospective control group. A protocol which allowed patients to start walking at less than 24 hours after surgery was instituted in August 2002. Between August 2002 and November 2004, 97 patients underwent a total of 122 total knee replacements. They formed the early mobilisation group, in which data were prospectively gathered. The two groups were of similar age, gender and had similar medical comorbidities. The surgical technique and tourniquet times were similar and the same instrumentation was used in nearly all cases. All the patients received low-molecular-weight heparin thromboprophylaxis and wore compression stockings post-operatively. In the early mobilisation group 90 patients (92.8%) began walking successfully within 24 hours of their operation. The incidence of deep-vein thrombosis fell from 27.6% in the control group to 1.0% in the early mobilisation group (chi-squared test, $p < 0.001$). There was a difference in the incidence of risk factors for deep-vein thrombosis between the two groups. However, multiple logistic regression analysis showed that the institution of an early mobilisation protocol resulted in a 30-fold reduction in the risk of post-operative deep-vein thrombosis when we adjusted for other risk factors.	Supports early mobilization following total knee replacement to reduce post-operative deep vein thrombosis. Note: historical control.
80	IV / A / 1	Post-operative care in hospital	Husted H, Jensen CM, Solgaard S, Kehlet H. Reduced length of stay following hip and knee arthroplasty in Denmark 2000-2009: from research to implementation. Arch Orthop Trauma Surg. 2012 Jan;132(1):101-4. PMID: 21947286	2/B		INTRODUCTION: Fast-track surgery is the combination of optimized clinical and organizational factors aiming at reducing convalescence and perioperative morbidity including the functional recovery resulting in reduced hospitalization. As the previous nationwide studies have demonstrated substantial variations in length of stay (LOS) following standardized operations such as total hip and knee arthroplasty (THA and TKA), this nationwide study was undertaken to evaluate the implementation process of fast-track THA and TKA in Denmark. MATERIALS AND METHODS: All hospitals in Denmark report to the National Patient Registry, linking the type of surgery and LOS with a unique individual social security number. This study is based on primary THA and TKA from a 5.5 million population from 2000 to the end of 2009. RESULTS: The number of performed primary unilateral THA and TKA has increased from around 7,200 in 2000 to 13,800 in 2009 with a concomitant reduction in LOS from median 10-11 days in 2000 to 4 days in 2009. CONCLUSION: Fast-track surgery has been successfully implemented in the orthopedic departments in Denmark through a multi-disciplinary educational and multi-institutional effort. These implementation principles may be transferred to other countries and other specialties.	Favors use of standardized operations to reduce length of stay for total knee and total hip replacement.