Institut de recherche et documentation en économie de la santé

Les parcours de soins pour prothèses de hanche et de genou

Bibliographie thématique

Mai 2020

Centre de documentation de l'Irdes

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Synthèses & Bibliographies

ISSN 2606-0272 **ISBN 978-2-87812-517-7**

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Problématique

En 2016, environ 230 000 séjours en chirurgie orthopédique concernaient des poses de prothèse du genou ou de hanche en France, soit un taux de recours de 3 pour 1 000 habitants en moyenne. Parmi ces séjours, 43 % relèvent de poses de prothèse de hanche (PDH) sans traumatismes récents, 15 % de poses de PDH après traumatismes récents et 42 % de poses de prothèse du genou (PDG). La moyenne d'âge des patients opérés est de 70 ans, environ un tiers des patients pour une PDH sans traumatismes récents ou une PDG ont 75 ans ou plus. Dans la plupart des cas, il s'agit principalement d'une chirurgie élective, du fait de son caractère non urgent. Cependant, une pose de prothèse peut être programmée en urgence lorsque l'individu a subi un traumatisme entraînant une fracture du col du fémur, par exemple. En moyenne, 60 % des séjours en orthopédie pour pose de PDH ou de PDG se déroulent dans le secteur privé lucratif. Depuis 2013, on observe une hausse du nombre de séjours en chirurgie ambulatoire en orthopédie, même s'ils représentent toujours moins de 1 % des séjours[1].

L'un des principaux enjeux actuels du système de santé est d'améliorer les parcours de soins en décloisonnant la ville et l'hôpital par une meilleure organisation des prises en charge centrées sur le patient. La littérature montre que même pour des interventions courantes, les pratiques médicales varient largement entre établissements selon l'offre de soins environnante, les incitations financières auxquelles sont soumis des offreurs, les préférences individuelles et les habitudes des professionnels de santé. Or ces variations de pratiques impactent non seulement la qualité de la prise en charge à l'hôpital mais aussi les soins fournis en amont et en aval de l'hospitalisation, les ressources mobilisées à l'hôpital (approchées notamment par la durée de séjour) et les parcours de soins des patients.

L'objectif de cette bibliographie est de recenser de la littérature scientifique sur le parcours de soins pour poses de prothèses de hanche et de genou dans les pays de l'OCDE, en axant notamment les recherches sur les modèles de protocoles de soins qui ont fait leur preuve et sur leurs évaluations.

[1] Mallejac, N., Or, Z. et Fournier, C. (2019). Évaluation d'impact d'une nouvelle organisation en chirurgie orthopédique sur les parcours de soins. Document de travail Irdes ; 79. Paris Irdes.

Les recherches bibliographiques ont été réalisées sur les bases et portails suivants : Base de l'Irdes, Banque de données en santé publique (Bdsp), Medline, Econlit, Sciencedirect, Cochrane et Cairn sur la période allant de 2000 à janvier 2020.

Les mots-clés interrogés sont les suivants :

"Arthroplasty, replacement, hip", "replacement, hip", "arthroplasty, replacement, knee", "replacement knee"
"Continuity of patient care », «critical pathways", "orthopedic procedures/rehabilitation", "surgical procedures, operative/rehabilitation", "reconstructive surgical procedures", "enhanced recovery after surgery", "fast track surgery"
"outcome and process assessment health care/economics", "outcome and process assessment health care/methods", "outcome and process assessment health care/organization and administration", "patient experience", "patient acceptance of health care", "quality improvement", "patient satisfaction", "patient participation", "patient outcome assessment".

Les références bibliographiques sont classées par ordre alphabétique d'auteurs, puis de titres. Cette bibliographie ne prétend pas à l'exhaustivité.

Une approche par les revues de la littérature

Adie, S., Kwan, A., Naylor, J. M., et al. (2012). "Cryotherapy following total knee replacement." Cochrane Database Syst Rev (9) : Cd007911.

> BACKGROUND: Total knee replacement (TKR) is a common intervention for patients with end-stage osteoarthritis of the knee. Post-surgical management may include cryotherapy. However, the effectiveness of cryotherapy is unclear. OBJECTIVES: To evaluate the acute (within 48 hours) application of cryotherapy following TKR on pain, blood loss and function. SEARCH METHODS: We searched the Cochrane Database of Systematic Reviews, CENTRAL, DARE, HTA Database, MEDLINE, EMBASE, CINAHL, PEDro and Web of Science on 15th March 2012. SELECTION CRITERIA: Randomised controlled trials or controlled clinical trials in which the experimental group received any form of cryotherapy, and was compared to any control group following TKR indicated for osteoarthritis. DATA COLLECTION AND ANALYSIS: Two reviewers independently selected trials for inclusion. Disagreements were discussed and resolved involving a third reviewer if required. Data were then extracted and the risk of bias of trials assessed. Main outcomes were blood loss, visual analogue score (VAS) pain, adverse events, knee range of motion, transfusion rate and knee function. Secondary outcomes were analgesia use, knee swelling, length of hospital stay, quality of life and activity level. Effects of interventions were estimated as mean differences (MD), standardised mean differences (SMD) or given as risk ratios (RR), with 95% confidence intervals (CI). Meta-analyses were performed using the inverse variance method and pooled using random effects. MAIN RESULTS: Eleven randomised trials and one controlled clinical trial involving 809 participants met the inclusion criteria. There is very low quality evidence from 10 trials (666 participants) that cryotherapy has a small benefit on blood loss (SMD -0.46, 95% CI, -0.84 to -0.08), equivalent to 225mL less blood loss in cryotherapy group (95% CI, 39 to 410mL). This benefit may not be clinically significant. There was very low quality evidence from four trials (322 participants) that cryotherapy improved visual analogue score pain at 48 hours (MD = -1.32 points on a 10 point scale, 95% CI, -2.37 to -0.27), but not at 24 or 72 hours. This benefit may not be clinically significant. There was no difference between groups in adverse events (RR =

0.98, 95% CI, 0.28 to 3.47). There is low quality evidence from two trials (107 participants) for improved range of motion at discharge (MD 11.39 degrees of additional flexion, 95% CI 4.13 to 18.66), but this benefit may not be clinically significant. There was no difference between groups in transfusion rate (RR 2.13, 95% CI 0.04 to 109.63), and knee function was not measured in any trial. No significant benefit were found for analgesia use, swelling or length of stay. Outcomes measuring quality of life or activity level were not reported. AUTHORS' CONCLUSIONS: Potential benefits of cryotherapy on blood loss, postoperative pain, and range of motion may be too small to justify its use, and the quality of the evidence was very low or low for all main outcomes. This needs to be balanced against potential inconveniences and expenses of using cryotherapy. Well designed randomised trials are required to improve the quality of the evidence.

Artz, N., Elvers, K. T., Lowe, C. M., et al. (2015). "Effectiveness of physiotherapy exercise following total knee replacement: systematic review and meta-analysis." BMC Musculoskelet Disord 16 : 15.

BACKGROUND: Rehabilitation, with an emphasis on physiotherapy and exercise, is widely promoted after total knee replacement. However, provision of services varies in content and duration. The aim of this study is to update the review of Minns Lowe and colleagues 2007 using systematic review and meta-analysis to evaluate the effectiveness of post-discharge physiotherapy exercise in patients with primary total knee replacement. METHODS: We searched MEDLINE, Embase, PsycInfo, CINAHL and Cochrane CENTRAL to October 4(th) 2013 for randomised evaluations of physiotherapy exercise in adults with recent primary knee replacement. Outcomes were: patient-reported pain and function, knee range of motion, and functional performance. Authors were contacted for missing data and outcomes. Risk of bias and heterogeneity were assessed. Data was combined using random effects meta-analysis and reported as standardised mean differences (SMD) or mean differences (MD). RESULTS: Searches identified 18 randomised trials including 1,739 patients with total knee replacement. Interventions compared: physiotherapy exercise and no provision; home and outpatient provision; pool and gym-based provision; walking skills and more general physiotherapy; and general physiotherapy exercise with and without additional balance exercises or ergometer cycling. Compared with controls receiving minimal physiotherapy, patients receiving physiotherapy exercise had improved physical function at 3-4 months, SMD -0.37 (95% CI -0.62, -0.12), and pain, SMD -0.45 (95% CI -0.85, -0.06). Benefit up to 6 months was apparent when considering only higher quality studies. There were no differences for outpatient physiotherapy exercise compared with home-based provision in physical function or pain outcomes. There was a short-term benefit favouring home-based physiotherapy exercise for range of motion flexion. There were no differences in outcomes when the comparator was hydrotherapy, or when additional balancing or cycling components were included. In one study, a walking skills intervention was associated with a long-term improvement in walking performance. However, for all these evaluations studies were under-powered individually and in combination. CONCLUSION: After recent primary total knee replacement, interventions including physiotherapy and exercise show short-term improvements in physical function. However this conclusion is based on meta-analysis of a few small studies and no long-term benefits of physiotherapy exercise interventions were identified. Future research should target improvements to long-term function, pain and performance outcomes in appropriately powered trials.

Atchabahian, A., Schwartz, G., Hall, C. B., et al. (2015). "Regional analgesia for improvement of long-term functional outcome after elective large joint replacement." Cochrane Database Syst Rev (8) : Cd010278.

BACKGROUND: Regional analgesia is more effective than conventional analgesia for controlling pain and may facilitate rehabilitation after large joint replacement in the short term. It remains unclear if regional anaesthesia improves functional outcomes after joint replacement beyond three months after surgery. OBJECTIVES: To assess the effects of regional anaesthesia and analgesia on long-term functional outcomes 3, 6 and 12 months after elective major joint (knee, shoulder and hip) replacement surgery. SEARCH METHODS: We performed an electronic search of several databases (CENTRAL, MEDLINE, EMBASE, CINAHL), and handsearched reference lists and conference abstracts. We updated our search in June 2015. SELECTION CRITERIA: We included randomized controlled trials (RCTs) comparing regional analgesia versus conventional analgesia in patients undergoing total shoulder, hip or knee replacement. We included studies that reported a functional outcome with a follow-up of at least three months after surgery. DATA COLLECTION AND ANALYSIS: We used standard methodological procedures expected by Cochrane. We contacted study authors for additional information. MAIN RESULTS: We included six studies with 350 participants followed for at least three months. All of these studies enrolled participants undergoing total knee replacement. Studies were at least partially blinded. Three studies had a high risk of performance bias and one a high risk of attrition bias, but the risk of bias was otherwise unclear or low.Only one study assessed joint function using a global score. Due to heterogeneity in outcome and reporting, we could only pool three out of six RCTs, with range of motion assessed at three months after surgery used as a surrogate for joint function. All studies had a high risk of detection bias. Using the random-effects model, there was no statistically significant difference between the experimental and control groups (mean difference 3.99 degrees, 95% confidence interval (CI) - 2.23 to 10.21; P value = 0.21, 3 studies, 140 participants, very low quality evidence).We did not perform further analyses because immediate adverse effects were not part of the explicit outcomes of any of these typically small studies, and long-term adverse events after regional anaesthesia are rare.None of the included studies elicited or reported long-term adverse effects like persistent nerve damage. AUTHORS' CONCLUSIONS: More high-quality studies are needed to establish the effects of regional analgesia on function after major joint replacement, as well as on the risk of adverse events (falls).

Bagnall, N. M., Malietzis, G., Kennedy, R. H., et al. (2014). "A systematic review of enhanced recovery care after colorectal surgery in elderly patients." Colorectal Dis 16(12) : 947-956.

AIM: Enhanced recovery after surgery (ERAS) can decrease complications and reduces hospital stay. Less certain is whether elderly patients can fully adhere to and benefit from ERAS. We aimed to determine the safety, feasibility and efficacy of enhanced recovery after colorectal surgery in patients aged >/= 65 years old. METHOD: A systematic search of Medline, EMBASE and Cochrane was performed to identify (i) studies comparing elderly patients managed with ERAS vs traditional care, (ii) cohort studies of ERAS with results of elderly vs younger patients and (iii) any case series of ERAS in elderly patients. End-points of interest were length of hospital stay, complications, mortality, readmission and re-operation, and ERAS protocol adherence. RESULTS: Sixteen studies were included. Two randomized controlled trials demonstrated shorter hospital stay in elderly patients with ERAS compared with elderly patients with non-ERAS (9 vs 13.2 days, P < 0.001; 5.5 vs 7 days, P < 0.0001). Fewer complications occurred with ERAS in both randomized controlled trials (27.4% vs 58.6%, P < 0.0001; 5% vs 21.1%, P = 0.045). The majority of observational studies did not show differences in outcome between elderly and younger patients in terms of hospital stay, morbidity or mortality. Inconsistent findings between cohort studies may reflect the disparities in ERAS protocol definitions or differences in study populations. CONCLUSION: ERAS can be safely applied to elderly patients to reduce complications and shorten length of

hospital stay. Further studies are required to assess whether elderly patients are able to adhere to, and benefit from, ERAS protocols to the same extent as younger patients.

Barbieri, A., Vanhaecht, K., Van Herck, P., et al. (2009). "Effects of clinical pathways in the joint replacement: a meta-analysis." BMC medicine 7 : 32-32.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2715423/

BACKGROUND: A meta-analysis was performed to evaluate the use of clinical pathways for hip and knee joint replacements when compared with standard medical care. The impact of clinical pathways was evaluated assessing the major outcomes of in-hospital hip and knee joint replacement processes: postoperative complications, number of patients discharged at home, length of in-hospital stay and direct costs. METHODS: Medline, Cinahl, Embase and the Cochrane Central Register of Controlled Trials were searched. The search was performed from 1975 to 2007. Each study was assessed independently by two reviewers. The assessment of methodological quality of the included studies was based on the Jadad methodological approach and on the New Castle Ottawa Scale. Data analysis abided by the guidelines set out by The Cochrane Collaboration regarding statistical methods. Meta-analyses were performed using RevMan software, version 4.2. RESULTS: Twenty-two studies met the study inclusion criteria and were included in the meta-analysis for a total sample of 6,316 patients. The aggregate overall results showed significantly fewer patients suffering postoperative complications in the clinical pathways group when compared with the standard care group. A shorter length of stay in the clinical pathway group was also observed and lower costs during hospital stay were associated with the use of the clinical pathways. No significant differences were found in the rates of discharge to home. CONCLUSION: The results of this meta-analysis show that clinical pathways can significantly improve the quality of care even if it is not possible to conclude that the implementation of clinical pathways is a cost-effective process, because none of the included studies analysed the cost of the development and implementation of the pathways. Based on the results we assume that pathways have impact on the organisation of care if the care process is structured in a standardised way, teams critically analyse the actual organisation of the process and the multidisciplinary team is highly involved in the re-organisation. Further studies should focus on the evaluation of pathways as complex interventions to help to understand which mechanisms within the clinical pathways can really improve the quality of care. With the need for knee and hip joint replacement on the rise, the use of clinical pathways might contribute to better quality of care and cost-effectiveness.

Brouwer, R. W., Huizinga, M. R., Duivenvoorden, T., et al. (2014). "Osteotomy for treating knee osteoarthritis." Cochrane Database Syst Rev (12) : Cd004019.

BACKGROUND: Patients with unicompartmental osteoarthritis of the knee can be treated with an osteotomy. The goal of an osteotomy is to unload the diseased compartment of the knee. This is the second update of the original review published in The Cochrane Library, Issue 1, 2005. OBJECTIVES: To assess the benefits and harms of an osteotomy for treating patients with knee osteoarthritis, including the following main outcomes scores: treatment failure, pain and function scores, health-related quality of life, serious adverse events, mortality and reoperation rate. SEARCH METHODS: The Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE and EMBASE (Current Contents, HealthSTAR) were searched until November 2013 for this second update. SELECTION CRITERIA: Randomised and controlled clinical trials comparing an osteotomy with other treatments for patients with unicompartmental osteoarthritis of the knee. DATA COLLECTION AND ANALYSIS: Two review authors independently selected trials, extracted data and assessed risk of bias using the

domains recommended in the 'Risk of bias' tool of The Cochrane Collaboration. The quality of the results was analysed by performing overall grading of evidence by outcome using the GRADE (Grades of Recommendation, Assessment, Development and Evaluation) approach. MAIN RESULTS: Eight new studies were included in this update, for a total of 21 included studies involving 1065 people.In four studies, the randomised sequence was adequately generated and clearly described. In eight studies, allocation concealment was adequately generated and described. In four studies, the blinding procedures were sufficient. In six studies, incomplete outcome data were not adequately addressed. Furthermore, in 11 studies, the selective outcome reporting item was unclear because no study protocol was provided.Follow-up of studies comparing different osteotomy techniques was too short to measure treatment failure, which implicates revision to a knee arthroplasty.Four studies evaluated a closing wedge high tibial osteotomy (CW-HTO) with another high tibial osteotomy (aHTO). Based on these studies, the CW-HTO group had 1.8% (95% confidence interval (CI) -7.7% to 4.2%; low-quality evidence) more pain compared with the aHTO group; this finding was not statistically significant. Pooled function in the CW-HTO group was 0.5% (95% CI -3.8% to 2.8%; low-quality evidence) higher compared with the aHTO group; this finding was not statistically significant. No data on health-related quality of life and mortality were presented.Serious adverse events were reported in only four studies and were not significantly different (low-quality evidence) between groups. The reoperation rate were scored as early hardware removal because of pain and pin track infection due to the external fixator. Risk of reoperation was 2.6 (95% CI 1.5 to 4.5; low-quality evidence) times higher in the aHTO group compared with the CW-HTO group, and this finding was statistically significant.The quality of evidence for most outcomes comparing different osteotomy techniques was downgraded to low because of the numbers of available studies, the numbers of participants and limitations in design.Two studies compared high tibial osteotomy versus unicompartmental knee replacement. Treatment failure and pain and function scores were not different between groups after a mean follow-up of 7.5 years. The osteotomy group reported more adverse events when compared with the unicompartmental knee replacement group, but the difference was not statistically significant. No data on health-related quality of life and mortality were presented.No study compared an osteotomy versus conservative treatment.Ten included studies compared differences in perioperative or postoperative conditions after high tibial osteotomy. In most of these studies, no statistically significant differences in outcomes were noted between groups. AUTHORS' CONCLUSIONS: The conclusion of this update did not change: Valgus high tibial osteotomy reduces pain and improves knee function in patients with medial compartmental osteoarthritis of the knee. However, this conclusion is based on within-group comparisons, not on non-operative controls. No evidence suggests differences between different osteotomy techniques. No evidence shows whether an osteotomy is more effective than alternative surgical treatment such as unicompartmental knee replacement or non-operative treatment. So far, the results of this updated review do not justify a conclusion on benefit of specific high tibial osteotomy technique for knee osteoarthritis.

Chan, E. Y., Fransen, M., Parker, D. A., et al. (2014). "Femoral nerve blocks for acute postoperative pain after knee replacement surgery." Cochrane Database Syst Rev (5) : Cd009941.

BACKGROUND: Total knee replacement (TKR) is a common and often painful operation. Femoral nerve block (FNB) is frequently used for postoperative analgesia. OBJECTIVES: To evaluate the benefits and risks of FNB used as a postoperative analgesic technique relative to other analgesic techniques among adults undergoing TKR. SEARCH METHODS: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) 2013, Issue 1, MEDLINE, EMBASE, CINAHL, Web of Science, dissertation abstracts and reference lists of included

studies. The date of the last search was 31 January 2013. SELECTION CRITERIA: We included randomized controlled trials (RCTs) comparing FNB with no FNB (intravenous patient-controlled analgesia (PCA) opioid, epidural analgesia, local infiltration analgesia, and oral analgesia) in adults after TKR. We also included RCTs that compared continuous versus single-shot FNB. DATA COLLECTION AND ANALYSIS: Two review authors independently performed study selection and data extraction. We undertook meta-analysis (random-effects model) and used relative risk ratios (RRs) for dichotomous outcomes and mean differences (MDs) or standardized mean differences (SMDs) for continuous outcomes. We interpreted SMDs according to rule of thumb where 0.2 or smaller represents a small effect, 0.5 a moderate effect and 0.8 or larger, a large effect. MAIN RESULTS: We included 45 eligible RCTs (2710 participants) from 47 publications; 20 RCTs had more than two allocation groups. A total of 29 RCTs compared FNB (with or without concurrent treatments including PCA opioid) versus PCA opioid, 10 RCTs compared FNB versus epidural, five RCTs compared FNB versus local infiltration analgesia, one RCT compared FNB versus oral analgesia and four RCTs compared continuous versus single-shot FNB. Most included RCTs were rated as low or unclear risk of bias for the aspects rated in the risk of bias assessment tool, except for the aspect of blinding. We rated 14 (31%) RCTs at high risk for both participant and assessor blinding and rated eight (18%) RCTs at high risk for one blinding aspect.Pain at rest and pain on movement were less for FNB (of any type) with or without a concurrent PCA opioid compared with PCA opioid alone during the first 72 hours post operation. Pooled results demonstrated a moderate effect of FNB for pain at rest at 24 hours (19 RCTs, 1066 participants, SMD -0.72, 95% CI -0.93 to -0.51, moderate-quality evidence) and a moderate to large effect for pain on movement at 24 hours (17 RCTs, 1017 participants, SMD -0.94, 95% CI -1.32 to -0.55, moderate-quality evidence). Pain was also less in each FNB subgroup: single-shot FNB, continuous FNB and continuous FNB + sciatic block, compared with PCA. FNB also was associated with lower opioid consumption (IV morphine equivalent) at 24 hours (20 RCTs, 1156 participants, MD -14.74 mg, 95% CI -18.68 to -10.81 mg, high-quality evidence) and at 48 hours (MD -14.53 mg, 95% CI -20.03 to -9.02 mg), lower risk of nausea and/or vomiting (RR 0.47, 95% CI 0.33 to 0.68, number needed to treat for an additional harmful outcome (NNTH) four, high-quality evidence), greater knee flexion (11 RCTs, 596 participants, MD 6.48 degrees, 95% CI 4.27 to 8.69 degrees, moderate-quality evidence) and greater patient satisfaction (four RCTs, 180 participants, SMD 1.06, 95% CI 0.74 to 1.38, low-quality evidence) compared with PCA.We could not demonstrate a difference in pain between FNB (any type) and epidural analgesia in the first 72 hours post operation, including pain at 24 hours at rest (six RCTs, 328 participants, SMD -0.05, 95% CI -0.43 to 0.32, moderate-quality evidence) and on movement (six RCTs, 317 participants, SMD 0.01, 95% CI -0.21 to 0.24, high-quality evidence). No difference was noted at 24 hours for opioid consumption (five RCTs, 341 participants, MD -4.35 mg, 95% CI -9.95 to 1.26 mg, high-quality evidence) or knee flexion (six RCTs, 328 participants, MD -1.65, 95% CI -5.14 to 1.84, high-quality evidence). However, FNB demonstrated lower risk of nausea/vomiting (four RCTs, 183 participants, RR 0.63, 95% CI 0.41 to 0.97, NNTH 8, moderate-quality evidence) and higher patient satisfaction (two RCTs, 120 participants, SMD 0.60, 95% CI 0.23 to 0.97, low-quality evidence), compared with epidural analgesia.Pooled results of four studies (216 participants) comparing FNB with local infiltration analgesia detected no difference in analgesic effects between the groups at 24 hours for pain at rest (SMD 0.06, 95% CI -0.61 to 0.72, moderate-quality evidence) or pain on movement (SMD 0.38, 95% CI -0.10 to 0.86, low-quality evidence). Only one included RCT compared FNB with oral analgesia. We considered this evidence insufficient to allow judgement of the effects of FNB compared with oral analgesia.Continuous FNB provided less pain compared with single-shot FNB (four RCTs, 272 participants) at 24 hours at rest (SMD -0.62, 95% CI -1.17 to -0.07, moderate-quality evidence) and on movement (SMD -0.42, 95% CI -0.67 to -0.17, high-quality evidence).

Continuous FNB also demonstrated lower opioid consumption compared with single-shot FNB at 24 hours (three RCTs, 236 participants, MD -13.81 mg, 95% CI -23.27 to -4.35 mg, moderate-quality evidence).Generally, the meta-analyses demonstrated considerable statistical heterogeneity, with type of FNB, allocation concealment and blinding of participants, personnel and outcome assessors reducing heterogeneity in the analyses. Available evidence was insufficient to allow determination of the comparative safety of the various analgesic techniques. Few RCTs reported on serious adverse effects such as neurological injury, postoperative falls or thrombotic events. AUTHORS' CONCLUSIONS: Following TKR, FNB (with or without concurrent treatments including PCA opioid) provided more effective analgesia than PCA opioid alone, similar analgesia to epidural analgesia and less nausea/vomiting compared with PCA alone or epidural analgesia. The review also found that continuous FNB provided better analgesia compared with single-shot FNB. RCTs were insufficient to allow definitive conclusions on the comparison between FNB and local infiltration analgesia or oral analgesia.

Corallo, A. N., Croxford, R., Goodman, D. C., et al. (2014). "A systematic review of medical practice variation in OECD countries." Health Policy 114(1) : 5-14.
http://dx.doi.org/10.1016/j.healthpol.2013.08.002

BackgroundMajor variations in medical practice have been documented internationally. Variations raise questions about the quality, equity, and efficiency of resource allocation and use, and have important implications for health care and health policy.

Dorsey, J. et Bradshaw, M. (2017). "Effectiveness of Occupational Therapy Interventions for Lower-Extremity Musculoskeletal Disorders: A Systematic Review." Am J Occup Ther 71(1) :
https://ajot.aota.org/article.aspx?articleid=2594478

Lower-extremity (LE) musculoskeletal disorders (MSDs) can have a major impact on the ability to carry out daily activities. The effectiveness of interventions must be examined to enable occupational therapy practitioners to deliver the most appropriate services. This systematic review examined the literature published between 1995 and July 2014 that investigated the effectiveness of occupational therapy interventions for LE MSDs. Forty-three articles met the criteria and were reviewed. Occupational therapy interventions varied on the basis of population subgroup: hip fracture, LE joint replacement, LE amputation or limb loss, and nonsurgical osteoarthritis and pain. The results indicate an overall strong role for occupational therapy in treating clients with LE MSDs. Activity pacing is an effective intervention for nonsurgical LE MSDs, and multidisciplinary rehabilitation is effective for LE joint replacement and amputation. Further research on specific occupational therapy interventions in this important area is needed.

Evans, J. T., Evans, J. P., Walker, R. W., et al. (2019). "How long does a hip replacement last? A systematic review and meta-analysis of case series and national registry reports with more than 15 years of follow-up." The Lancet 393(10 172) : 647-654.

Forster, R. et Stewart, M. (2016). "Anticoagulants (extended duration) for prevention of venous thromboembolism following total hip or knee replacement or hip fracture repair." Cochrane Database Syst Rev 3 : Cd004179.

BACKGROUND: The optimal duration of thromboprophylaxis after total hip or knee replacement, or hip fracture repair remains controversial. It is common practice to

administer prophylaxis using low-molecular-weight heparin (LMWH) or unfractionated heparin (UFH) until discharge from hospital, usually seven to 14 days after surgery. International guidelines recommend extending thromboprophylaxis for up to 35 days following major orthopaedic surgery but the recommendation is weak due to moderate quality evidence. In addition, recent oral anticoagulants that exert effect by direct inhibition of thrombin or activated factor X lack the need for monitoring and have few known drug interactions. Interest in this topic remains high. OBJECTIVES: To assess the effects of extended-duration anticoagulant thromboprophylaxis for the prevention of venous thromboembolism (VTE) in people undergoing elective hip or knee replacement surgery, or hip fracture repair. SEARCH METHODS: The Cochrane Vascular Information Specialist searched the Specialised Register (last searched May 2015) and CENTRAL (2015, Issue 4). Clinical trials databases were searched for ongoing or unpublished studies. SELECTION CRITERIA: Randomised controlled trials assessing extended-duration thromboprophylaxis (five to seven weeks) using accepted prophylactic doses of LMWH, UFH, vitamin K antagonists (VKA) or direct oral anticoagulants (DOAC) compared with short-duration thromboprophylaxis (seven to 14 days) followed by placebo, no treatment or similar extended-duration thromboprophylaxis with LMWH, UFH, VKA or DOACs in participants undergoing hip or knee replacement or hip fracture repair. DATA COLLECTION AND ANALYSIS: We independently selected trials and extracted data. Disagreements were resolved by discussion. We performed fixed-effect model meta-analyses with odds ratios (ORs) and 95% confidence intervals (CIs). We used a random-effects model when there was heterogeneity. MAIN RESULTS: We included 16 studies (24,930 participants); six compared heparin with placebo, one compared VKA with placebo, two compared DOAC with placebo, one compared VKA with heparin, five compared DOAC with heparin and one compared anticoagulants chosen at investigators' discretion with placebo. Three trials included participants undergoing knee replacement. No studies assessed hip fracture repair.Trials were generally of good methodological quality. The main reason for unclear risk of bias was insufficient reporting. The quality of evidence according to GRADE was generally moderate, as some comparisons included a single study, low number of events or heterogeneity between studies leading to wide CIs.We showed no difference between extended-duration heparin and placebo in symptomatic VTE (OR 0.59, 95% CI 0.35 to 1.01; 2329 participants; 5 studies; high quality evidence), symptomatic deep vein thrombosis (DVT) (OR 0.73, 95% CI 0.39 to 1.38; 2019 participants; 4 studies; moderate quality evidence), symptomatic pulmonary embolism (PE) (OR 0.61, 95% CI 0.16 to 2.33; 1595 participants; 3 studies; low quality evidence) and major bleeding (OR 0.59, 95% CI 0.14 to 2.46; 2500 participants; 5 studies; moderate quality evidence). Minor bleeding was increased in the heparin group (OR 2.01, 95% CI 1.43 to 2.81; 2500 participants; 5 studies; high quality evidence). Clinically relevant non-major bleeding was not reported.We showed no difference between extended-duration VKA and placebo (one study, 360 participants) for symptomatic VTE (OR 0.10, 95% CI 0.01 to 1.94; moderate quality evidence), symptomatic DVT (OR 0.13, 95% CI 0.01 to 2.62; moderate quality evidence), symptomatic PE (OR 0.32, 95% CI 0.01 to 7.84; moderate quality evidence) and major bleeding (OR 2.89, 95% CI 0.12 to 71.31; low quality evidence). Clinically relevant non-major bleeding and minor bleeding were not reported.Extended-duration DOAC showed reduced symptomatic VTE (OR 0.20, 95% CI 0.06 to 0.68; 2419 participants; 1 study; moderate quality evidence) and symptomatic DVT (OR 0.18, 95% CI 0.04 to 0.81; 2459 participants; 2 studies; high quality evidence) compared to placebo. No differences were found for symptomatic PE (OR 0.25, 95% CI 0.03 to 2.25; 1733 participants; 1 study; low quality evidence), major bleeding (OR 1.00, 95% CI 0.06 to 16.02; 2457 participants; 1 study; low quality evidence), clinically relevant non-major bleeding (OR 1.22, 95% CI 0.76 to 1.95; 2457 participants; 1 study; moderate quality evidence) and minor bleeding (OR 1.18, 95% CI 0.74 to 1.88; 2457 participants; 1 study; moderate quality evidence).We showed no

difference between extended-duration anticoagulants chosen at investigators' discretion and placebo (one study, 557 participants, low quality evidence) for symptomatic VTE (OR 0.50, 95% CI 0.09 to 2.74), symptomatic DVT (OR 0.33, 95% CI 0.03 to 3.21), symptomatic PE (OR 1.00, 95% CI 0.06 to 16.13), and major bleeding (OR 5.05, 95% CI 0.24 to 105.76). Clinically relevant non-major bleeding and minor bleeding were not reported.We showed no difference between extended-duration VKA and heparin (one study, low quality evidence) for symptomatic VTE (OR 1.64, 95% CI 0.85 to 3.16; 1279 participants), symptomatic DVT (OR 1.36, 95% CI 0.69 to 2.68; 1279 participants), symptomatic PE (OR 9.16, 95% CI 0.49 to 170.42; 1279 participants), major bleeding (OR 3.87, 95% CI 1.91 to 7.85; 1272 participants) and minor bleeding (OR 1.33, 95% CI 0.64 to 2.76; 1279 participants). Clinically relevant non-major bleeding was not reported.We showed no difference between extended-duration DOAC and heparin for symptomatic VTE (OR 0.70, 95% CI 0.28 to 1.70; 15,977 participants; 5 studies; low quality evidence), symptomatic DVT (OR 0.60, 95% CI 0.11 to 3.27; 15,977 participants; 5 studies; low quality evidence), symptomatic PE (OR 0.91, 95% CI 0.43 to 1.94; 14,731 participants; 5 studies; moderate quality evidence), major bleeding (OR 1.11, 95% CI 0.79 to 1.54; 16,199 participants; 5 studies; high quality evidence), clinically relevant non-major bleeding (OR 1.08, 95% CI 0.90 to 1.28; 15,241 participants; 4 studies; high quality evidence) and minor bleeding (OR 0.95, 95% CI 0.82 to 1.10; 11,766 participants; 4 studies; high quality evidence). AUTHORS' CONCLUSIONS: Moderate quality evidence suggests extended-duration anticoagulants to prevent VTE should be considered for people undergoing hip replacement surgery, although the benefit should be weighed against the increased risk of minor bleeding. Further studies are needed to better understand the association between VTE and extended-duration oral anticoagulants in relation to knee replacement and hip fracture repair, as well as outcomes such as distal and proximal DVT, reoperation, wound infection and healing.

Fransen, M. et Neal, B. (2013). "WITHDRAWN: Non-steroidal anti-inflammatory drugs for preventing heterotopic bone formation after hip arthroplasty." Cochrane Database Syst Rev (3) : Cd001160.

BACKGROUND: Heterotopic bone formation (HBF) in the soft tissues surrounding the hip joint is a frequent complication of hip surgery. Non-steroidal anti-inflammatory drugs (NSAIDs) administered in the immediate perioperative period reduce the risk of HBF. However, the magnitude of the effect on HBF, and the effects on other associated outcomes, such as pain and physical function, are uncertain. OBJECTIVES: To determine the effects of perioperative NSAID therapy versus control on the risk of HBF and other outcomes in patients undergoing hip arthroplasty. SEARCH METHODS: We searched the Cochrane Bone, Joint and Muscle Trauma Group specialised register (October 2002), the Cochrane Central Register of Controlled Trials (The Cochrane Library issue 3, 2002), MEDLINE (1966 to October 2002), EMBASE (1988 to 2002 Week 43), CURRENT CONTENTS (1993 Week 27 to 2002 Week 44) and reference lists of articles. We also contacted trialists and drug manufacturers. SELECTION CRITERIA: All trials which enrolled patients scheduled to undergo hip arthroplasty with random or quasi-random allocation to perioperative NSAID or control and that recorded post-operative radiographically determined HBF. The primary outcome was post-operative radiographic HBF. Secondary outcomes were pain, function (including range of motion), gastro-intestinal and other bleeding complications, and other causes of major morbidity or mortality. DATA COLLECTION AND ANALYSIS: Two reviewers independently assessed methodological quality and extracted data. All analyses were conducted on dichotomised outcomes. MAIN RESULTS: Sixteen randomised and two quasi-randomised trials involving a total of 4,763 patients were included. Overall, in 17 trials that examined the effects of medium to high doses of NSAIDs, there was a reduced risk of developing HBF after hip surgery (59% reduction, 95% confidence interval 54% to 64% reduction). In contrast, one

large trial examining low-dose aspirin, demonstrated no effect on the risk of HBF (2% reduction, 95% confidence interval 15% reduction to 12% increase). There was strong evidence of differences in the size of the treatment effects observed between the trials examining medium to high doses of NSAIDs, but reasons were not clearly identified.There was a non-significant one third increased risk of gastro-intestinal side effects among patients assigned NSAIDs (29% increase, 95% confidence interval 0% to 76% increase). Most of this increase was due to an increased risk of minor gastro-intestinal complications. Data on the late post-operative outcomes of pain, impaired physical function and range of joint movement were few and no formal overviews of the effects of NSAIDs on these outcomes were possible. AUTHORS' CONCLUSIONS: Perioperative NSAIDs, apart from low dose aspirin, appear to produce between a one half and two thirds reduction in the risk of HBF. With routine use, such agents may be able to prevent 15-20 cases of HBF among every 100 total hip replacements performed. However, while medium to high doses of perioperative NSAIDs clearly produce a substantial reduction in the incidence of radiographic HBF, there remains some uncertainty about short-term side effects of treatment and substantial uncertainty about effects on long-term clinical outcomes such as chronic pain and impaired physical function. The net effect of routine HBF prophylaxis with NSAIDs requires formal assessment in a randomised trial designed to determine the balance of benefits and risks for all outcomes.

Haanstra, T. M., van den Berg, T., Ostelo, R. W., et al. (2012). "Systematic review: do patient expectations influence treatment outcomes in total knee and total hip arthroplasty?" Health Qual Life Outcomes 10 : 152.

OBJECTIVE: This systematic review aims to summarise all the available evidence related to the association between pre-operative patient expectations (outcome expectations, process expectations and self efficacy expectations) and 5 different treatment outcomes (overall improvement, pain, function, stiffness and satisfaction) in patients with total knee or total hip arthroplasty at three different follow-op periods (>6 weeks; >6 weeks- </=6 months; >6 months). METHODS: English and Dutch language articles were identified through PubMed, EMBASE.com, PsycINFO, CINAHL and The Cochrane Library from inception to September 2012. Articles assessing the association between pre-operative patient expectations and treatment outcomes for TKA/THA in either adjusted or unadjusted analysis were included. Two reviewers, working independently, determined eligibility, rated methodological quality and extracted data on study design, population, expectation measurements, outcome measurements and strength of the associations. Methodological quality was rated by the same reviewers on a 19 item scale. The scores on the quality assessment were taken into account when drawing final conclusions. RESULTS: The search strategy generated 2252 unique references, 18 articles met inclusion criteria. Scores on the methodological quality assessment ranged between 6% and 79%. Great variety was seen in definitions and measurement methods of expectations. No significant associations were found between patient expectations and overall improvement, satisfaction and stiffness. Both significant positive and non-significant associations were found for the association between expectations and pain and function. CONCLUSIONS: There was no consistency in the association between patients' pre-operative expectations and treatment outcomes for TKA and THA indentified in this systematic review. There exists a need for a sound theoretical framework underlying the construct of 'patient expectations' and consistent use of valid measurement instruments to measure that construct in order to facilitate future research synthesis.

Harvey, L. A., Brosseau, L. et Herbert, R. D. (2010). "Continuous passive motion following total knee arthroplasty in people with arthritis." Cochrane Database Syst Rev (3) : Cd004260.

> BACKGROUND: Total knee arthroplasty is a common intervention for patients with arthritis. Post-surgical rehabilitation often includes continuous passive motion. However, it is not clear whether continuous passive motion is effective. OBJECTIVES: To evaluate the effectiveness of continuous passive motion following total knee arthroplasty in people with arthritis. SEARCH STRATEGY: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2009, Issue 3), MEDLINE (January 1966 to January 2009), EMBASE (January 1980 to January 2009), CINAHL (January 1982 to January 2009), AMED (January 1985 to January 2009) and PEDro (to January 2009). SELECTION CRITERIA: Randomised controlled trials in which the experimental group received continuous passive motion, and both the experimental and control groups received similar postoperative care and therapy following total knee arthoplasty in people with arthritis. DATA COLLECTION AND ANALYSIS: Two reviewers independently selected trials for inclusion. Data were then extracted and the quality of trials assessed. The primary outcomes were active knee flexion range of motion, passive knee flexion range of motion, active knee extension range of motion, passive knee extension range of motion, length of hospital stay, function and incidence of manipulation under anaesthesia. The secondary outcomes were pain, swelling and quadriceps strength. Effects were estimated as weighted mean differences or standardised mean differences with 95% confidence intervals (CI). Meta-analyses were performed using random-effects models for continuous variables. MAIN RESULTS: Twenty randomised controlled trials of 1335 participants met the inclusion criteria. There is high-quality evidence that continuous passive motion increases passive knee flexion range of motion (mean difference 2 degrees, 95% CI 0 to 5) and active knee flexion range of motion (mean difference 3 degrees, 95% CI 0 to 6). These effects are too small to be clinically worthwhile. There is low-quality evidence that continuous passive motion has no effect on length of hospital stay (mean difference -0.3 days; 95% CI -0.9 to 0.2) but reduces the need for manipulation under anaesthesia (relative risk 0.15; 95% CI 0.03 to 0.70). AUTHORS' CONCLUSIONS: The effects of continuous passive motion on knee range of motion are too small to justify its use. There is weak evidence that continuous passive motion reduces the subsequent need for manipulation under anaesthesia.

He, M. L., Xiao, Z. M., Lei, M., et al. (2014). "Continuous passive motion for preventing venous thromboembolism after total knee arthroplasty." Cochrane Database Syst Rev (7) : Cd008207.

> BACKGROUND: Total knee arthroplasty (TKA) is a common form of orthopaedic surgery. Venous thromboembolism (VTE), which consists of deep venous thrombosis (DVT) and pulmonary embolism (PE), is a major and potentially fatal complication after TKA. The incidence of DVT after TKA is 40% to 80% and the incidence of PE is approximately 2%. It is generally agreed that thromboprophylaxis should be used in patients who undergo TKA. Both pharmacological and mechanical methods are used in the prevention of DVT. Pharmacological methods alter the blood coagulation profile and may increase the risk of bleeding complications. When pharmacological methods cannot be used the mechanical methods become crucial for VTE prophylaxis. Continuous passive motion (CPM) is provided through an external motorised device which enables a joint to move passively throughout a preset arc of motion. Despite the theoretical effectiveness and widespread use of CPM, there are still differing views on the effectiveness of CPM as prophylaxis against thrombosis after TKA. This is an update of the review first published in 2012. OBJECTIVES: The aim of this review was to determine the effectiveness of continuous passive motion (CPM) therapy for preventing venous thromboembolism (VTE) in patients after total knee arthroplasty (TKA).

SEARCH METHODS: For this update the Cochrane Peripheral Vascular Diseases Group Trials Search Co-ordinator searched the Specialised Register (last searched February 2014), CENTRAL (2014, Issue 1), Ovid MEDLINE (to week 1 February 2014) and EMBASE (to Week 07 2014). SELECTION CRITERIA: Randomised controlled trials (RCTs) comparing the use of CPM with control in preventing DVT or PE after TKA. People aged 18 years and older who had undergone TKA were included in this review. We excluded studies of patients who presented with DVT at baseline. The experimental and control groups received similar postoperative care and therapy other than the CPM. DATA COLLECTION AND ANALYSIS: Two review authors independently assessed the citations retrieved by the search strategies for reports of relevant RCTs. They independently selected trials that satisfied the inclusion criteria, extracted data and undertook quality assessment. Effects were estimated as risk ratios (RRs), mean differences or standardised mean differences with 95% confidence intervals (CIs). Meta-analyses were performed using a fixed-effect model for continuous variables. Where heterogeneity existed (determined by the I(2) statistic) a random-effects model was used. MAIN RESULTS: Eleven RCTs involving 808 participants met the inclusion criteria. The methodological quality of the included studies was variable and most of the predefined outcomes were reported by only one or two studies, therefore the quality of the evidence was low. Five studies with a total of 405 patients reported the incidence of DVT. In the CPM group (205 patients) 36 developed DVT (18%) compared to 29 (15%) in the control group (200 patients). The results of the meta-analysis showed no evidence that CPM had any effect on preventing VTE after TKA (RR 1.22, 95% CI 0.84 to 1.79). One trial (150 participants) did not find PE in any of the patients during hospitalisation or in the subsequent three months. PE was not reported in the other included studies. None of the trials reported deaths among the included participants. AUTHORS' CONCLUSIONS: There is not enough evidence from the available RCTs to conclude that CPM reduces VTE after TKA. We cannot assess the effect of CPM on mortality because no such events occurred amongst the participants of these trials. The quality of the evidence was low. The results are supported by only a small number of studies, most of which are of low to moderate quality.

Hofstede, S. N., Nouta, K. A., Jacobs, W., et al. (2015). "Mobile bearing vs fixed bearing protheses for posterior cruciate retaining total knee arthroplasty for postoperative functional status in patients with osteoarthritis and rheumatoid arthritis." Cochrane Database Syst Rev (2) : Cd003130.

BACKGROUND: It is unclear whether there are differences in benefits and harms between mobile and fixed prostheses for total knee arthroplasty (TKA). The previous Cochrane review published in 2004 included two articles. Many more trials have been performed since then; therefore an update is needed. OBJECTIVES: To assess the benefits and harms of mobile bearing compared with fixed bearing cruciate retaining total knee arthroplasty for functional and clinical outcomes in patients with osteoarthritis (OA) or rheumatoid arthritis (RA). SEARCH METHODS: We searched The Cochrane Library, PubMed, EMBASE, CINAHL and Web of Science up to 27 February 2014, and the trial registers ClinicalTrials.gov, Multiregister, Current Controlled Trials and the World Health Organization (WHO) International Clinical Trials Registry Platform for data from unpublished trials, up to 11 February 2014. We also screened the reference lists of selected articles. SELECTION CRITERIA: We selected randomised controlled trials comparing mobile bearing with fixed bearing prostheses in cruciate retaining TKA among patients with osteoarthritis or rheumatoid arthritis, using functional or clinical outcome measures and follow-up of at least six months. DATA COLLECTION AND ANALYSIS: We used standard methodological procedures as expected by The Cochrane Collaboration. MAIN RESULTS: We found 19 studies with 1641 participants (1616 with OA (98.5%) and 25 with RA (1.5%)) and 2247 knees. Seventeen new studies were included in this update.Quality of the evidence ranged from moderate (knee pain) to low

(other outcomes). Most studies had unclear risk of bias for allocation concealment, blinding of participants and personnel, blinding of outcome assessment and selective reporting, and high risk of bias for incomplete outcome data and other bias. Knee painWe calculated the standardised mean difference (SMD) for pain, using the Knee Society Score (KSS) and visual analogue scale (VAS) in 11 studies (58%) and 1531 knees (68%). No statistically significant differences between groups were reported (SMD 0.09, 95% confidence interval (CI) -0.03 to 0.22, P value 0.15). This represents an absolute risk difference of 2.4% points higher (95% CI 0.8% lower to 5.9% higher) on the KSS pain scale and a relative percent change of 0.22% (95% CI 0.07% lower to 0.53% higher). The results were homogeneous. Clinical and functional scores The KSS clinical score did not differ statistically significantly between groups (14 studies (74%) and 1845 knees (82%)) with a mean difference (MD) of -1.06 points (95% CI -2.87 to 0.74, P value 0.25) and heterogeneous results. KSS function was reported in 14 studies (74%) with 1845 knees (82%) as an MD of -0.10 point (95% CI -1.93 to 1.73, P value 0.91) and homogeneous results. In two studies (11%), the KSS total score was favourable for mobile bearing (159 vs 132 for fixed bearing), with MD of -26.52 points (95% CI -45.03 to -8.01, P value 0.005), but with a wide 95% confidence interval indicating uncertainty about the estimate.Other reported scoring systems did not show statistically significant differences: Hospital for Special Surgery (HSS) score (seven studies (37%) in 1021 knees (45%)) with an MD of -1.36 (95% CI -4.18 to 1.46, P value 0.35); Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) total score (two studies (11%), 167 knees (7%)) with an MD of -4.46 (95% CI -16.26 to 7.34, P value 0.46); and Oxford total (five studies (26%), 647 knees (29%) with an MD of -0.25 (95% CI -1.41 to 0.91, P value 0.67). Health-related quality of lifeThree studies (16%) with 498 knees (22%) reported on health-related quality of life, and no statistically significant differences were noted between the mobile bearing and fixed bearing groups. The Short Form (SF)-12 Physical Component Summary had an MD of -1.96 (95% CI -4.55 to 0.63, P value 0.14) and heterogeneous results. Revision surgeryTwenty seven revisions (1.3%) were performed in 17 studies (89%) with 2065 knees (92%). In all, 13 knees were revised in the fixed bearing group and 14 knees in the mobile bearing group. No statistically significant differences were found (risk difference 0.00, 95% CI -0.01 to 0.01, P value 0.58), and homogeneous results were reported. MortalityIn seven out of 19 studies, 13 participants (37%) died. Two of these participants had undergone bilateral surgery, and for seven participants, it was unclear which prosthesis they had received; therefore they were excluded from the analyses. Thus our analysis included four out of 191 participants (2.1%) who had died: one in the fixed bearing group and three in the mobile bearing group. No statistically significant differences were found. The risk difference was -0.02 (95% CI -0.06 to 0.03, P value 0.49) and results were homogeneous. Reoperation ratesThirty reoperations were performed in 17 studies (89%) with 2065 knees (92%): 18 knees in the fixed bearing group (of the 1031 knees) and 12 knees in the mobile group (of the 1034 knees). No statistically significant differences were found. The risk difference was -0.01 (95% CI -0.01 to 0.01, P value 0.99) with homogeneous results. Other serious adverse eventsSixteen studies (84%) reported nine other serious adverse events in 1735 knees (77%): four in the fixed bearing group (of the 862 knees) and five in the mobile bearing group (of the 873 knees). No statistically significant differences were found (risk difference 0.00, 95% CI -0.01 to 0.01, P value 0.88), and results were homogeneous. AUTHORS' CONCLUSIONS: Moderate- to low-quality evidence suggests that mobile bearing prostheses may have similar effects on knee pain, clinical and functional scores, health-related quality of life, revision surgery, mortality, reoperation rate and other serious adverse events compared with fixed bearing prostheses in posterior cruciate retaining TKA. Therefore we cannot draw firm conclusions. Most (98.5%) participants had OA, so the findings primarily reflect results reported in participants with OA. Future studies should report in greater detail outcomes such as those presented in this systematic review, with sufficient follow-up time to allow gathering of high-quality evidence

and to inform clinical practice. Large registry-based studies may have added value, but they are subject to treatment-by-indication bias. Therefore, this systematic review of RCTs can be viewed as the best available evidence.

Jordan, C. J., Goldstein, R. Y., Michels, R. F., et al. (2012). "Comprehensive program reduces hospital readmission rates after total joint arthroplasty." Am J Orthop (Belle Mead NJ) 41(11) : E147-151.

Hospital readmissions are quality indicators of healthcare delivery. Our purpose is to examine the effect of a program designed to reduce readmissions after total joint replacement. We initiated a comprehensive program with 4 goals: (1) outpatient workup of venous thromboembolism; (2) decrease surgical site infection; (3) early follow-up with primary care physicians; and (4) increase physician awareness of the financial and quality-related ramifications of unplanned readmissions. We then compared readmission rates before our initiative was instituted (2005-2006) to 3 years after implementation (2007-2009). Readmission rates preintervention were 3.70 and 3.29 for total hip replacement (THR) and knee replacement (TKR), respectively. Postintervention rates fell to 1.78 and 1.98, respectively, representing a 47.2% reduction of readmission for THR and 39.8% for TKR (P<.05). These results demonstrate the success of our program in reducing readmissions. This may result in reductions in healthcare costs and improvement in quality of care.

Kahlenberg, C. A., Nwachukwu, B. U., Schairer, W. W., et al. (2017). "Patient Satisfaction Reporting After Total Hip Arthroplasty: A Systematic Review." Orthopedics 40(3) : e400-e404.

This review evaluated the quality of patient satisfaction reporting after total hip arthroplasty. The initial search of the MEDLINE database yielded 755 studies. Twenty-four met the inclusion criteria. Most studies provided level III or IV evidence (n=15, 62.5%). The most common method used to assess satisfaction was the 10-point visual analog scale (7 studies, 29.2%), followed by an ordinal satisfaction scale (6 studies, 25.0%). The quality of evidence was poor, and the methods used to assess satisfaction were not standardized. Further research is needed to define the factors that affect patient satisfaction after total hip arthroplasty and how satisfaction is best measured. [Orthopedics. 201; 40(3):e400-e404.].

Malik, A. T., Jain, N., Scharschmidt, T. J., et al. (2018). "Does Surgeon Volume Affect Outcomes Following Primary Total Hip Arthroplasty? A Systematic Review." The Journal of arthroplasty 33(10) : 3329-3342.
https://www.arthroplastyjournal.org/article/S0883-5403(18)30524-2/fulltext

BACKGROUND: Surgeon volume has been identified as an important factor impacting postoperative outcome in patients undergoing orthopedic surgeries. With an absence of a detailed systematic review, we sought to collate evidence on the impact of surgeon volume on postoperative outcomes in patients undergoing primary total hip arthroplasty. METHODS: PubMed (MEDLINE) and Google Scholar databases were queried for articles using the following search criteria: ("Surgeon Volume" OR "Provider Volume" OR "Volume Outcome") AND ("THA" OR "Total hip replacement" OR "THR" OR "Total hip arthroplasty"). Studies investigating total hip arthroplasty being performed for malignancy or hip fractures were excluded from the review. Twenty-eight studies were included in the final review. All studies underwent a quality appraisal using the GRADE tool. The systematic review was performed in accordance with the PRISMA guidelines. RESULTS: Increasing surgeon volume was associated with a shorter length of stay, lower costs, and lower dislocation rates. Studies showed a significant association between an increasing surgeon volume and higher odds of early-term and midterm survivorship, but not long-term survivorships. Although complications were

reported and recorded differently in studies, there was a general trend toward a lower postoperative morbidity with regard to complications following surgeries by a high-volume surgeon. CONCLUSION: This systematic review shows evidence of a trend toward better postoperative outcomes with high-volume surgeons. Future prospective studies are needed to better determine long-term postoperative outcomes such as survivorship before healthcare policies such as regionalization and/or equal-access healthcare systems can be considered.

Masaracchio, M., Hanney, W. J., Liu, X., et al. (2017). "Timing of rehabilitation on length of stay and cost in patients with hip or knee joint arthroplasty: A systematic review with meta-analysis." PloS one 12(6) : e0178295-e0178295.
https://pubmed.ncbi.nlm.nih.gov/28575058

OBJECTIVE: To investigate the role of early initiation of rehabilitation on length of stay (LOS) and cost following total hip arthroplasty, total knee arthroplasty, or unicompartmental knee arthroplasty. DATA SOURCES: Electronic databases PubMed, CINAHL, Pedro, Embase, AMED, and the Cochrane Library were searched in July 2016. Five additional trials were identified through reference list scanning. STUDY SELECTION: Eligible studies were published in English language peer-reviewed journals; included participants that had undergone total hip arthroplasty, total knee arthroplasty, or unicompartmental knee arthroplasty reported clearly defined timing of rehabilitation onset for at least two groups; and reported at least one measure of LOS or cost. Inclusion criteria were applied by 2 independent authors, with disagreements being determined by a third author. Searching identified 1,029 potential articles, of which 17 studies with 26,614 participants met the inclusion criteria. DATA EXTRACTION: Data was extracted independently by 2 authors, with disagreements being determined by a third author. Methodological quality of each study was evaluated independently by 2 authors using the Downs and Black checklist. Pooled analyses were analyzed using a random-effects model with inverse variance methods to calculate standardized mean differences (SMD) and 95% confidence intervals for LOS. DATA SYNTHESIS: When compared with standard care, early initiation of physical therapy demonstrated a decrease in length of stay for the 4 randomized clinical trials (SMD = -1.90; 95% CI -2.76 to -1.05; I2 = 93%) and for the quasi-experimental and 5 prospective studies (SMD = -1.47; 95% CI -1.85 to -1.10; I2 = 88%). CONCLUSION: Early initiation of rehabilitation following total hip arthroplasty, total knee arthroplasty, or unicompartmental knee arthroplasty is associated with a shorter LOS, a lower overall cost, with no evidence of an increased number of adverse reactions. Additional high quality studies with standardized methodology are needed to further examine the impact of early initiation of physical therapy among patients with joint replacement procedures.

McDonald, S., Page, M. J., Beringer, K., et al. (2014). "Preoperative education for hip or knee replacement." Cochrane Database Syst Rev (5) : Cd003526.

BACKGROUND: Hip or knee replacement is a major surgical procedure that can be physically and psychologically stressful for patients. It is hypothesised that education before surgery reduces anxiety and enhances clinically important postoperative outcomes. OBJECTIVES: To determine whether preoperative education in people undergoing total hip replacement or total knee replacement improves postoperative outcomes with respect to pain, function, health-related quality of life, anxiety, length of hospital stay and the incidence of adverse events (e.g. deep vein thrombosis). SEARCH METHODS: We searched the Cochrane Central Register of Controlled Trials (2013, Issue 5), MEDLINE (1966 to May 2013), EMBASE (1980 to May 2013), CINAHL (1982 to May 2013), PsycINFO (1872 to May 2013) and PEDro to July

2010. We handsearched the Australian Journal of Physiotherapy (1954 to 2009) and reviewed the reference lists of included trials and other relevant reviews. SELECTION CRITERIA: Randomised or quasi-randomised trials of preoperative education (verbal, written or audiovisual) delivered by a health professional within six weeks of surgery to people undergoing hip or knee replacement compared with usual care. DATA COLLECTION AND ANALYSIS: Two review authors independently assessed trial quality and extracted data. We analysed dichotomous outcomes using risk ratios. We combined continuous outcomes using mean differences (MD) or standardised mean differences (SMD) with 95% confidence intervals (CI). Where possible, we pooled data using a random-effects meta-analysis. MAIN RESULTS: We included 18 trials (1463 participants) in the review. Thirteen trials involved people undergoing hip replacement, three involved people undergoing knee replacement and two included both people with hip and knee replacements. Only six trials reported using an adequate method of allocation concealment, and only two trials blinded participants. Few trials reported sufficient data to analyse the major outcomes of the review (pain, function, health-related quality of life, global assessment, postoperative anxiety, total adverse events and re-operation rate). There did not appear to be an effect of time on any outcome, so we chose to include only the latest time point available per outcome in the review.In people undergoing hip replacement, preoperative education may not offer additional benefits over usual care. The mean postoperative anxiety score at six weeks with usual care was 32.16 on a 60-point scale (lower score represents less anxiety) and was 2.28 points lower with preoperative education (95% confidence interval (CI) -5.68 to 1.12; 3 RCTs, 264 participants, low-quality evidence), an absolute risk difference of -4% (95% CI -10% to 2%). The mean pain score up to three months postoperatively with usual care was 3.1 on a 10-point scale (lower score represents less pain) and was 0.34 points lower with preoperative education (95% CI -0.94 to 0.26; 3 RCTs, 227 participants; low-quality evidence), an absolute risk difference of -3% (95% CI -9% to 3%). The mean function score at 3 to 24 months postoperatively with usual care was 18.4 on a 68-point scale (lower score represents better function) and was 4.84 points lower with preoperative education (95% CI -10.23 to 0.66; 4 RCTs, 177 participants; low-quality evidence), an absolute risk difference of -7% (95% CI -15% to 1%). The number of people reporting adverse events, such as infection and deep vein thrombosis, did not differ between groups, but the effect estimates are uncertain due to very low quality evidence (23% (17/75) reported events with usual care versus 18% (14/75) with preoperative education; risk ratio (RR) 0.79; 95% CI 0.19 to 3.21; 2 RCTs, 150 participants). Health-related quality of life, global assessment of treatment success and re-operation rates were not reported.In people undergoing knee replacement, preoperative education may not offer additional benefits over usual care. The mean pain score at 12 months postoperatively with usual care was 80 on a 100-point scale (lower score represents less pain) and was 2 points lower with preoperative education (95% CI -3.45 to 7.45; 1 RCT, 109 participants), an absolute risk difference of -2% (95% CI -4% to 8%). The mean function score at 12 months postoperatively with usual care was 77 on a 100-point scale (lower score represents better function) and was no different with preoperative education (0; 95% CI -5.63 to 5.63; 1 RCT, 109 participants), an absolute risk difference of 0% (95% CI -6% to 6%). The mean health-related quality of life score at 12 months postoperatively with usual care was 41 on a 100-point scale (lower score represents worse quality of life) and was 3 points lower with preoperative education (95% CI -6.38 to 0.38; 1 RCT, 109 participants), an absolute risk difference of -3% (95% CI -6% to 1%). The number of people reporting adverse events, such as infection and deep vein thrombosis, did not differ between groups (18% (11/60) reported events with usual care versus 13% (7/55) with preoperative education; RR 0.69; 95% CI 0.29 to 1.66; 1 RCT, 115 participants), an absolute risk difference of -6% (-19% to 8%). Global assessment of treatment success, postoperative anxiety and re-operation rates were not reported. AUTHORS' CONCLUSIONS: Although preoperative education is embedded in the

consent process, we are unsure if it offers benefits over usual care in terms of reducing anxiety, or in surgical outcomes, such as pain, function and adverse events. Preoperative education may represent a useful adjunct, with low risk of undesirable effects, particularly in certain patients, for example people with depression, anxiety or unrealistic expectations, who may respond well to preoperative education that is stratified according to their physical, psychological and social need.

Nakama, G. Y., Peccin, M. S., Almeida, G. J., et al. (2012). "Cemented, cementless or hybrid fixation options in total knee arthroplasty for osteoarthritis and other non-traumatic diseases." Cochrane Database Syst Rev 10 : Cd006193.

BACKGROUND: It is not clear which fixation of total knee arthroplasty obtains the best clinical, functional and radiographic results in people with osteoarthritis and other non-traumatic diseases, such as rheumatoid arthritis. OBJECTIVES: To assess the benefits and harms of cemented, cementless and hybrid knee prostheses fixation techniques in participants with primary osteoarthritis (osteoarthritis following trauma was not included) and other non-traumatic diseases, such as rheumatoid arthritis. SEARCH METHODS: We searched CENTRAL (2011, issue 10), MEDLINE via PubMed, EMBASE, Current Controlled Trials, LILACS, The Cumulative Index to Nursing and Allied Health Literature, SPORTDiscus, Health Technology Assessment Database and the Database of Abstracts of Reviews of Effectiveness, all from implementation to October 2011, along with handsearches of high-yield journals and reference lists of articles. No language restrictions were applied. SELECTION CRITERIA: Randomized controlled trials (RCTs) evaluating cemented, cementless and hybrid fixation. Participants included patients that were 18 years or older with osteoarthritis and other non-traumatic diseases who were undergoing primary total knee arthroplasty. DATA COLLECTION AND ANALYSIS: Three authors independently selected the eligible trials, assessed the trial quality, risk of bias and extracted data. Researchers were contacted to obtain missing information. MAIN RESULTS: Five RCTs and 297 participants were included in this review. Using meta-analysis on roentgen stereophotogrammetric analysis (RSA) we observed that cemented fixation of the tibial components demonstrated smaller displacement in relation to cementless fixation (with and without hydroxyapatite) after a follow-up of two years (maximum total point-motion, N = 167, two RCTs, mean difference (MD) = 0.52 mm, 95% confidence interval (CI) 0.31 to 0.74). However, the risk of future aseptic loosening with uncemented fixation was approximately half that of cemented fixation according to the arthroplasty instability classification (moderate quality as assessed by GRADE) inferred from RSA (N = 216, three RCTs, risk ratio (RR) = 0.47, 95% CI 0.24 to 0.92) with a 16% absolute risk difference between groups. The number needed to treat for an additional beneficial outcome (NNTB) to prevent future aseptic loosening was 7 (95% CI 5 to 44). There was a low risk of bias for RSA among the studies included. It was not possible to perform meta-analysis on patient-important outcomes, such as the survival rate of the implant (any change of a component), patient global assessments, functional measures, pain, health-related quality of life measures and adverse events. Almost all included studies recorded functional measures of Knee Society and Hospital for Special Surgery knee scores, but the authors of each study found no significant difference between the groups. AUTHORS' CONCLUSIONS: There was a smaller displacement of the cemented tibial component in relation to the cementless fixation in studies with osteoarthritis and rheumatoid arthritis participants who underwent primary total knee prosthesis with a follow-up of two years; however, the cemented fixation presented a greater risk of future aseptic loosening than cementless fixation.

Parker, M. J., Gurusamy, K. S. et Azegami, S. (2010). "Arthroplasties (with and without bone cement) for proximal femoral fractures in adults." Cochrane Database Syst Rev (6) : Cd001706.

> BACKGROUND: Numerous types of arthroplasties may be used in the surgical treatment of a hip fracture (proximal femoral fracture). The main differences between the implants are in the design of the stems, whether the stem is cemented or uncemented, whether a second articulating joint is included within the prosthesis (bipolar prosthesis), or whether a partial (hemiarthroplasty) or total whole hip replacement is used. OBJECTIVES: To review all randomised controlled trials comparing different arthroplasties for the treatment of hip fractures in adults. SEARCH STRATEGY: We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (September 2009), CENTRAL (The Cochrane Library 2009, Issue 3), MEDLINE, EMBASE and trial registers (all to September 2009), and reference lists of articles. SELECTION CRITERIA: All randomised and quasi-randomised controlled trials comparing different arthroplasties and their insertion with or without cement, for the treatment of hip fractures. DATA COLLECTION AND ANALYSIS: Two review authors independently assessed trial quality, by use of a 10-item checklist, and extracted data. MAIN RESULTS: Twenty-three trials involving 2861 older and mainly female patients with proximal femoral fractures are included. Cemented prostheses, when compared with uncemented prostheses (6 trials, 899 participants) were associated with a less pain at a year or later and improved mobility. No significant difference in surgical complications was found. One trial of 220 participants compared a hydroxyapatite coated hemiarthroplasty with a cemented prosthesis and reported no notable differences between the two prosthesis. Comparison of unipolar hemiarthroplasty with bipolar hemiarthroplasty (7 trials, 857 participants, 863 fractures) showed no significant differences between the two types of implant. Seven trials involving 734 participants compared hemiarthroplasty with a total hip replacement (THR). Most studies involved cemented implants. Dislocation of the prosthesis was more common with the THR but there was a general trend within these studies to better functional outcome scores for those treated with the THR. AUTHORS' CONCLUSIONS: There is good evidence that cementing the prostheses in place will reduce post-operative pain and lead to better mobility. From the trials to date there is no evidence of any difference in outcome between bipolar and unipolar prosthesis. There is some evidence that a total hip replacement leads to better functional outcome than a hemiarthroplasty. Further well-conducted randomised trials are required.

Pritchard, M. G., Murphy, J., Cheng, L., et al. (2020). "Enhanced recovery following hip and knee arthroplasty: a systematic review of cost-effectiveness evidence." BMJ Open 10(1) : e032204. https://bmjopen.bmj.com/content/bmjopen/10/1/e032204.full.pdf

> Objectives To assess cost-effectiveness of enhanced recovery pathways following total hip and knee arthroplasties. Secondary objectives were to report on quality of studies and identify research gaps for future work.Design Systematic review of cost–utility analyses.Data sources Ovid MEDLINE, Embase, the National Health Service Economic Evaluations Database and EconLit, January 2000 to August 2019.Eligibility criteria English-language peer-reviewed cost–utility analyses of enhanced recovery pathways, or components of one, compared with usual care, in patients having total hip or knee arthroplasties for osteoarthritis.Data extraction and synthesis Data extracted by three reviewers with disagreements resolved by a fourth. Study quality assessed using the Consensus on Health Economic Criteria list, the International Society for Pharmacoeconomics and Outcomes Research and Assessment of the Validation Status of Health-Economic decision models tools; for trial-based studies the Cochrane Collaboration’s tool to assess risk of bias. No quantitative synthesis was undertaken.Results We identified 17 studies: five trial-based and 12 model-based studies.

Two analyses evaluated entire enhanced recovery pathways and reported them to be cost-effective compared with usual care. Ten pathway components were more effective and cost-saving compared with usual care, three were cost-effective, and two were not cost-effective. We had concerns around risk of bias for all included studies, particularly regarding the short time horizon of the trials and lack of reporting of model validation.Conclusions Consistent results supported enhanced recovery pathways as a whole, prophylactic systemic antibiotics, antibiotic-impregnated cement and conventional ventilation for infection prevention. No other interventions were subject of more than one study. We found ample scope for future cost-effectiveness studies, particularly analyses of entire recovery pathways and comparison of incremental changes within pathways. A key limitation is that standard practices have changed over the period covered by the included studies.PROSPERO registration number CRD42017059473.

Salazar, C. A., Malaga, G. et Malasquez, G. (2010). "Direct thrombin inhibitors versus vitamin K antagonists or low molecular weight heparins for prevention of venous thromboembolism following total hip or knee replacement." Cochrane Database Syst Rev (4) : Cd005981.

BACKGROUND: Patients who have undergone total hip or knee replacement (THR, TKR) have a high risk of developing venous thromboembolism (VTE) following surgery, despite appropriate anticoagulation with warfarin or low molecular weight heparin (LMWH). New anticoagulants are under investigation. OBJECTIVES: To examine the efficacy and safety of prophylactic anticoagulation with direct thrombin inhibitors (DTIs) versus LMWH or vitamin K antagonists in the prevention of VTE in patients undergoing THR or TKR. SEARCH STRATEGY: The Cochrane Peripheral Vascular Disease Group searched their Specialized Register (last searched 12 March 2010) and CENTRAL (last searched 2010, Issue 2). SELECTION CRITERIA: Randomised controlled trials. DATA COLLECTION AND ANALYSIS: Three reviewers independently assessed methodological quality and extracted data in pre-designed tables. The reported follow-up events were included MAIN RESULTS: We included 14 studies included involving 21,642 patients evaluated for efficacy and 27,360 for safety. No difference was observed in major VTE in DTIs compared with LMWH in both types of operations (odds ratio (OR) 0.91; 95% confidence interval (CI) 0.69 to 1.19), with high heterogeneity (I(2) 71%). No difference was observed with warfarin (OR 0.85; 95% CI 0.63 to 1.15) in TKR, with no heterogeneity (I(2) 0%).More total bleeding events were observed in the DTI group (in ximelagatran and dabigatran but not in desirudin) in patients subjected to THR (OR 1.40; 95% CI 1.06, 1.85; I(2) 41%) compared with LMWH. No difference was observed with warfarin in TKR (OR 1.76; 95% CI 0.91 to 3.38; I(2) 0%). All-cause mortality was higher in the DTI group when the reported follow-up events were included (OR 2.06; 95% CI 1.10 to 3.87).Studies that initiated anticoagulation before surgery showed less VTE events; those that began anticoagulation after surgery showed more VTE events in comparison with LMWH. Therefore, the effect of the DTIs compared with LMWH appears to be influenced by the time of initiation of coagulation more than the effect of the drug it self. The results obtained from sensitivity analysis, did not differ from the analysed results; this strengthens the value of the results. AUTHORS' CONCLUSIONS: Direct thrombin inhibitors are as effective in the prevention of major venous thromboembolism in THR or TKR as LMWH and vitamin K antagonists. However, they show higher mortality and cause more bleeding than LMWH. No severe hepatic complications were reported in the analysed studies. Use of ximelagatran is not recommended for VTE prevention in patients who have undergone orthopedic surgery. More studies are necessary regarding dabigatran.

Smith, T. O., Jepson, P., Beswick, A., et al. (2016). "Assistive devices, hip precautions, environmental modifications and training to prevent dislocation and improve function after hip arthroplasty." Cochrane Database Syst Rev 7 : Cd010815.

BACKGROUND: Total hip arthroplasty (THA) is one of the most common orthopaedic operations performed worldwide. Painful osteoarthritis of the hip is the primary indication for THA. Following THA, people have conventionally been provided with equipment, such as raised toilet seats and chairs, and educated to avoid activities that could cause the hip joint to be in a position of flexion over 90 degrees, or adduction or rotation past the midline. These aspects of occupational therapy have been advocated to reduce the risks of prosthesis dislocation. However, the appropriateness of these recommendations has been questioned. OBJECTIVES: To assess the effects of provision of assistive devices, education on hip precautions, environmental modifications and training in activities of daily living (ADL) and extended ADL (EADL) for people undergoing THA. SEARCH METHODS: We searched MEDLINE (1946 to April 2016), EMBASE (1947 to April 2016), the Cochrane Library including CENTRAL (Issue 4 of 12, 2016), Database of Reviews of Effects (DARE), Health Technology Assessment (HTA), Economic Evaluations Database (EED), CINAHL, PEDro and CIRRIE from inception to April 2016. In addition we checked Controlled Clinical Trials, Clinicaltrials.gov, the National Institutes of Health Trial Registry, the World Health Organization International Clinical Trials Registry Platform (WHO ICTRP) and the OpenGrey database from inception to April 2016. SELECTION CRITERIA: We included randomised controlled trials (RCTs), quasi-RCTs and cluster-RCTs that evaluated the effectiveness of the provision of assistive devices, education on hip precautions, environmental modifications, or training in ADL and EADL for people undergoing THA. The main outcomes of interest were pain, function, health-related quality of life (HRQOL), global assessment of treatment success, reoperation rate, hip dislocation and adverse events. DATA COLLECTION AND ANALYSIS: We used standard methodological procedures recognised by Cochrane. We conducted a systematic literature search using several databases and contacted corresponding authors, appraised the evidence using the Cochrane risk of bias tool, analysed the data using a narrative analysis approach (as it was not possible to conduct a meta-analysis due to heterogeneity in interventions), and interpreted all outcomes using the GRADE approach. MAIN RESULTS: We included three trials with a total of 492 participants who had received 530 THA. The evidence presented with a high risk of performance, detection and reporting bias.One study (81 participants) compared outcomes for participants randomised to the provision of hip precautions, equipment and functional restrictions versus no provision of hip precautions, equipment or functional restrictions. Due to the quality of evidence being very low, we are uncertain if the provision of hip precautions, equipment and functional restrictions improved function measured using the Harris Hip Score at 12 month follow-up, or health-related quality of life (HRQOL) measured by the Short Form-12 at four week follow-up, compared to not providing this. There were no incidences of hip dislocation or adverse events in either group during the initial 12 postoperative months. The study did not measure pain score, global assessment of treatment success or total adverse events.One study (265 participants; 303 THAs) evaluated the provision of hip precautions with versus without the prescription of postoperative equipment and restrictions to functional activities. Due to the quality of evidence being very low, we are uncertain if perceived satisfaction in the rate of recovery differed in people who were not prescribed postoperative equipment and restrictions (135/151 satisfied) compared to those prescribed equipment and restrictions (113/152) (risk ratio (RR) 0.83, 95% confidence interval (CI) 0.75 to 0.93; 265 participants, one trial; number needed to treat for an additional beneficial outcome (NNTB) = 7). Due to the low quality evidence, we are uncertain if the incidence of hip dislocation differed between participants provided with hip precautions with (1/152) compared to without providing equipment or restrictions post-THA

(0/151) (RR 2.98, 95% CI 0.12 to 72.59). The study did not measure pain, function, HRQOL, re-operation rates or total adverse events.One study (146 participants) investigated the provision of an enhanced postoperative education and rehabilitation service on hospital discharge to promote functional ADL versus a conventional rehabilitation intervention in the community. This study was of very low quality evidence. We were uncertain if the provision of enhanced postoperative education and rehabilitation improved function at six months follow-up, when assessed using the Objective and Subjective Functional Capability Index (146 participants, one trial; P > 0.05; no numerical results provided) compared to conventional rehabilitation. The study did not measure pain score, HRQOL, global assessment of treatment success, hip dislocation, re-operation rate or total adverse events. AUTHORS' CONCLUSIONS: Very low quality evidence is available from single trials, thus we are uncertain if hip precautions with or without the addition of equipment and functional restrictions are effective in preventing dislocation and improving outcomes after THA. There is also insufficient evidence to support or refute the adoption of a postoperative community rehabilitation programme consisting of functional reintegration and education compared to conventional rehabilitation strategies based on functional outcomes.Further high-quality trials are warranted to assess the outcomes of different occupational therapy interventions both in the short and longer-term for those who undergo THA. An assessment of the impact of such interventions on pain and restriction on personal ADL, EADL and instrumental ADL is needed, and also of functional integration-type interventions rather than just hip precautions, equipment and restrictions.

Tay Swee Cheng, R., Klainin-Yobas, P., Hegney, D., et al. (2015). "Factors relating to perioperative experience of older persons undergoing joint replacement surgery: an integrative literature review." Disabil Rehabil 37(1) : 9-24.

PURPOSE: The purpose of this literature review was to examine factors relating to the perioperative experience of older persons undergoing total hip and knee replacement surgery resulting from osteoarthritis. METHOD: A literature search was undertaken using databases CINAHL, PubMed, Scopus and Web of Science to provide relevant research articles. Articles were included if they examined the factors relating to the HRQOL, QOL and perioperative experience of older persons undergoing joint replacement surgery resulting from osteoarthritis. The use of Joanna Briggs Institute's critical appraisal checklist facilitated a systematic appraisal of studies with regard to the scientific rigor of the studies. RESULTS: Twenty-two publications were categorized into one main theme: "factors relating to perioperative experience" subcategorized into eight subthemes: "waiting time", "pain and disability", "mental health", "race/ethnicity, age and gender", "body image", "coping and social support", "patient education" and "care continuity". CONCLUSION: There is a need to conduct further research to examine the perioperative experience of older persons undergoing joint replacement surgery, in particular, the lived perioperative experience of a diverse race, ethnicity and culture in an Asian population. Implications for Rehabilitation Healthcare services should remain focused on reducing waiting time as prolonged waiting time for joint replacement surgery was detrimental to patients' HRQOL. Healthcare professionals need to identify strategies to improve the perioperative pain experience through patient education on pain management and positive social support to support the process of recovery. Patients' expectations of pain and their process of recovery were closely linked to patient education. One model of patient education that was seen to be successful and linked to good post-operative outcomes was care continuity model. Being actively involved in the care continuity results in better post-operative outcomes for the patient and their family.

Van Herck, P., Vanhaecht, K., Deneckere, S., et al. (2010). "Key interventions and outcomes in joint arthroplasty clinical pathways: a systematic review." J Eval Clin Pract 16(1) : 39-49.

UNLABELLED: SUMMARY RATIONALE, AIMS AND OBJECTIVES: Clinical pathways are globally used to improve quality and efficiency of care. Total joint arthroplasty patients are one of the primary target groups for clinical pathway development. Despite the worldwide use of clinical pathways, it is unclear which key interventions multidisciplinary teams select as pathway components, which outcomes they measures and what the effect of this complex intervention is. This literature study is aimed at three research questions: (1) What are the key interventions used in joint arthroplasty clinical pathways? (2) Which outcome measures are used? (3) What are the effects of a joint arthroplasty clinical pathway? METHOD: Systematic literature review using a multiple reviewer approach. Five electronic databases were searched comprehensively. Reference lists were screened. Experts were consulted. After application of inclusion and exclusion criteria and critical appraisal, 34 of the 4055 publications were included. RESULTS: Joint arthroplasty clinical pathways address pre-admission education, pre-admission exercises, pre-admission assessment and testing, admission and surgical procedure, postoperative rehabilitation, minimal manipulation, symptoms management, thrombosis prophylaxis, discharge management, primary caregiver involvement, home-based physiotherapy and continuous follow-up. An overview of target dimensions and corresponding indicators is provided. Clinical pathways for joint arthroplasty could improve process and financial outcomes. The effects on clinical outcome are mixed. Evidence on team and service outcome is lacking. CONCLUSIONS: A set of key interventions and outcome measures is available to support joint arthroplasty clinical pathways. Team and service outcomes should be further addressed in practice and research. Meta-analysis on the outcome indicators should be performed. Future studies should more rigorously comply with existing reporting standards.

Verra, W. C., van den Boom, L. G., Jacobs, W., et al. (2013). "Retention versus sacrifice of the posterior cruciate ligament in total knee arthroplasty for treating osteoarthritis." Cochrane Database Syst Rev (10) : Cd004803.

BACKGROUND: The functional and clinical basis on which to choose whether or not to retain the posterior cruciate ligament during total knee arthroplasty surgery remained unclear after a Cochrane systematic review and meta-analysis in 2005, which contained eight clinical trials. Several new trials have been conducted since then. Hence, an update of the review was performed. OBJECTIVES: Our aim was to assess the benefits and harms of retention compared to sacrifice of the posterior cruciate ligament in total knee arthroplasty in patients with osteoarthritis of the knee. SEARCH METHODS: An extensive search was conducted in CENTRAL, MEDLINE (PubMed), EMBASE, Web of Science, CINAHL, Academic Search Premier, Current Contents Connect and Science Direct. All databases were searched, without any limitations, up to 6 December 2012. References of the articles were checked and citation tracking was performed. SELECTION CRITERIA: Randomised and quasi-randomised controlled trials comparing retention with sacrifice of the posterior cruciate ligament in primary total knee arthroplasty in patients with osteoarthritis of the knee. DATA COLLECTION AND ANALYSIS: Data were collected with a pre-developed form. Risk of bias was assessed independently by two authors (WV, LB). The level of evidence was graded using the GRADE approach. Meta-analysis was performed by pooling the results of the selected studies, when possible. Subgroup analyses were performed for posterior cruciate ligament retention versus sacrifice using the same total knee arthroplasty design, and for studies using a posterior cruciate ligament retaining or posterior stabilised design, and when sufficient studies were available subgroup analyses were performed for the same brand. MAIN RESULTS: Seventeen

randomised controlled trials (with 1810 patients and 2206 knees) were found, described in 18 articles. Ten of these were new studies compared to the previous Cochrane Review. One study from the original Cochrane review was excluded. Most new studies compared a posterior cruciate ligament retaining design with a posterior stabilised design, in which the posterior cruciate ligament is sacrificed (a posterior stabilised design has an insert with a central post which can engage on a femoral cam during flexion).The quality of evidence (graded with the GRADE approach) and the risk of bias were highly variable, ranging from moderate to low quality evidence and with unclear or low risk of bias for most domains, respectively.The performance outcome 'range of motion' was 2.4 degrees higher in favour of posterior cruciate ligament sacrifice (118.3 degrees versus 115.9 degrees ; 95% confidence interval (CI) of the difference 0.13 to 4.67; P = 0.04), however the results were heterogeneous. On the item 'knee pain' as experienced by patients, meta-analysis could be performed on the Knee Society knee pain score; this score was 48.3 in both groups, yielding no difference between the groups. Implant survival rate could not be meta-analysed adequately since randomised controlled trials lack the longer term follow-up in order to evaluate implant survival. A total of four revisions in the cruciate-retention and four revisions in the cruciate-sacrifice group were found. The well-validated Western Ontario and McMaster Universities osteoarthritis index (WOMAC) total score was not statistically significantly different between the groups (16.6 points for cruciate-retention versus 15.0 points for cruciate-sacrifice). One study reported a patient satisfaction grade (7.7 points for cruciate-retention versus 7.9 points for cruciate-sacrifice on a scale from 0 to 10, 10 being completely satisfied) which did not differ statistically significantly. Complications were distributed equally between both groups. Only one study reported several re-operations other than revision surgery; that is patella luxations, surgical manipulation because of impaired flexion.The mean functional Knee Society Score was 2.3 points higher (81.2 versus 79.0 points; 95% CI of the difference 0.37 to 4.26; P = 0.02) in the posterior cruciate ligament sacrificing group. Results from the outcome Knee Society functional score were homogeneous. All other outcome measures (extension angle, knee pain, adverse effects, clinical questionnaire scores, Knee Society clinical scores, radiological rollback, radiolucencies, femorotibial angle and tibial slope) showed no statistically significant differences between the groups. In the subgroup analyses that allowed pooling of the results of the different studies, no homogeneous statistically significant differences were identified. AUTHORS' CONCLUSIONS: The methodological quality and the quality of reporting of the studies were highly variable. With respect to range of motion, pain, clinical, and radiological outcomes, no clinically relevant differences were found between total knee arthroplasty with retention or sacrifice of the posterior cruciate ligament. Two statistically significant differences were found; range of motion was 2.4 degrees higher in the posterior cruciate ligament sacrificing group, however results were heterogeneous; and the mean functional Knee Society Score was 2.3 points higher in the posterior cruciate ligament sacrificing group. These differences are clinically not relevant.

Wang, L., Lee, M., Zhang, Z., et al. (2016). "Does preoperative rehabilitation for patients planning to undergo joint replacement surgery improve outcomes? A systematic review and meta-analysis of randomised controlled trials." BMJ Open 6(2) : e009857.

OBJECTIVES: The clinical impact of preoperative physiotherapy on recovery after joint replacement remains controversial. This systematic review aimed to assess the clinical impact of prehabilitation before joint replacement. DESIGN: We searched PubMed, Embase and Cochrane CENTRAL up to November 2015 for randomised controlled trials comparing prehabilitation versus no prehabilitation before joint replacement surgery. Postoperative pain and function scores were converted to Western Ontario and McMaster Universities

Osteoarthritis Index (WOMAC) pain and function subscales (0-100, high scores indicate worse outcome). Random effects meta-analysis was performed to calculate weighted mean differences (WMD, 95% CI), subgrouped by hip and knee surgery. PRIMARY AND SECONDARY OUTCOMES: Postoperative pain and function scores, time to resume activities of daily living, quality of life, length of hospital stay, total cost, patient satisfaction, postoperative complications, any adverse events and discontinuations. RESULTS: Of 22 studies (1492 patients), 18 had high risk of bias. Prehabilitation slightly reduced pain scores within 4 weeks postoperatively (WMD -6.1 points, 95% CI -10.6 to -1.6 points, on a scale of 0-100), but differences did not remain beyond 4 weeks. Prehabilitation slightly improved WOMAC function score at 6-8 and 12 weeks (WMD -4.0, 95% CI -7.5 to -0.5), and time to climbing stairs (WMD -1.4 days, 95% CI -1.9 to -0.8 days), toilet use (-0.9 days, 95% CI -1.3 to -0.5 days) and chair use (WMD -1.2 days, 95% CI -1.7 to -0.8 days). Effects were similar for knee and hip surgery. Differences were not found for SF-36 scores, length of stay and total cost. Other outcomes of interest were inadequately reported. CONCLUSIONS: Existing evidence suggests that prehabilitation may slightly improve early postoperative pain and function among patients undergoing joint replacement; however, effects remain too small and short-term to be considered clinically-important, and did not affect key outcomes of interest (ie, length of stay, quality of life, costs).

Xu, J., Chen, X. M., Ma, C. K., et al. (2014). "Peripheral nerve blocks for postoperative pain after major knee surgery." Cochrane Database Syst Rev (12) : Cd010937.

BACKGROUND: Major knee surgery is a common operative procedure to help people with end-stage knee disease or trauma to regain mobility and have improved quality of life. Poorly controlled pain immediately after surgery is still a key issue for this procedure. Peripheral nerve blocks are localized and site-specific analgesic options for major knee surgery. The increasing use of peripheral nerve blocks following major knee surgery requires the synthesis of evidence to evaluate its effectiveness and safety, when compared with systemic, local infiltration, epidural and spinal analgesia. OBJECTIVES: To examine the efficacy and safety of peripheral nerve blocks for postoperative pain control following major knee surgery using methods that permit comparison with systemic, local infiltration, epidural and spinal analgesia. SEARCH METHODS: We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (Issue 1, 2014), MEDLINE and EMBASE, from their inception to February 2014. We identified ongoing studies by searching trial registries, including the metaRegister of controlled trials (mRCT), clinicaltrials.gov and the WHO International Clinical Trials Registry Platform (ICTRP). SELECTION CRITERIA: We included participant-blind, randomized controlled trials of adult participants (15 years or older) undergoing major knee surgery, in which peripheral nerve blocks were compared to systemic, local infiltration, epidural and spinal analgesia for postoperative pain relief. DATA COLLECTION AND ANALYSIS: Two review authors independently assessed study eligibility and extracted data. We recorded information on participants, methods, interventions, outcomes (pain intensity, additional analgesic consumption, adverse events, knee range of motion, length of hospital stay, hospital costs, and participant satisfaction). We used the 5-point Oxford quality and validity scale to assess methodological quality, as well as criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions. We conducted meta-analysis of two or more studies with sufficient data to investigate the same outcome. We used the I(2) statistic to explore the heterogeneity. If there was no significant heterogeneity (I(2) value 0% to 40%), we used a fixed-effect model for meta-analysis, but otherwise we used a random-effects model. For dichotomous data, we present results as a summary risk ratio (RR) and a 95% confidence interval (95% CI). Where possible, we calculated the number needed to treat for an additional beneficial outcome (NNTB) or for an additional harmful outcome (NNTH), together

with 95% CIs. For continuous data, we used the mean difference (MD) and 95% CI for similar outcome measures. We describe the findings of individual studies where pooling of data was not possible. MAIN RESULTS: According to the eligibility criteria, we include 23 studies with 1571 participants, with high methodological quality overall. The studies compared peripheral nerve blocks adjunctive to systemic analgesia with systemic analgesia alone (19 studies), peripheral nerve blocks with local infiltration (three studies), and peripheral nerve blocks with epidural analgesia (one study). No study compared peripheral nerve blocks with spinal analgesia.Compared with systemic analgesia alone, peripheral nerve blocks adjunctive to systemic analgesia resulted in a significantly lower pain intensity score at rest, using a 100 mm visual analogue scale, at all time periods within 72 hours postoperatively, including the zero to 23 hours interval (MD -11.85, 95% CI -20.45 to -3.25, seven studies, 390 participants), the 24 to 47 hours interval (MD -12.92, 95% CI -19.82 to -6.02, six studies, 320 participants) and the 48 to 72 hours interval (MD -9.72, 95% CI -16.75 to -2.70, four studies, 210 participants). Subgroup analyses suggested that the high levels of statistical variation in our analyses could be explained by larger effects in people undergoing total knee arthroplasty compared with other types of surgery. Pain intensity was also significantly reduced on movement in the 48 to 72 hours interval postoperatively (MD -6.19, 95% CI -11.76 to -0.62, two studies, 112 participants). There was no significant difference on movement between these two groups in the time period of zero to 23 hours (MD -6.95, 95% CI -15.92 to 2.01, five studies, 304 participants) and 24 to 47 hours (MD -8.87, 95% CI -27.77 to 10.03, three studies, 182 participants). The included studies reported diverse types of adverse events, and we did not conduct a meta-analysis on specific types of adverse event. The numbers of studies and participants were also too few to draw conclusions on the other prespecified outcomes of: additional analgesic consumption; median time to remedication; knee range of motion; median time to ambulation; length of hospital stay; hospital costs; and participant satisfaction. There were insufficient data to compare peripheral nerve blocks and local infiltration or between peripheral nerve blocks and epidural analgesia. AUTHORS' CONCLUSIONS: All of the included studies reported the main outcome of pain intensity but did not cover all the secondary outcomes of interest. The current review provides evidence that the use of peripheral nerve blocks as adjunctive techniques to systemic analgesia reduced pain intensity when compared with systemic analgesia alone after major knee surgery. There were too few data to draw conclusions on other outcomes of interest. More trials are needed to demonstrate a significant difference when compared with local infiltration, epidural analgesia and spinal analgesia.

Zhao, J. M., He, M. L., Xiao, Z. M., et al. (2014). "Different types of intermittent pneumatic compression devices for preventing venous thromboembolism in patients after total hip replacement." Cochrane Database Syst Rev (12) : Cd009543.

BACKGROUND: Total hip replacement (THR) is an effective treatment for reducing pain and improving function and quality of life in patients with hip disorders. While this operation is very successful, deep vein thrombosis (DVT) and pulmonary embolism (PE) are significant complications after THR. Different types of intermittent pneumatic compression (IPC) devices have been used for thrombosis prophylaxis in patients following THR. Available devices differ in compression garments, location of air bladders, patterns of pump pressure cycles, compression profiles, cycle length, duration of inflation time and deflation time, or cycling mode such as automatic or constant cycling devices. Despite the widely accepted use of IPC for the treatment of arterial and venous diseases, the relative effectiveness of different types of IPC systems as prophylaxis against thrombosis after THR is still unclear. OBJECTIVES: To assess the comparative effectiveness and safety of different IPC devices with respect to the prevention of venous thromboembolism in patients after THR. SEARCH METHODS: For this

update the Cochrane Peripheral Vascular Diseases Group Trials Search Coordinator searched the Specialised Register (November 2014), CENTRAL (2014, Issue 10). Clinical trial databases were searched for details of ongoing and unpublished studies. Reference lists of relevant articles were also screened. There were no limits imposed on language or publication status. SELECTION CRITERIA: Randomized and quasi-randomized controlled studies were eligible for inclusion. DATA COLLECTION AND ANALYSIS: Two review authors independently selected trials, assessed trials for eligibility and methodological quality, and extracted data. Disagreement was resolved by discussion or, if necessary, referred to a third review author. MAIN RESULTS: Only one quasi-randomized controlled study with 121 study participants comparing two types of IPC devices met the inclusion criteria. The authors found no cases of symptomatic DVT or PE in either the calf-thigh compression group or the plantar compression group during the first three weeks after the THR. The calf-thigh pneumatic compression was more effective than plantar compression for reducing thigh swelling during the early postoperative stage. The strength of the evidence in this review is weak as only one trial was included and it was classified as having a high risk of bias. AUTHORS' CONCLUSIONS: There is a lack of evidence from randomized controlled trials to make an informed choice of IPC device for preventing venous thromboembolism (VTE) following total hip replacement. More research is urgently required, ideally a multicenter, properly designed RCT including a sufficient number of participants. Clinically relevant outcomes such as mortality, imaging-diagnosed asymptomatic VTE and major complications must be considered.

Les parcours de soins

ÉTUDES FRANÇAISES

Adam, P., Philippe, R., Ehlinger, M., et al. (2012). "Dual mobility cups hip arthroplasty as a treatment for displaced fracture of the femoral neck in the elderly. A prospective, systematic, multicenter study with specific focus on postoperative dislocation." Orthop Traumatol Surg Res 98(3) : 296-300.

INTRODUCTION: Displaced fractures of the femoral neck in the elderly are best treated with arthroplasty. The type of arthroplasty to be used, either hemi- or total hip arthroplasty, remains controversial as total hip replacements potentially have a higher rate of dislocation. HYPOTHESIS: Dual mobility cups have a low dislocation rate when used to manage acute fractures of the femoral neck. PATIENTS AND METHODS: In a multicenter prospective study conducted in France over an inclusion time of 3 months, all displaced fractures of the femoral neck treated with arthroplasty were operated on with insertion of a dual mobility cup. Patients had clinical and radiological assessment at 3, 6, and 9 months postoperative. RESULTS: Two hundred and fourteen hips in 214 patients with a mean age of 83 years (range, 70-103 years) were included. None of the patients was lost to follow-up. The mortality rate after 9 months was 19%. Two patients (1%) had early postoperative infection successfully treated with lavage and antibiotics. Three patients (1.4%), operated through a posterior approach, presented one postoperative dislocation, all of which were posterior. Reduction was performed through closed external manipulation under general anesthesia. There was no recurrence of dislocation. DISCUSSION: This low rate of dislocation after acute total hip replacement using dual mobility design cups favorably compares with hemiarthroplasties. Dual mobility cups might therefore be considered a valuable option to prevent postoperative dislocation when treating displaced intracapsular fractures of the proximal femur in elderly patients if a total hip replacement is recommended. Further study is needed before extending the indications for total hip arthroplasty following a fracture of the femoral neck,

to assess the potential cost and complications of a longer procedure with its potential acetabular complication, and weigh them against the potential benefits.

Amouyel, T., Brunschweiler, B., Freychet, B., et al. (2015). "No improvement in the post-TKA infection prognosis when the implant is not reimplanted: Retrospective multicentre study of 72 cases." Orthop Traumatol Surg Res 101(6 Suppl) : S251-255.

INTRODUCTION: For the surgeon and patient, permanent removal of an infected knee prosthesis is an unwelcome decision taken out of necessity because unfavourable local or general conditions may increase the likelihood of mechanical or infectious failure upon prosthesis reimplantation. The purpose of this study was to determine if permanent removal of an infected total knee arthroplasty (TKA) implant controls the infection and prevents above-the-knee amputation when reimplantation turns out to be too risky. It was hypothesized that removal without reimplantation contributes to eradicating the infection and helps to avoid amputation. PATIENTS AND METHODS: Seventy-two consecutive patients who underwent TKA removal between 2000 and 2010 at 14 hospitals were reviewed. The TKA removal was followed by knee fusion in 29 cases or implantation of a permanent cement spacer in 43 cases. RESULTS: If failure is defined as clinically obvious recurrence of the infection, the survival rate was 65 +/- 5% at 2 years; 44% of patients had a recurrence of the infection, 8% had undergone amputation and 19% presented with nonunion at the last follow-up. The male gender and the presence of multiple co-morbidities were predisposing factors for failure. DISCUSSION: Control of the infection is not guaranteed upon TKA implant removal; the success rate is lower than in cases of two-stage reimplantation. The outcomes in this study are worse than those of other published studies. This is likely due to the heterogeneity in the patient population and treatments, along with the presence of co-morbidities. This treatment option should be the last recourse before amputation.

Baumann, C., Rat, A. C., Mainard, D., et al. (2011). "Importance of patient satisfaction with care in predicting osteoarthritis-specific health-related quality of life one year after total joint arthroplasty." Qual Life Res 20(10) : 1581-1588.

PURPOSE: After previous results observed with a generic health-related quality of life (HRQoL) instrument, we aimed to confirm that immediate postoperative patient satisfaction with care predicts self-perceived health 1 year after total hip replacement/total knee replacement (THR/TKR), using an osteoarthritis (OA)-specific HRQoL questionnaire. METHODS: This was a French multicenter prospective cohort study of patients after THR/TKR. HRQoL was assessed by the OsteoArthritis Knee and Hip Quality Of Life (OAKHQOL) instrument before and after surgery and satisfaction with care by the Quality of Care Scale (QCS). RESULTS: A total of 189 patients were followed up 12 months after discharge (mean age 68.9 SD = 8.5; 41.9% male). After adjustment for relevant variables, patients satisfied with care postoperatively showed greater 1-year postoperative HRQOL than those less satisfied with care. Patients satisfied with medical information had a higher postoperative HRQoL score than patients less satisfied in 3 of 5 OAKHQOL dimensions ($P < 0.001$ to $P = 0.02$), and patients satisfied with relationships with staff and daily routine scored higher on all HRQoL dimensions than did less-satisfied patients (all $P < 0.001$). CONCLUSIONS: These new findings with an OA-specific HRQOL questionnaire confirm that immediate postoperative satisfaction with care after THR/TKR for OA is a good predictor of self-perceived health status 1 year after surgery. Satisfaction with care therefore represents a relevant indicator of patient-reported health and is quickly accessible to clinicians.

Bel, J. C. et Carret, J. P. (2015). "Total hip arthroplasty with minimal invasive surgery in elderly patients with neck of femur fractures: our institutional experience." Injury 46 Suppl 1 : S13-17.

The purpose of this study was to investigate whether minimal invasive surgery (MIS) in elderly patients with neck of femur fractures would reduce the peri-operative complications and improve the post-operative ambulation and length of hospital stay in his cohort of patients. Forty elderly patients were treated with either total hip arthroplasty (THA) or bipolar prosthesis using MIS transgluteal approach. A matched reference group treated with a conventional surgical approach formed the control group. All procedures were performed by the same surgeon. Selection of acetabular component included Novae(R) uncemented press fit dual mobility concept socket or Bipolar Hemi-Arthroplasty (BHA). The femoral implant was Corail(R) uncemented stem or Fjord(R) cemented stem when primary instability was encountered. The follow-up was done for all patients and its minimum length was more than thirty-six months. The average length of the skin incision was 7 (6-8) SD 0.7 cm. Eighteen THA, twenty-two BHA, thirty-seven uncemented femoral stems and three cemented stems were implemented. The length of the procedure was the same as those of the reference group. The operative and post-operative blood loss and analgesic use were significantly decreased in the MIS group. Radiographic implants positioning was similar amongst the two groups. No skin complication, no primary infection, no death within ninety days and no dislocations were observed. MIS approach for implanting THA after a femoral neck fracture in the elderly appears to be a reliable procedure.

Belbachir, A. (2012). "Prise en charge de la douleur après prothèse totale de hanche." DOULEURS : EVALUATION, DIAGNOSTIC, TRAITEMENT 13(2) : 63-73.

La prothèse totale de hanche est actuellement une intervention fréquente et bien codifiée, environ 120000 par an en France. Les patients sont en majorité des femmes et la moyenne d'âge est de 69 ans. Les patients sont de plus en plus nombreux à exiger de ne plus souffrir après l'intervention. Modérée au repos, la douleur postopératoire après prothèse totale de hanche est souvent exacerbée au mouvement ou par des spasmes réflexes du quadriceps. Cependant, de fortes douleurs surviennent chez 50 % des patients au repos et chez 70 % des patients à la mobilisation. La meilleure approche analgésique permettant d'assurer un confort et une rééducation fonctionnelle de qualité est multimodale. L'adjonction de plusieurs sites d'action permet de contrer le message nociceptif et l'effet synergique ou additif des associations réduit la dose de chaque analgésique et par la-même les effets secondaires. L'analgésie locorégionale réalisée sous échographie en préopératoire permet une épargne morphinique voire une abstention et une réduction de l'intensité douloureuse durant les quatre heures post-extubation. L'intérêt en est de diminuer l'effet hyperalgésique des morphiniques. L'adjonction de produit anti-hyperalgésiants telle la kétamine à faible dose est maintenant bien prise en compte. Le relai est assuré par voie orale en postopératoire immédiat par des antalgiques non morphiniques en systématique et la morphine per os en fonction de l'intensité de la douleur. L'analgésie est une des pièces maîtresses de la réhabilitation postopératoire précoce. À cela s'ajoutera l'éducation thérapeutique qui aura un impact non seulement sur l'anxiété et la douleur postopératoire mais également sur la reprise fonctionnelle.

Biau, D. J., Leclerc, P., Marmor, S., et al. (2012). "Monitoring the one year postoperative infection rate after primary total hip replacement." Int Orthop 36(6) : 1155-1161.

PURPOSE: Infection of a total hip replacement is potentially a devastating complication. Statistical process control methods have been generating interest as a means of improving

the quality of healthcare, and we report our experience with the implementation of such a method to monitor the one year infection rate after primary total hip replacement. METHOD: Infection was defined as the growth of the same organism in cultures of at least two aspirates or intra-operative specimens, or growth of one pathogen in a patient with local signs of infection such as erythema, abscess or draining sinus tract. The cumulative summation test (CUSUM test) was used to continuously monitor the one year postoperative infection rate. The target performance was 0.5% and the test was set to detect twice that rate. RESULTS: Over the three year study period, 2006 primary total hip replacements were performed. Infection developed within one year after surgery in eight (0.4%) hips. The CUSUM test generated no alarms during the study period, indicating that there was no evidence that the process was out of control. CONCLUSION: The one year infection rate after primary total hip replacement was in control. The CUSUM test is a useful method to continuously ensure that performance is maintained at an adequate level.

Cholewinski, P., Putman, S., Vasseur, L., et al. (2015). "Long-term outcomes of primary constrained condylar knee arthroplasty." Orthop Traumatol Surg Res 101(4) : 449-454.

BACKGROUND: Although constrained condylar knee (CCK) inserts are widely used for total knee arthroplasty (TKA), their long-term outcomes remain unclear. We sought to evaluate patients with at least 10 years' follow-up after CCK TKA to identify potential adverse events (osteolysis, loosening, constraint-mechanism failure), assess functional outcomes with special emphasis on range of motion, and determine prosthesis survival. HYPOTHESIS: Increasing constraint by implantation of a CCK insert does not increase the long-term frequencies of osteolysis or mechanical loosening. MATERIAL AND METHODS: We studied 43 knees after Legacy((R)) CCK TKA. The indication was severe deformity (n=20), pre-operative laxity (n=6), or failure to achieve intra-operative balancing (n=17). There were 41 patients with a mean age of 66 years (21-88). A history of one or more surgical procedures was noted for 27 (63%) knees. Outcome measures were the Hospital for Special Surgery (HSS) knee score, Knee Society Score (KSS), and change in the hip-knee-ankle (HKA) angle. Prosthesis survival was assessed using revision surgery for any reason or for reasons other than infection as the censoring criterion. RESULTS: Complications other than venous thrombosis occurred in 16% of patients, including 3 who required revision surgery (septic loosening, n=2; and major instability in a patient with ipsilateral hip arthrodesis). No cases of osteolysis or aseptic loosening were recorded. Mean follow-up was 12.7 years (range, 10-14). At last follow-up, the HSS score had improved from 53 (26-83) pre-operatively to 80 (55-93), the KSS knee component from 42 (16-77) to 90 (77-99), and the KSS function component from 31 (0-80) to 61 (10-90) (P<0.001). Mean range of flexion increased from 109 degrees (50 degrees -140 degrees) to 112 degrees (90 degrees -130 degrees) (P=0.12). The HKA angle changed from 182 degrees +/-15.5 degrees (150 degrees -210 degrees) to 179.5 degrees +/-2.5 degrees (174 degrees -184 degrees) (P=0.5). The 11-year prosthesis survival rate was 88.5% (95% confidence interval, 0.69-0.94) overall and 97.7% (0.76-0.99) after excluding the cases of infection. DISCUSSION: Long-term functional gains after CCK TKA were similar to those reported after standard posterior-stabilised TKA, with no cases of constraint-mechanism failure or osteolysis. The complication rate was higher, with decreased survival compared to standard TKA, but the knee deformities and/or instability were particularly severe and two-thirds of knees had a history of one or more surgical procedures.

Cournapeau, J., Klouche, S., Bauer, T., et al. (2015). "Survival and functional results after a mean follow-up of 9 years with the Ceragyr(R) highly congruent mobile-bearing TKA." Orthop Traumatol Surg Res 101(4) : 455-460.

INTRODUCTION: Fixed-bearing total knee arthroplasty (TKA) implants have excellent long-term survival. Mobile-bearing implants were developed to reduce bone-implant interface stresses and polyethylene insert wear. The primary objective of this study was to analyze the survival rate of a highly congruent mobile-bearing TKA implant (Ceragyr((R))) in patients having a minimum follow-up of 7 years. We hypothesized that the survival rate would be 95-100% at that time point. PATIENTS AND METHODS: A single-center prospective study included all the patients operated for a primary TKA procedure with a Ceragyr((R)) implant between 2000 and 2003. All the implants were cemented. Patellar resurfacing was not carried out systematically, but could be carried out secondarily in cases of persistent anterior knee pain. Clinical and radiological data were collected before the surgery, at 3 months postoperative, at 1 year and then at a minimum follow-up of 7 years. The primary endpoint was the overall revision-free survival rate. Secondary endpoints were the survival without mechanical failure, IKS scores, knee range of motion and implant positioning. RESULTS: One hundred and thirty-four patients (143 Ceragyr((R)) TKA cases) were included; 9 patients (10 TKA) were lost to follow-up (6.7%) and the remaining 125 patients (133 TKA) were contacted. At the final review, 7 of the 133 TKA cases (5.3%) had been revised (6 men, 1 women; P = 0.002), 2 (1.5%) because of mechanical failure and 5 (3.8%) because of an infection. The overall revision-free survival rate was 94.8% [95% CI: 89.3-97.5]; survival was 98.4% [95% CI: 93.8-99.6] with mechanical failure as an endpoint. An in-person assessment was conducted on 76 patients (80 TKA cases) (49 women; 27 men) who had an average age of 70.3 +/- 8.4 years at the time of the arthroplasty procedure. The patella had been resurfaced during the initial procedure in 49 cases, and was either not resurfaced or secondarily resurfaced in 31 cases. The average follow-up was 8.7 +/- 1.1 years. The IKS score had significantly improved relative to the preoperative values (P < 0.00001). Knee flexion and the IKS knee score remained stable over time (P > 0.05). Patients who underwent patella resurfacing during the initial TKA procedure had better clinical results (P = 0.03). CONCLUSION: After a minimum follow-up of 7years, the overall revision-free survival rate for the Ceragyr((R)) was 94.8%; the survival was 98.4% with mechanical failure as an endpoint. The results were stable over time.

Dauty, M., Schmitt, X., Menu, P., et al. (2012). "Using the Risk Assessment and Predictor Tool (RAPT) for patients after total knee replacement surgery." Ann Phys Rehabil Med 55(1) : 4-15.

OBJECTIVES: The aim of this study was to use the Risk Assessment and Predictor Tool (RAPT) to evaluate the risk of complications in patients hospitalized after total knee replacement (TKR) surgery. METHOD: The medical charts of 272 patients who had TKR surgery for knee osteoarthritis (OA) were included in the study. The presurgical RAPT score and Lequesne functional pain index score were determined based on a thorough analysis of the medical charts. Complications that had an impact on the vital prognosis or knee prosthesis outcomes were reported. Patients were compared according to the RAPT and a relative risk of complications was established. RESULTS: Only 12.2% of patients hospitalized in a Physical Medicine and Rehabilitation (PM&R) center after their surgery could have been discharged home directly after their initial hospital stay for TKR surgery (score RAPT more than 9). These patients were mostly men and significantly younger. Their Lequesne score was significantly lower by an average of at least two points. Their relative risk of complications was 0.45 vs. 2.16 for patients who had a RAPT score less than 6. CONCLUSION: Patients with a RAPT score more than 9 have a low risk of complications. They should not systematically be admitted to a PM&R unit after surgery. On the other hand, for patients with a RAPT score less than 6 a hospital stay in a PM&R care center is justified after TKR surgery.

Debette, C., Parratte, S., Maucort-Boulch, D., et al. (2014). "French adaptation of the new Knee Society Scoring System for total knee arthroplasty." Orthop Traumatol Surg Res 100(5) : 531-534.

INTRODUCTION: In November 2011, the Knee Society published its new KSS score to evaluate objective clinical data and also patient expectations, satisfaction and knee function during various physical activities before and after total knee arthroplasty (TKA). We undertook the French cross-cultural adaptation of this scoring system according to current recommendations. HYPOTHESIS: The French version of the new KSS score is a consistent, feasible, reliable and discriminating score. PATIENTS AND METHODS: Eighty patients with knee osteoarthritis were recruited from two centers: one group of 40 patients had a TKA indication, while the other group of 40 patients had an indication for conservative treatment. After the new KSS score was translated and back-translated, it was compared to three other validated instruments (KOOS, AMIQUAL and SF-12) to determine construct validity, discriminating power, feasibility in terms of response rate and existence of floor or ceiling effect, internal consistency with Chronbach's alpha and reliability based on reproducibility and sensitivity to change (responsiveness). RESULTS: Due to missing data, two cases were eliminated. We found that the score could discriminate between groups; it had a nearly 100% response rate, a ceiling effect in the "expectations" domain, satisfactory Chronbach's alpha, excellent reproducibility and good responsiveness. DISCUSSION: These results confirm that the French version of the new KSS score is reliable, feasible, discriminating, consistent and responsive. The novelty of this scoring system resides in the "expectations" and "satisfaction" domains, its availability as a self-assessment questionnaire and the evaluation of function during various activities. LEVEL OF PROOF, TYPE OF STUDY: Level III.

Delaunay, C., Hamadouche, M., Girard, J., et al. (2013). "What are the causes for failures of primary hip arthroplasties in France?" Clin Orthop Relat Res 471(12) : 3863-3869.

BACKGROUND: There are no large database cohorts describing the causes for failure of primary THAs in France. Because implants and causes for revision vary between national registers, it is important to obtain data from all countries. QUESTIONS/PURPOSES: We therefore determined (1) the mechanisms of failure of primary THAs, (2) their order of appearance with time, (3) the types of surgical techniques and implant designs used to perform revision THAs, and (4) 90-day complications after revision THA in France. METHODS: We prospectively collected data on all 2107 first-time revision THAs from 30 tertiary centers from January 1, 2010, to December 31, 2011. A dual-mobility liner had been used in 251 hips. Mean time from primary procedure to revision THA was 11.2 years (range, 1 day to 42 years). Mean age at revision was 70 years (range, 17-104 years). RESULTS: The causes for revision were mechanical loosening (42%), periprosthetic fracture (12%), infection (11%), wear/osteolysis (11%), dislocation (10%), surgical technique error (6%), and implant fracture (3%). The most common type of revision procedure was all-component revision (49%). A dual-mobility liner was used in 1184 hips (62%). The 90-day dislocation rate was less than 4%, and mortality rate was 1.6%. CONCLUSIONS: Contrary to other reported data, we found dislocation was not the main cause for failure of primary THAs but was still the more frequent early complication after revision. These findings might be related to the use of dual-mobility sockets in more than 10% of primary THAs and more than 60% of revision THAs.

Ehlinger, M., Delaunay, C., Karoubi, M., et al. (2014). "Revision of primary total hip arthroplasty for peri-prosthetic fracture: A prospective epidemiological study of 249 consecutive cases in France." Orthop Traumatol Surg Res 100(6) : 657-662.

BACKGROUND: Revision total hip arthroplasty (reTHA) for peri-prosthetic fracture (PPF) is increasingly performed but still ranks fourth among reasons for reTHA in registries. In France, no specific registry is available and the frequency of PPF among reasons for THA revision is

therefore unknown. Here, our objectives were to determine the relative frequency of PPF as a reason for reTHA, to identify patient-related and primary-THA-related factors associated with reTHA for PPF, to describe reTHA modalities for PPF, and to determine the morbidity and mortality associated with reTHA for PPF. HYPOTHESIS: PPF is the second most common reason for reTHA, after loosening. METHODS: Consecutive reTHA procedures performed in 30 French centres over a 2-year period were collected prospectively. Repeat revisions and revisions of hemi-arthroplasties were excluded. The epidemiological, clinical, and surgical data needed to answer the questions of the study were collected. RESULTS: PPF was the second leading reason for reTHA (249/2107, 11.8%). Vancouver type B2 fractures were the most common (n=127 [51.5%]). Compared to patients who underwent reTHA for reasons other than PPF, those with reTHA for PPF were older at primary THA (67.9 years versus 57.7 years) and more often had intra-operative complications (16.9% versus 11.6%); furthermore, the primary THA was more often cementless (62.7% versus 42.7%) with a dual-mobility cup (20.6% versus 11.1%). At reTHA, the patients with PPF were older (77.6 years versus 69.2 years), had worst medical condition (mean ASA score, 2.4 versus 2.1) and less physically active (mean Devane score, 2.1 versus 2.4). The patients with reTHA for PPF had a shorter time to revision (9.8 years versus 11.4 years), a longer operative time (144 minutes versus 128 minutes), and more frequent use of the posterior approach (77% versus 67%) with a cementless dual-mobility cup (78% versus 60%) and a cementless revision femoral stem (72% versus 50%). Morbidity and mortality rates were high (5.9% operative complication rate and 12% of surgical complications with 4.8% mortality within the first 3 months) however, these results were similar to those in the rest of the cohort. DISCUSSION AND CONCLUSION: PPF is the second most common reason for reTHA, a result that is at variance with data in national registries. LEVEL OF EVIDENCE: Level IV, prospective observational cohort study.

Erivan, R., Villatte, G., Chaput, T., et al. (2019). "Traduction française et adaptation culturelle du questionnaire de suivi de patient porteur de prothèse de hanche ou de genou." Revue de Chirurgie Orthopédique et Traumatologique 105(3) : 293-298.
http://www.sciencedirect.com/science/article/pii/S1877051719300681

Résumé Introduction Un suivi par simple questionnaire envoyé au domicile du patient et réalisation d'une radiographie sont possibles grâce au questionnaire de Kingsbury, évitant la nécessité de devoir faire déplacer le patient s'il n'y a pas de problème. Il s'agit d'un questionnaire permettant de détecter une anomalie sur le suivi d'un patient. Si une anomalie est détectée soit sur la radiographie, soit sur le questionnaire, le patient est contacté et/ou revu en fonction de l'anomalie observée. Ce questionnaire n'a pas eu de validation transculturelle, aussi nous avons mené un travail prospectif afin de : 1) traduire en français le questionnaire validé en anglais, 2) l'adapter pour une bonne compréhension suivant les habitudes culturelles, 3) évaluer cette traduction par une méthode type test-retest. Hypothèse L'hypothèse est que ce questionnaire traduit aurait une bonne reproductibilité. Matériel et méthodes Le questionnaire exact en anglais a été obtenu en sollicitant directement les auteurs de l'article de référence. En reprenant la méthodologie de traduction, rétro traduction puis de test-retest, nous avons pu évaluer la traduction du questionnaire et sa reproductibilité. Nous avons utilisé la méthode de référence pour l'adaptation culturelle des auto-questionnaires ou des documents d'information destinés aux patients. Ce questionnaire a été testé de manière prospective. Résultats Sur les 100 patients sollicités nous avons obtenu 73 tests cliniques avec validation radiographique et 48 test-retest dans une population représentative des patients porteurs de Prothèse Totale de Hanche (PTH) et de Genou (PTG). Le résultat de la cohérence interne retrouvait un KR-20=0,71, le calcul du coefficient alpha de Cronbach était de 0,76, confirmant une bonne cohérence interne. Nous avons retrouvé une difficulté d'item basse dans toutes les

questions, correspondant au rappel du patient. La variance était également faible en moyenne sur les 7 questions de 0,08 (0,02 à 0,16). La corrélation était proche de 0,5 sur chaque question. Concernant la reproductibilité, on retrouvait un excellent pourcentage d'accord (>90 %) sur les 7 premières questions qui sont binaires, pour la question 8, le pourcentage était bon (83,3 %) compte tenu du fait que c'est une question avec 5 réponses possibles. Dix-neuf patients des 73 répondants avaient l'indication d'une reprise de contact sur les données du questionnaire, ils ont été rappelés et après analyse de leurs radiographies, nous avons dû revoir 4 patients en consultation sur les 73 patients analysés. Les 15 autres patients contactés avaient des réponses défavorables mais sans évolution par rapport au dernier suivi classique ni d'anomalie radiologique, ils n'ont pas eu à être revus en consultation. Conclusion La version française de ce questionnaire permet une évaluation reproductible des patients permettant d'éviter un déplacement de celui-ci lorsque cela ne s'avère pas nécessaire. Ce questionnaire devra être validé sur une plus large population avant une large diffusion, cette étude n'étant qu'une première étape. Niveau de preuve IV, Prospective sans groupe témoin.

Erivan, R., Villatte, G., Dartus, J., et al. (2019). "Évolution et projection de la chirurgie de la hanche en France de 2008 à 2070 : étude épidémiologique avec analyse de tendance et projection." Revue de Chirurgie Orthopédique et Traumatologique 105(7) : 803-812.
http://www.sciencedirect.com/science/article/pii/S187705171930423X

Résumé Introduction La prothèse de hanche a été élue « intervention du siècle » grâce aux améliorations fonctionnelles qu'elle apporte. Sa fréquence est croissante, mais il est toujours difficile d'estimer à la fois le nombre de chirurgie réalisée et l'évolution à venir du fait des changements d'indication et de l'évolution de l'espérance de vie, mais aussi en France du fait de l'absence de registre. Peu de données sont accessibles en France aussi nous avons mené une investigation destinée à : (1) faire le point sur le nombre de chirurgie de la hanche en France, (2) prévoir l'évolution sur les prochaines décennies en considérant les scénarii extrêmes. Hypothèse Une augmentation sensible du nombre de chirurgie peut être prévue sur les 50 prochaines années. Matériel et méthode Il s'agit d'une étude portant sur l'analyse de données nationales à partir du codage des actes concernant le nombre de chirurgies de hanche en France. Nous avons défini 2 scénarii, l'un ne prenant en compte que l'évolution de la population et les modifications de la structure d'âge dans le temps, l'autre reconduisant en plus les tendances constatées sur les dernières années. Nous avons mesuré l'activité actuelle en chirurgie de la hanche en France puis l'évolution de cette activité en fonction des évolutions des flux de population. Résultats En 2018 en France, il y eu 183 139 actes codés en tant qu'acte principal en rapport avec la hanche. On note une nette prédominance de la chirurgie de reconstruction avec 148 965 actes de prothèse primaires dont 124 251 prothèses totales. Il y avait 19 304 reprises de prothèses de hanche. Nous avons observé de fortes différences régionales pour les reprises de prothèses concernant le type de centre où étaient réalisées les interventions (p<0,0001). Entre 2018 et 2050, pour les prothèses de hanche primaires, nous avons prévu une augmentation entre 41,9 et 114,3 % selon le scénario et entre 42,0 et 98,3 % pour l'activité globale de chirurgie de la hanche. Discussion Nos résultats sont dépendants des ruptures technologiques et découvertes médicales mais constituent la perspective d'une augmentation majeure des besoins en chirurgie de la hanche. Nos résultats s'entendent en l'état actuel des connaissances médicales. Niveau de preuve IV, étude épidémiologique descriptive.

Geissler, A., Scheller-Kreinsen, D. et Quentin, W. (2012). "Do diagnosis-related groups appropriately explain variations in costs and length of stay of hip replacement? A comparative assessment of DRG systems across 10 European countries." Health Econ 21 Suppl 2 : 103-115.

This paper assesses the variations in costs and length of stay for hip replacement cases in Austria, England, Estonia, Finland, France, Germany, Ireland, Poland, Spain and Sweden and examines the ability of national diagnosis-related group (DRG) systems to explain the variation in resource use against a set of patient characteristic and treatment specific variables. In total, 195,810 cases clustered in 712 hospitals were analyzed using OLS fixed effects models for cost data (n=125,698) and negative binominal models for length-of-stay data (n=70,112). The number of DRGs differs widely across the 10 European countries (range: 2-14). Underlying this wide range is a different use of classification variables, especially secondary diagnoses and treatment options are considered to a different extent. In six countries, a standard set of patient characteristics and treatment variables explain the variation in costs or length of stay better than the DRG variables. This raises questions about the adequacy of the countries' DRG system or the lack of specific criteria, which could be used as classification variables.

Girard, J., Kern, G., Migaud, H., et al. (2013). "Primary total hip arthroplasty revision due to dislocation: prospective French multicenter study." Orthop Traumatol Surg Res 99(5) : 549-553.

INTRODUCTION: Dislocation following total hip arthroplasty (THA) may require surgical revision, and is one of the most frequent causes for revision in national registers. The goals of this study were to determine the characteristics of revision THA for dislocation and identify the typical features of hips revised due to dislocation. MATERIALS AND METHODS: A prospective multicenter study (30 centers) was performed in first revision THA performed between January 1, 2010 and December 31, 2011 (multiple revisions were excluded). RESULTS: Two hundred nineteen (10.4%) of all first revisions (2153 cases in 2107 patients) were for dislocation, which was the fifth cause of revision. There were 135 men and 84 women, mean age 65.9 years old (24.3-92.4) at primary THA and 72.9 years old (31.9-98.8) at revision. Revision surgery was performed a mean 7.1 years (+/- 7.1) after primary THA. The predictive risk factors for dislocation were: a 22.2mm diameter femoral head (risk x 2.4), a posterolateral approach (risk x 1.7), older age (risk x 1.1), an elevated rim liner for primary THA (risk x 6.6). The use of a dual mobility cup did not influence the rate of revision for dislocation (8.8%) compared to the use of a flat rim liner (9.1%). DISCUSSION: The 10.4% rate of revision of THA for dislocation seems markedly lower than the results in the literature both for frequency and ranking. The use of elevated rim or constrained liners designed to decrease the risk of dislocation does not improve results compared to standard liners. LEVEL OF EVIDENCE: Level IV, prospective prognostic study without a control group.

Grammatico-Guillon, L., Baron, S., Gaborit, C., et al. (2014). "Quality assessment of hospital discharge database for routine surveillance of hip and knee arthroplasty-related infections." Infect Control Hosp Epidemiol 35(6) : 646-651.

OBJECTIVE: Surgical site infection (SSI) surveillance represents a key method of nosocomial infection control programs worldwide. However, most SSI surveillance systems are considered to be poorly cost effective regarding human and economic resources required for data collection and patient follow up. This study aims to assess the efficacy of using hospital discharge databases (HDDs) as a routine surveillance system for detecting hip or knee arthroplasty-related infections (HKAIs). METHODS: A case-control study was conducted among patients hospitalized in the Centre region of France between 2008 and 2010. HKAI cases were extracted from the HDD with various algorithms based on the International Classification of Diseases, Tenth Revision, and procedure codes. The control subjects were patients with hip or knee arthroplasty (HKA) without infection selected at random from the

HDD during the study period. The gold standard was medical chart review. Sensitivity (Se), specificity (Spe), positive predictive value (PPV), and negative predictive value (NPV) were calculated to evaluate the efficacy of the surveillance system. RESULTS: Among 18,265 hospital stays for HKA, corresponding to 17,388 patients, medical reports were checked for 1,010 hospital stays (989 patients). We identified 530 cases in total (incidence rate, 1% [95% confidence interval (CI), 0.4%-1.6%), and 333 cases were detected by routine surveillance. As compared with 480 controls, Se was 98%, Spe was 71%, PPV was 63%, and NPV was 99%. Using a more specific case definition, based on a sample of 681 hospital stays, Se was 97%, Spe was 95%, PPV was 87%, and NPV was 98%. CONCLUSIONS: This study demonstrates the potential of HDD as a tool for routine SSI surveillance after low-risk surgery, under conditions of having an appropriate algorithm for selecting infections.

Grammatico-Guillon, L., Baron, S., Rosset, P., et al. (2015). "Surgical site infection after primary hip and knee arthroplasty: a cohort study using a hospital database." Infect Control Hosp Epidemiol 36(10) : 1198-1207.

BACKGROUND: Hip or knee arthroplasty infection (HKAI) leads to heavy medical consequences even if rare. OBJECTIVE: To assess the routine use of a hospital discharge detection algorithm of prosthetic joint infection as a novel additional tool for surveillance. METHODS: A historic 5-year cohort study was built using a hospital database of people undergoing a first hip or knee arthroplasty in 1 French region (2.5 million inhabitants, 39 private and public hospitals): 32,678 patients with arthroplasty code plus corresponding prosthetic material code were tagged. HKAI occurrence was then tracked in the follow-up on the basis of a previously validated algorithm using International Statistical Classification of Disease, Tenth Revision, codes as well as the surgical procedures coded. HKAI density incidence was estimated during the follow-up (up to 4 years after surgery); risk factors were analyzed using Cox regression. RESULTS: A total of 604 HKAI patients were identified: 1-year HKAI incidence was1.31%, and density incidence was 2.2/100 person-years in hip and 2.5/100 person-years in knee. HKAI occurred within the first 30 days after surgery for 30% but more than 1 year after replacement for 29%. Patients aged 75 years or older, male, or having liver diseases, alcohol abuse, or ulcer sore had higher risk of infection. The inpatient case fatality in HKAI patients was 11.4%. CONCLUSIONS: The hospital database method used to measure occurrence and risk factors of prosthetic joint infection helped to survey HKAI and could optimize healthcare delivery.

Kahan, A., Le Pen, Lleu, P. L., et al. (2002). "Analyse coût-efficacité comparant, pendant neuf mois, deux stratégies thérapeutiques chez des patients souffrant de gonarthrose." Journal D'economie Medicale 20(2) : 92-104, rés., tabl., fig.

[BDSP. Notice produite par ORSRA m3BxR0xj. Diffusion soumise à autorisation]. Plusieurs études cliniques ont démontré l'efficacité et la tolérance du Synvisc dans le traitement de patients souffrant de gonarthrose. L'objectif de cette étude médico-économique était d'évaluer si le bénéfice clinique attendu du Synvisc s'accompagnait ou non d'un surcoût pour l'Assurance Maladie. Une étude multicentrique randomisée a été réalisée chez 518 patients afin d'analyser le rapport coût-efficacité du Synvisc comparativement à celui des traitements usuels de la gonarthrose sur une période de neuf mois. L'évolution clinique des patients était évaluée à l'aide de différents instruments spécifiques de la gonarthrose, l'indice de Lequesne étant le critère principal d'efficacité et l'indice de WOMAC, un des critères secondaires d'efficacité. Les coûts directs et indirects liés à la gonarthrose ont été pris en compte. (résumé d'auteur).

Kankeu-Tchewonpi, H., Elegbede, C. F., Rigollot, N., et al. (2020). "Prédiction du parcours de soins des patients en vue d'un modèle de financement intégré : exemple de la prothèse de hanche." Revue d'Épidémiologie et de Santé Publique 68 : S21.
http://www.sciencedirect.com/science/article/pii/S0398762020300535

> Introduction À la suite de la LFSS 2018 (Art. 51) qui prévoyait la mise en place de financements innovants à l'épisode de soins (EDS), l'ATIH, en lien avec la Direction générale de l'offre de soins (DGOS), la Cnam et les acteurs de terrain a mené des travaux pour comprendre le parcours de soins (PdS) des patients avec une pose de prothèse de hanche (PTH), afin de le prédire pour un patient donné et de financer l'EDS. Une méthodologie en trois temps a été élaborée : – définir le périmètre de l'EDS et identifier les PdS ; – prédire le PdS attendu pour un patient selon ses caractéristiques ; – déterminer le forfait associé à l'EDS. Cette présentation décrit les deux premières étapes. Méthodes Les données du Système national des données de santé (SNDS) 2013–2017 ont été utilisées (DCIR ; table bénéficiaire ; PMSI-MCO, SSR et HAD ; ACE). Tous les patients avec un séjour MCO pour pose de PTH (séjour initial) entre 2014 et 2016 ont été inclus. Premièrement, le périmètre de l'EDS a été défini : séjours hospitaliers MCO, SSR, HAD et soins de ville (SDV, infirmier, kiné, MPR) en lien avec la PTH. Des périodes pré (45 j) et post (90 j) séjour initial ont été considérées. Les principaux PdS ont ensuite été décrits. Deuxièmement, les facteurs prédictifs des PdS ont été recherchés parmi les caractéristiques des patients (âge, sexe, niveau socio-économique, comorbidités, etc.) par régression logistique et des méthodes de sélection de variables. Résultats Huit PdS principaux ont été identifiés selon : SDV avant intervention, passage en SSR et SDV après intervention. La modélisation des PdS a montré, par exemple, que le passage en SSR est plus fréquent chez les femmes. Discussion/Conclusion Ces premières étapes ont permis de définir les PdS des patients avec une pose de PTH et d'en identifier les facteurs prédictifs. Les facteurs prédictifs retenus étaient cohérents avec les recommandations de la SOFMER. Le modèle développé permet de prédire le PdS pour un patient afin de financer l'entièreté de la consommation de soins au cours de l'EDS.

Kurtz, S. M., Ong, K. L., Lau, E., et al. (2011). "International survey of primary and revision total knee replacement." Int Orthop 35(12) : 1783-1789.

> PURPOSE: Total knee arthroplasty (TKA) is currently the international standard of care for treating degenerative and rheumatologic knee joint disease, as well as certain knee joint fractures. We sought to answer the following three research questions: (1) What is the international variance in primary and revision TKA rates around the world? (2) How do patient demographics (e.g., age, gender) vary internationally? (3) How have the rates of TKA utilization changed over time? METHODS: The survey included 18 countries with a total population of 755 million, and an estimated 1,324,000 annual primary and revision total knee procedures. Ten national inpatient databases were queried for this study from Canada, the United States, Finland, France, Germany, Italy, the Netherlands, Portugal, Spain, and Switzerland. Inpatient data were also compared with published registry data for eight countries with operating arthroplasty registers (Denmark, England & Wales, Norway, Romania, Scotland, Sweden, Australia, and New Zealand). RESULTS: The average and median rate of primary and revision (combined) total knee replacement was 175 and 149 procedures/100,000 population, respectively, and ranged between 8.8 and 234 procedures/100,000 population. We observed that the procedure rate significantly increased over time for the countries in which historical data were available. The compound annual growth in the incidence of TKA ranged by country from 5.3% (France) to 17% (Portugal). We observed a nearly 27-fold range of TKA utilization rates between the 18 different countries

included in the survey. CONCLUSION: It is apparent from the results of this study that the demand for TKA has risen substantially over the past decade in countries around the world.

Le Manach, Y., Collins, G., Bhandari, M., et al. (2015). "Outcomes After Hip Fracture Surgery Compared With Elective Total Hip Replacement." Jama 314(11) : 1159-1166.

IMPORTANCE: Patients undergoing surgery for a hip fracture have a higher risk of mortality and major complications compared with patients undergoing an elective total hip replacement (THR) operation. The effect of older age and comorbidities associated with hip fracture on this increased perioperative risk is unknown. OBJECTIVE: To determine if there was a difference in hospital mortality among patients who underwent hip fracture surgery relative to an elective THR, after adjustment for age, sex, and preoperative comorbidities. DESIGN, SETTING, AND PARTICIPANTS: Using the French National Hospital Discharge Database from January 2010 to December 2013, patients older than 45 years undergoing hip surgery at French hospitals were included. The International Statistical Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), codes were used to determine patients' comorbidities and complications after surgery. A population matched for age, sex, and preoperative comorbidities of patients who underwent elective THR or hip fracture surgery was created using a multivariable logistic model and a greedy matching algorithm with a 1:1 ratio. EXPOSURE: Hip fracture. MAIN OUTCOMES AND MEASURES: Postoperative in-hospital mortality. RESULTS: A total of 690,995 eligible patients were included from 864 centers in France. Patients undergoing elective THR surgery (n = 371,191) were younger, more commonly men, and had less comorbidity compared with patients undergoing hip fracture surgery. Following hip fracture surgery (n = 319,804), 10,931 patients (3.42%) died before hospital discharge and 669 patients (0.18%) died after elective THR. Multivariable analysis of the matched populations (n = 234,314) demonstrated a higher risk of mortality (1.82% for hip fracture surgery vs 0.31% for elective THR; absolute risk increase, 1.51% [95% CI, 1.46%-1.55%]; relative risk [RR], 5.88 [95% CI, 5.26-6.58]; P < .001) and of major postoperative complications (5.88% for hip fracture surgery vs 2.34% for elective THR; absolute risk increase, 3.54% [95% CI, 3.50%-3.59%]; RR, 2.50 [95% CI, 2.40-2.62]; P < .001) among patients undergoing hip fracture surgery. CONCLUSIONS AND RELEVANCE: In a large cohort of French patients, hip fracture surgery compared with elective THR was associated with a higher risk of in-hospital mortality after adjustment for age, sex, and measured comorbidities. Further studies are needed to define the causes for these differences.

Lefevre-Colau, M. M., Coudeyre, E., Griffon, A., et al. (2007). "Existe-t-il des critères d'orientation vers un centre de rééducation après la pose d'une prothèse totale de hanche ou de genou? Élaboration de recommandations françaises pour la pratique clinique." Annales de Réadaptation et de Médecine Physique 50(5) : 317-326.
http://www.sciencedirect.com/science/article/pii/S0168605407000840

Résumé Objectifs Élaborer des recommandations concernant l'orientation vers un service de rééducation après la pose d'une prothèse totale de hanche ou de genou. Méthode La méthodologie utilisée, proposée par la Société française de médecine physique et réadaptation (Sofmer), associe une revue systématique de la littérature, un recueil des pratiques professionnelles et une validation par un panel pluridisciplinaire d'experts. Résultats Les conclusions issues de la revue de la littérature et des pratiques professionnelles actuelles en France ne permettent pas de distinguer les contextes de la prothèse totale de hanche et de genou pour orienter le malade après l'opération vers un service de rééducation. Dans les deux situations, les principaux critères d'orientation vers un service de rééducation sont: 1) démographique: âge élevé et sexe féminin; 2) psychosociaux et

environnementaux: absence d'entourage à domicile, sentiment du patient de ne pas pouvoir réintégrer dans l'immédiat son domicile (une éducation préopératoire pourrait permettre d'orienter ce paramètre «préférence du patient»); 3) prédictifs du chirurgien à partir de l'évaluation clinique et fonctionnelle du patient: mauvais état fonctionnel pré- et postopératoire. Conclusion Il est nécessaire de mettre en place rapidement des études de bonne qualité méthodologique permettant d'évaluer des outils prédictifs d'orientation comme l'indice RAPT en distinguant le contexte des prothèses totales de hanche et de genou et en retenant comme critères principaux d'évaluation le statut algofonctionnel final ainsi que la réduction des situations de handicap.

Lernout, T., Labalette, C., Sedel, L., et al. (2010). "Cost analysis in total hip arthroplasty: experience of a teaching medical center located in Paris." Orthop Traumatol Surg Res 96(2) : 113-123.

BACKGROUND: Since the beginning of 2008, the implementation of a 100% activity-based payment system, has made efficiency one of the prime concern for the French health-care providing institutions. We therefore assessed the real cost of a scheduled total hip replacement (THR) ina teaching hospital and compared findings with French national data (and with the Government Healthcare Insurance System allowance). HYPOTHESIS: The study should suggest possible means to optimize organization of management and/or clinicians' practice. MATERIAL AND METHODS: This is a retrospective full-cost economic study. Patients were included only if fulfilling the following criteria: admitted in 2006; classified in Diagnosis-Related Group (DRG) 08C23 V or 08C23W (respectively THR without and with associated comorbidity); treated in a single department; admitted from home; and having undergone a THR (coded as NEKA020 in the french CPT) that same year. Treatment-cost was established on the basis of data collected from two main sources: the Information Systems Medicalization Program (ISMP) data-base, and the finance department data, which were taken into account in line with the French National Costs Study (NCS) structure. RESULTS: The methodology employed here follows the 2006 National Costs Scale structure. Treatment costs (excluding the cost of implantable medical devices or IMDs) were estimated at 8,104.72 EUR for DRG 08C23W and 7,529.19 EUR for DRG 08C23 V. These figures were higher than the rates authorized in 2006 (excluding IMDs), which were 7,677.92 EUR for 08C23W and 6,358.97 EUR for 08C23 V (taking the 7% geographic coefficient into account) and than the 2005 NCS figures (excluding IMDs) of respectively 7,536.13 EUR and 6,083.59 EUR. DISCUSSION: Clinical units and departments need to be able to assess costs for the pathologies they treat, as health-care institutions have to balance their expenditure against their income, which largely comes from their hospital-care activity. The methodology put forward here, of cost comparison according to the NCS structure, enables the total cost to be known. Comparing results (expenditure line by expenditure line) against national data, selectively highlights the areas in which efficiency can be improved. The exactitude of the obtained results remains, however, limited by the rules currently in use at each individual hospital's accounting department. LEVEL OF EVIDENCE: Level IV, retrospective economic and decision analysis study.

Merle-Vincent, F., Couris, C. M., Schott, A. M., et al. (2011). "Factors predicting patient satisfaction 2 years after total knee arthroplasty for osteoarthritis." Joint Bone Spine 78(4) : 383-386.

OBJECTIVE: To identify factors predicting patient satisfaction 2 years after total knee arthroplasty (TKA) for osteoarthritis. METHODS: Prospective multicenter study of patients followed up for 2 years after TKA for osteoarthritis. We evaluated pain and function (Lequesne index and WOMAC) at baseline and after 2 years. After 2 years, the patients rated their satisfaction as a percentage, with values greater than 50% defining good satisfaction.

Factors associated with good satisfaction were identified by univariate analyses followed by multivariate analysis. RESULTS: Of 299 patients, 264 completed the study (26 were lost to follow-up, six died, and three refused the 2-year evaluation), including 237 (89.8%) with satisfaction scores greater than 50%. Highly significant improvements were found after 2 years versus baseline in the Lequesne index (7.9 vs. 14.5, P<0.0001) and WOMAC index (26.3 vs. 51.3, P<0.0001). There were 26 (9.8%) complications. Factors significantly associated with good satisfaction in the multivariate model were absence of complications (P=0.004), body mass index less than 27 kg/m(2) (P=0.015), high radiological joint narrowing score (P=0.038), age greater or equal to 70 years (P=0.038), and absence of depression at the 2-year evaluation (P=0.002). CONCLUSION: We report the first prospective multicenter study done in France to assess pain and function in a large number of patients treated with TKA for osteoarthritis. Our results indicate a high success rate. We identified three factors that predict patient satisfaction and can be assessed before surgery (age greater than 70 years, absence of obesity, and severe joint space narrowing).

Migaud, H., Putman, S., Berton, C., et al. (2014). "Does prior conservative surgery affect survivorship and functional outcome in total hip arthroplasty for congenital dislocation of the hip? A case-control study in 159 hips." Orthop Traumatol Surg Res 100(7) : 733-737.

INTRODUCTION: The results of total hip arthroplasty (THA) in congenital dislocation of the hip (CDH) are well known, but such is not the case for the impact of prior conservative surgery on THA function and survivorship. The present study compared THA in CDH with prior conservative bone surgery (BS group) versus no prior bone surgery (NBS group), to (1) assess the impact of prior conservative surgery on function and survivorship after THA, and (2) determine whether a particular type of conservative surgery affected function or survivorship. HYPOTHESIS: Prior conservative surgery for CDH does not affect function or survivorship of subsequent THA. PATIENTS AND METHODS: A multicenter retrospective case-control study analyzed 430 THAs in CDH patients (332 patients: 269 female, 63 male; mean age, 56 years [range, 17-80 years]) at a mean 13.2+/-5.4 years' follow-up (range, 1-29 years). The BS group included 159 hips (37%) (64 pelvic, 81 femoral and 14 combined pelvic and femoral osteotomies), and the NBS group 271 (63%). Groups were comparable for gender, age at surgery, Devane activity score, preoperative Postel Merle d'Aubigne (PMA) functional score and CDH radiographic type following Crowe. RESULTS: At follow-up, PMA scores were comparable: BS, 16.8+/-1.4 (11-18); NBS, 16.9+/-1.5 (7-18). Fifteen-year survivorship censored for implant revision for whatever reason did not significantly differ: BS, 87% (95% CI: 83-91%); NBS, 89% (95% CI: 86-92%). Ten-year survivorship on the same criterion did not significantly differ according to type of prior surgery: hip shelf arthroplasty, 97% (95% CI: 95-99%); Chiari osteotomy, 100%; femoral osteotomy, 95% (95% CI: 92-98%); and Milch osteotomy 96% (95% CI: 93-99%). DISCUSSION/CONCLUSION: Conservative surgery for CDH does not impair the functional results or survivorship of subsequent THA. LEVEL OF EVIDENCE: III, case-control study.

Migaud, H., Putman, S., Kern, G., et al. (2016). "Do the Reasons for Ceramic-on-ceramic Revisions Differ From Other Bearings in Total Hip Arthroplasty?" Clin Orthop Relat Res 474(10) : 2190-2199.

BACKGROUND: Despite widespread use of ceramic-on-ceramic (CoC) in total hip arthroplasty (THA) during the past 10 years, little is known about why revisions are performed in hips with this bearing or the time elapsed before revision. QUESTIONS/PURPOSES: The purposes of this study were: (1) Do the reasons for first revision differ between CoC bearings and other bearing couples? (2) Does the time to revision differ between CoC and other bearing couples? (3) Are there unique reasons for revisions of CoC bearings? METHODS: All members

of the Societe Francaise de Chirurgie Orthopedique et Traumatologique (SoFCOT) who performed >/= 30 revisions per year were invited to participate in this multicenter, prospective, observational study. Our data represent 12% of the revision procedures performed in France. A total of 2107 first revisions of THA (from January 2010 to December 2011) were done in 2107 patients (1201 females [57%] and 906 males [43%]; median age, 73 years; age range, 17-104 years) at the time of surgery after a median of 11 years (range, 0 day-42 years) after the primary THA. There were 238 of 2107 (11%) CoC, 148 of 2107 (7%) metal-on-metal (MoM), and 1721 of 2017 (82%) metal-on-polyethylene (MoP) bearings. RESULTS: The reasons for reoperation differed according to the bearing component: (1) for the MoP reference bearing (odds ratio [OR]; 95% confidence interval), cup loosening occurred in 698 of 1721 hips (41%), periprosthetic fracture in 220 of 1721 hips (13%), and osteolysis in 213 of 1721 hips (12%); (2) for CoC, cup loosening occurred in 41 of 238 hips (17%) (OR, 0.31 [0.22-0.43; p < 0.001), infection in 39 of 238 hips (16%) (OR, 1.63 [1.12-2.37]; p = 0.01), and dislocation in 23 of 238 hips (10%) (OR, 0.9 [0.57-1.42]; p = 0.9); (3) for MoM, cup loosening occurred in 28 of 148 hips (19%) (OR, 0.34 [0.22-0.52]; p < 0.001), adverse reaction to metallic debris in 26 of 148 hips (18%) (OR, 18.12 [9.84-33.4]; p < 0.001), and infection in 16 of 148 hips (11%) (OR, 1 [0.59-1.73]; p = 0.9). In comparison with MoP, osteolysis was rarely the reason for revision in CoC (four of 238 hips [2%]; OR, 0.12 [0.05-0.33]; p < 0.001), but this bearing was frequently revised because of iliopsoas irritation (18 of 238 hips [8%]; OR, 4.9 [2.7-9]; p < 0.001). The time elapsed before revision differed between bearings: median of 3 years (range, 3 days to 28 years) for CoC and 4 years (range, 14 days to 37 years) for MoM versus a median 13 years (range, 0 day to 42 years) for MoP (p < 0.001). Thirty-seven of the 238 revisions (16%) were directly related to ceramic use (ceramic breakage [n = 23], squeaking [n = 6], impingement [n = 7], incorrect ceramic insert insertion [n = 1]). No factors were identified that contributed to breakage of the 12 bulk ceramic components (eight heads, four inserts, four of 12 Delta ceramic). No factors were associated with squeaking, iliopsoas irritation, or impingement, but component orientation was not assessed. CONCLUSIONS: The reasons and time to first revision differed between CoC and other bearings. CoC THAs are revised earlier and are sensitive to mechanical problems such as impingement, squeaking, and ceramic rupture that did not disappear with introduction of Delta ceramics and large-diameter (>/= 36 mm) bearings. CoC was rarely revised for osteolysis, but a high rate of iliopsoas irritation requires further investigation. LEVEL OF EVIDENCE: Level III, therapeutic study.

Morvan, G., Vuillemein, V., Guerini, H., et al. (2011). "L'imagerie actuelle des prothèses de hanche et de genou." Bulletin De L'academie Nationale De Medecine 195(3) : 613-628.

Plus de 222 000 prothèses de hanche et de genou sont implantées annuellement en France et ce chiffre va en augmentant. L'imagerie de ces prothèses repose à l'heure actuelle essentiellement sur les radiographies. L'apport de ces dernières est indiscutable mais comporte de sérieuses limites : l'impossibilité de voir certaines régions de la prothèse, la méconnaissance des parties molles? L'utilisation de la tomodensitométrie et de l'échographie qui permet de lever une bonne partie de ces limites à, en quelques années, considérablement fait progresser les possibilités idagnostoqies de l'imagerie des prothèses. Ce travail propose de le démontrer.

Oberlin, P. et Mouquet, M. C. (2002). "Les interventions faites lorsque les patients ne tolèrent plus une gêne fonctionnelle. Enquête de morbidité hospitalière 1992-1993 et bases nationales PMSI 1998 et 1999." Serie Statistiques - Document De Travail – Drees (35) : 149, tabl., carte, graph.

[BDSP. Notice produite par ORSRA g6VR0xgm. Diffusion soumise à autorisation]. Cette étude étudie l'évolution du nombre d'actes chirurgicaux réalisés en France métropolitaine en 1993, en 1998 et en 1999, pour certaines pathologies entraînant une gêne fonctionnelle. Les pathologies étudiées sont : l'adénome de la prostate, la cataracte, les hernies de l'aine, les hémorroïdes, les troubles de la statique pelvienne, le syndrome du canal carpien, les varices, les problèmes d'articulation de la hanche ou du genou. Les résultats présentés portent sur les unités de soins de courte durée (à l'exclusion des unités psychiatriques), qu'il s'agisse d'hospitalisation conventionnelle ou de chirurgie ambulatoire. Pour chaque type d'intervention, sont présentés les résultats selon la catégorie de l'établissement d'hospitalisation, selon la durée de séjour, selon le diagnostic principal traité, selon le sexe et l'âge du patient.

Or, Z. et Verboux, D. (2014). France : Geographic variations in health care. Geographic Variations in Health Care: What Do We Know and What Can Be Done to Improve Health System Performance?, Paris : OCDE**:** 221-243.
http://www.keepeek.com/Digital-Asset-Management/oecd/social-issues-migration-health/geographic-variations-in-health-care/france-geographic-variations-in-health-care_9789264216594-10-en

In France, awareness about practice variations has been growing in recent years due to the harsh economic context and changes in regional governance. This chapter provides information on variations in the use of eight specific hospital procedures and activities across departments for 2005 and 2011. It then provides an overview of the major policy instruments used in France for tackling variations in medical practice.

Parratte, S., Bonnevialle, P., Pietu, G., et al. (2011). "Primary total knee arthroplasty in the management of epiphyseal fracture around the knee." Orthop Traumatol Surg Res **97**(6 Suppl): S87-94.

INTRODUCTION: Over the past few years the use of arthroplasty was broadened to treating complex epiphyseal fractures at the shoulder and elbow joints. Similar trends to treat this type of fractures at the knee are less documented. Based on a multicenter retrospective series study, the aims of this work is to evaluate the short term clinical results of total knee prostheses in the management of comminuted epiphyseal fractures around the knee, to identify the technical issues and fine tune the indications. MATERIAL AND METHODS: Following the initiative of the French Hip and Knee Society (SFHG) and the Traumatology Study Group (GETRAUM), 26 charts from eight different centers in France were included in this multicenter retrospective series. Inclusion criteria were: primary total knee arthroplasty (TKA) in the management of complex articular fractures involving the proximal end of the tibia or distal end of the femur. Surgical features were identified and complications were analyzed. The assessment protocol at last follow-up was standardized and included patient demographic data, analysis of the Parker and IKS scores. RESULTS: During the immediate postoperative period, six patients (23%) reported a general complication and four patients (15%) a local arthroplasty-related complication. At last follow-up (mean 16.2 months), the overall final Parker score was 6.3 (a mean decrease of 1.7) and the mean IKS knee score was 82 points for a mean function score of 54 points. DISCUSSION: Primary TKA is a suitable management option for complex fractures in autonomous elderly patients suffering from knee osteoarthritis. The key technical details of this procedure should be respected and meticulously planned to achieve optimal results and limit the risk of complications. This risk in these acute complex fractures remains higher than after conventional TKA but comparable

to that observed after TKA for post-traumatic arthritis. LEVEL OF EVIDENCE: IV; retrospective cohort study.

Reina, N., Delaunay, C., Chiron, P., et al. (2013). "Infection as a cause of primary total hip arthroplasty revision and its predictive factors." Orthop Traumatol Surg Res 99(5) : 555-561.

INTRODUCTION: Infection is a serious complication of total hip arthroplasty (THA) and is one of the most frequent causes of failure. The goal of this study was to evaluate the importance of infection among the different causes of revision THA and identify any risk factors specifically associated with this cause of revision. MATERIALS AND METHODS: All patients who underwent a first revision of THA were included in a prospective multicenter study. Postoperative clinical and radiological evaluation and follow-up of morbidity and mortality were performed at 3 months. RESULTS: Two hundred forty out of 2107 revisions (11.4%) were performed for infected THA, which was the third cause after aseptic loosening (42.3%) and peri-prosthetic fractures (11.8%). These patients had a higher BMI associated with co-morbidities and lower clinical scores than patients with other causes of revision. One-stage revision was performed in most cases (66%) with replacement of the complete implant in 86% of cases, resulting in longer surgery compared to that for other causes. Male gender (OR 2.3), avascular necrosis (OR 2.4), arthroplasties with dual mobility cups (OR 2.5) and a Rottinger anterolateral approach (OR 3.4) were all associated with an increased risk of infection. DISCUSSION: Some of these risk factors are not or have rarely been reported in the literature. They should be taken into consideration to help in the prevention and continuing battle against THA infection. LEVEL OF EVIDENCE: Level IV, prospective cohort study.

Roger, C., Debuyzer, E., Dehl, M., et al. (2019). "Facteurs influençant la durée de séjour, le mode de sortie et la réadmission à 30 jours après arthroplastie primaire de hanche et de genou." Revue de Chirurgie Orthopédique et Traumatologique 105(5) : 606-612.
http://www.sciencedirect.com/science/article/pii/S1877051719302023

Résumé Introduction En France comme aux États-Unis, les prévisions à 2030 du nombre d'implantations de prothèses totales de hanche (PTH) ou de genou (PTG) sont croissantes avec une tendance globale à la diminution de la Durée de Séjour (DS). Les facteurs prédictifs connus de la DS sont le jour opératoire, la sortie en centre de rééducation fonctionnelle (CRF) ou la présence de certaines comorbidités. Cependant, les résultats sont contradictoires et à notre connaissance, aucune étude n'a été réalisée sur une population française concernant ces facteurs après arthroplastie. Pourtant, une meilleure connaissance de ces facteurs est un moyen d'améliorer l'efficience des soins. Aussi, nous avons mené une étude de cohorte monocentrique rétrospective sur une large population afin de : 1) déterminer si ces facteurs influencent la DS après arthroplastie, 2) déterminer quels facteurs étaient prédictifs d'une sortie en CRF et de la réadmission dans les 30 jours postopératoires. Hypothèse Il existe des facteurs intrinsèques au patient non modifiables et extrinsèques organisationnels modifiables qui influencent la durée de séjour. Matériel et méthode Tous les patients majeurs opérés d'une PTH ou d'une PTG dans notre centre hospitalo-universitaire entre le 1er janvier 2015 et le 31 décembre 2016 étaient identifiés. Étaient exclus tous les patients opérés d'une révision d'arthroplastie, d'une PTH avec reconstruction fémorale ou acétabulaire, d'une PTG contrainte de type charnière ou encore ceux opérés d'une fracture. Les données collectées comprenaient les paramètres préopératoires, le type d'arthroplastie et les soins postopératoires. Résultats Nous avons inclus 938 patients dans le groupe PTH et 725 dans le groupe PTG. En analyse multivariée, « le risque de sortie » au 5e jour diminuait avec l'âge (HR=0,986 95 % IC : 0,98–0,99), de 13 % pour les femmes (HR=0,871 95 % IC : 0,77–0,986), de 39 % lors d'un antécédent de diabète (HR=0,606 95 %

IC : 0,5–0,73), de 68 % lors d'une sortie en CRF (HR=0,322 95 % IC : 0,267–0,389) et de 27 % lors d'une intervention le vendredi (HR=0,733 95 % IC : 0,631–0,852). L'âge, le genre féminin, un antécédent de broncho-pneumopathie chronique obstructive, de trouble anxio-dépressif ou d'accident vasculaire cerébral étaient prédictifs de la sortie en CRF. Le risque de réadmission augmentait chez les hommes, en cas d'obésité et après une sortie en CRF. Discussion Cette étude analysait l'influence des facteurs sur la DS par un modèle de survie en prenant en compte l'âge en tant que variable continue, les comorbidités de façon distincte et en considérant l'impact du mode de sortie. Nos résultats sont concordants avec la littérature internationale et confirment une influence importante en population française du diabète, du jour opératoire et du mode de sortie sur la DS. Aussi, cette étude a précisé les facteurs prédictifs d'une sortie en CRF et de la réadmission à 30 jours. Niveau de preuve IV, étude de cohorte rétrospective.

Saragaglia, D., Bonnin, M., Dejour, D., et al. (2013). "Results of a French multicentre retrospective experience with four hundred and eighteen failed unicondylar knee arthroplasties." Int Orthop 37(7) : 1273-1278.

PURPOSE: By means of a multicentre retrospective study based on the failure of 418 aseptic unicondylar knee arthroplasties (UKA) our aims were to present the different types of revision procedure used in failed UKAs, to establish a clear operative strategy for each type of revision and to better define the indications for each type of revision. METHODS: Aseptic loosening was the principal cause of failure (n = 184, 44%) of which 99 cases were isolated tibial loosening (23.5 % of the whole series and 54% of all loosening), 25 were isolated femoral loosening (six and 13.6%) and 60 were both femoral and tibial loosening (14.3 and 32.6%). The next most common causes of failure were progression of arthritis (n = 56, 13.4%), polyethylene wear (n = 53, 12.7%), implant positioning errors (n = 26), technical difficulties (n = six) and implant failure (n = 16, 3.8% of cases). Data collection was performed online using OrthoWave software (Aria, Bruay Labuissiere, France), which allows collection of all details of the primary and revision surgery to be recorded. RESULTS: A total of 426 revisions were performed; 371 patients underwent revision to a total knee arthroplasty (TKA) (87%), 33 patients (7.7%) were revised to an ipsilateral UKA, 11 (2.6%) patients underwent contralateral UKA (ten) or patellofemoral arthroplasty (one) and 11 patients (2.6%) underwent revision without any change in implants. CONCLUSIONS: Before considering a revision procedure it is important to establish a definite cause of failure in order to select the most appropriate revision strategy. Revision to a TKA is by far the most common strategy for revision of failed UKA but by no means the only available option. Partial revisions either to an alternative ipsilateral UKA or contralateral UKA are viable less invasive techniques, which in carefully selected patients and in experienced hands warrant consideration.

Tan, S. S., Chiarello, P. et Quentin, W. (2013). "Knee replacement and Diagnosis-Related Groups (DRGs): patient classification and hospital reimbursement in 11 European countries." Knee Surg Sports Traumatol Arthrosc 21(11) : 2548-2556.

PURPOSE: Researchers from 11 countries (Austria, England, Estonia, Finland, France, Germany, Ireland, Netherlands, Poland, Spain, and Sweden) compared how their Diagnosis-Related Group (DRG) systems deal with knee replacement cases. The study aims to assist knee surgeons and national authorities to optimize the grouping algorithm of their DRG systems. METHODS: National or regional databases were used to identify hospital cases treated with a procedure of knee replacement. DRG classification algorithms and indicators of resource consumption were compared for those DRGs that together comprised at least 97 % of cases. Five standardized case scenarios were defined and quasi-prices according to

national DRG-based hospital payment systems ascertained. RESULTS: Grouping algorithms for knee replacement vary widely across countries: they classify cases according to different variables (between one and five classification variables) into diverging numbers of DRGs (between one and five DRGs). Even the most expensive DRGs generally have a cost index below 2.00, implying that grouping algorithms do not adequately account for cases that are more than twice as costly as the index DRG. Quasi-prices for the most complex case vary between euro 4,920 in Estonia and euro 14,081 in Spain. CONCLUSIONS: Most European DRG systems were observed to insufficiently consider the most important determinants of resource consumption. Several countries' DRG system might be improved through the introduction of classification variables for revision of knee replacement or for the presence of complications or comorbidities. Ultimately, this would contribute to assuring adequate performance comparisons and fair hospital reimbursement on the basis of DRGs.

Weeks, W. B., Jardin, M., Dufour, J. C., et al. (2014). "Geographic variation in admissions for knee replacement, hip replacement, and hip fracture in France: evidence of supplier-induced demand in for-profit and not-for-profit hospitals." Med Care 52(10) : 909-917.

INTRODUCTION: We sought to determine whether there was evidence of supplier-induced demand in mainland France, where health care is mainly financed by a public and compulsory health insurance and provided by both for-profit and not-for-profit hospitals. METHODS: Using a dataset of all admissions to French hospitals for 2009 and 2010, we calculated department-level age-adjusted and sex-adjusted per capita admission rates for hip replacement, knee replacement, and hip fracture for 2 age groups (45-64 and 65-99 y old), for-profit and not-for-profit hospitals. We used spatial regression analysis to examine the relationship between ecological variables, procedure rates, and supply of surgeons or sector-specific surgical beds. RESULTS: The large majority of hip and knee replacement surgeries were performed in for-profit hospitals, whereas the large majority of hip fracture admissions were in not-for-profit hospitals; nonetheless, we found approximately 2-fold variation in per capita rates of hip and knee replacement surgery in both age groups and settings. Spatial regression results showed that among younger patients, higher incomes were associated with lower admission rates; among older patients, higher levels of reliance on social benefits were associated with lower rates of elective surgery in for-profit hospitals. Although overall surgical bed supply was not associated with admission rates, for-profit-specific and not-for-profit-specific bed supply were associated with higher rates of elective procedures within a respective hospital type. DISCUSSION: We found evidence of supplier-induced demand within the French for-profit and not-for-profit hospital systems; however, these systems appear to complement one another so that there is no overall national supplier-induced effect.

ÉTUDES ETRANGERES

(2015). "Total joint replacement patients need care coordination, too." Hosp Case Manag 23(1) : 5-6.

Joint replacement surgery may seem routine, but patients are being readmitted to the hospital for a variety of reasons, including comorbidities, poor outcomes from therapy, and deep venous thrombosis. Experts recommend the following: Develop triggers for a medical consultation for patients who have chronic conditions and comorbidities or otherwise are at risk. Take all of the patient's conditions into consideration when developing a discharge plan. Make follow-up phone calls to patients to ensure that they have any prescribed equipment,

are participating in physical therapy, have follow-up doctor's appointments, and are taking their medication.

Abbas, C. et Daher, J. "Pilot study: Post-operative rehabilitation pathway changes and implementation of functional closed kinetic chain exercise in total hip and total knee replacement patient." Journal of Bodywork and Movement Therapies.
http://www.sciencedirect.com/science/article/pii/S1360859217300098

Abstract: Objective The aim of this study was to assess the feasibility of introducing a functional closed kinetic chain exercise program to an acute care setting to reduce length of hospital stay and assess tolerance to exercise immediately following total hip or total knee arthroplasty. Methods A protocol change implementing a functional closed kinetic chain based exercise program, post total hip (n = 535) and total knee (n = 695) arthroplasty, was performed at Windsor Regional Hospital Ouellette Campus in Windsor, Ontario Canada. A chart review was performed to compare the length of stay, post-surgery, of the new protocol to the length of stay of the previous range of motion and open kinetic chain based protocols of the previous two years. Results A significant (P-value <0.05) number of total hip and total knee arthroplasty patients reduced the length of hospital stay to less than 4 days using the closed kinetic chain program. Conclusion Evidence suggests that closed kinetic chain exercises are tolerated in the acute care setting and may be useful in reducing hospital length of stay post total hip and total knee arthroplasty.

Abbasi, A., Uddin, S. et Hossain, L. (2012). "Socioeconomic analysis of patient-centric networks: effects of patients and hospitals's characteristics and network structure on hospitalization costs." European Journal of Health Economics (the) 13(3) : 267-276, tabl., graph., fig.

Improving operations and delivery of cost-effective healthcare services is considered to be an important area of investigation due to the challenges in allocation of resources in meeting the increasing cost of health care for the twenty-first century. To date, appropriate mechanisms for systematic evaluation of hospital operations and its impact of the delivery of cost-effective healthcare services are lacking. This is, perhaps, the first study, which focuses on using large insurance claims data to develop a social network-based model for exploring the effect of patient-doctor tie strength and patient socio-demographic factors for exploring the social structure of operations and delivery of cost-effective healthcare services. We suggest that delivery of cost-effective healthcare services and operation is embedded within the social structure of hospitals. By exploring the mode of hospital operations in terms of their patient-centric care network, we are able to develop a better understanding of the operation and delivery of cost-effective healthcare services

Anneli, H., Nina, S.-K., Arja, H., et al. (2017). "Effect of total knee replacement surgery and postoperative 12 month home exercise program on gait parameters." Gait & Posture 53 : 92-97.
http://www.sciencedirect.com/science/article/pii/S0966636217300036

AbstractObjective To evaluate the effects of surgery and a postoperative progressive home exercise program on gait parameters among individuals operated with total knee arthroplasty. Design Single blinded randomized controlled trial. Subjects 108 patients (84 females, 24 males, mean age 69 years). Interventions Patients were equally randomized into an exercise group (EG) and control group (CG). The 12-months progressive home exercise program starting two months postoperatively was compared to usual care. Methods Gait analysis was performed using the Gaitrite electronic walkway system. In addition, knee extension and flexion strength were measured by a dynamometer preoperatively, and pain

on visual analog scale (VAS) at two months and 14 months postoperatively. Results At the 12–month follow-up, maximal gait velocity (p = 0.006), cadence (p = 0.003) and stance time (p = 0.039) showed a greater increase among EG than CG. All the other gait parameters improved among both groups, but with not statistically discernible difference between groups. Weak correlations were found between changes in maximal gait velocity and the knee extension (r = −0.31, p = 0.002), flexion strength (r = 0.28, p = 0.004) and pain during loading (r = −0.27, p = 0.005) values. Conclusion The intervention produced statistically significant changes in maximal gait velocity, cadence and stance times in the exercise group compared to controls. Although the average change was small it is of importance that biggest changes occurred in those with low performance.

Anton, D., Nelson, M., Russell, T., et al. (2016). "Validation of a Kinect-based telerehabilitation system with total hip replacement patients." J Telemed Telecare 22(3) : 192-197.

The evolving telecommunications industry combined with medical information technology has been proposed as a solution to reduce health care cost and provide remote medical services. This paper aims to validate and show the feasibility and user acceptance of using a telerehabilitation system called Kinect Rehabilitation System (KiReS) in a real scenario, with patients attending repeated rehabilitation sessions after they had a Total Hip Replacement (THR). We present the main features of KiReS, how it was set up in the considered scenario and the experimental results obtained in relation to two different perspectives: patients' subjective perceptions (gathered through questionnaires) and the accuracy of the performed exercises (by analysing the data captured using KiReS). We made a full deployment of KiReS, defining step by step all the elements of a therapy: postures, movements, exercises and the therapy itself. Seven patients participated in this trial in a total of 19 sessions, and the system recorded 3865 exercise executions. The group showed general support for telerehabilitation and the possibilities that systems such as KiReS bring to physiotherapy treatment.

Appleby, J., Poteliakhoff, E., Shah, K., et al. (2013). "Using patient-reported outcome measures to estimate cost-effectiveness of hip replacements in English hospitals." J R Soc Med 106(8) : 323-331.

OBJECTIVE: To estimate the average cost per quality adjusted life year (QALY) gained from hip surgery, and to examine the variation in that between hospitals. DESIGN: The transformation of patient-reported outcome measures (EQ-5D data) into QALYs, covering 25,463 NHS patient episodes between April 2009 and August 2010 from hospitals in England, using a model of future health change arising from a hip operation compared to a counterfactual of no operation. Hospital-level costs for hip procedures from the National Reference Costs data-set was used to calculate the hospitals' cost per QALY. SETTING: English hospitals treating NHS-funded patients undergoing hip replacement. PARTICIPANTS: NHS-funded patients undergoing primary hip replacement. MAIN OUTCOME MEASURE: Cost per QALY. RESULTS: Assuming some degradation in patients' health over the lifetime of the hip prosthesis, average health gain arising from a hip operation was 2.77 QALYs. For procedures paid for by the NHS but carried out in the independent sector the average gain was 2.97 QALYs. Average NHS hospital hip procedure costs were estimated to be pound5844. The unweighted average cost per QALY for NHS hospitals was pound2128. There were significant variations in cost per QALY between hospitals; most of this variation appears to be driven by variations in cost, not QALYs. CONCLUSIONS: Using the new patient-assessed health-related quality of life data combined with routine hospital-level cost data it is possible to estimate a procedure-based measure of efficiency for hospitals. The fact that variations in cost per QALY are strongly driven by variations in cost suggests that further work is needed to investigate the causes of cost variations per se--especially the quality of routine NHS cost data.

Argenson, J. N., Husted, H., Lombardi, A., Jr., et al. (2016). "Global Forum: An International Perspective on Outpatient Surgical Procedures for Adult Hip and Knee Reconstruction." J Bone Joint Surg Am 98(13) : e55.

Outpatient surgical procedures for adult hip and knee reconstruction are gaining interest on a worldwide basis and have been progressively increasing over the last few years. Preoperative screening needs to concentrate on both the patient's comorbidities and home environment to provide a proper alignment of expectations of the surgeon, the patient, and the patient's family. Preoperative multidisciplinary patient information covering all aspects of the upcoming treatment course is a mandatory step, focusing on pain management and early mobilization. Perioperative pain management includes both multimodal and preventive analgesia. Preemptive medications, minimization of narcotics, and combination of general and regional anesthesia are the techniques required in joint arthroplasty performed as an outpatient surgical procedure. A multimodal blood loss management program should be used with preoperative identification of anemia and attention directed toward minimizing blood loss, considering the use of tranexamic acid during the surgical procedure. Postoperative care extends from the initial recovery from anesthesia to the physical therapist's evaluation of the patient's ambulatory status. After the patient has met the criteria for discharge and has been discharged on the same day of the surgical procedure, a nurse should call the patient later at home to check on wound status, pain control, and muscle weakness, which will be further addressed by physiotherapy and education. Implementing outpatient arthroplasty requires monitoring safety, patient satisfaction, and economic impact.

Atkinson, H. D. E. (2017). "The negatives of knee replacement surgery: complications and the dissatisfied patient." Orthopaedics and Trauma 31(1): 25-33.
http://www.sciencedirect.com/science/article/pii/S187713271630149X

Total knee replacement (TKR) surgery is a very effective treatment option for patients with disabling and severe end-stage knee pain. It is usually life-changing surgery and most patients report improvements in outcome measures scoring pain, function and quality of life. However, around 14%–53% of TKR patients have some level of persisting knee pain, 7%–50% of TKR patients report poor knee function, and mean published dissatisfaction rates range between 15% and 30%. This article reviews the negatives of knee replacement surgery, covering the risks of potential complications and the factors that should routinely be discussed in detail with patients as part of the informed consent process.

Avisar, E., Elvey, M. H., Bar-Ziv, Y., et al. (2015). "Severe vascular complications and intervention following elective total hip and knee replacement: A 16-year retrospective analysis." Journal of Orthopaedics 12(3) : 151-155.
http://www.sciencedirect.com/science/article/pii/S0972978X15000094

AbstractIntroduction Iatrogenic vascular injuries associated with elective orthopaedic joint procedures are relatively rare, however when they do occur they carry a risk of significant morbidity and mortality. The aim of this study was to investigate the incidence of vascular complications and resultant need for specialist intervention following elective total hip replacement (THR) and total knee replacement(TKR). Methods This was a retrospective analysis of prospectively collected data. The primary outcome measure was vascular complication requiring an interventional radiology procedures or vascular surgery. As a secondary outcome measure postoperative Modified Knee Society Scores and Harris Hip

Scores were analysed to assess long term clinical outcome. Results Six cases of vascular injury requiring specialist intervention were identified. From 2073 total TKRs there were one cases of popliteal artery injury, one case of venous injury and two case of lateral geniculate artery injury (0.19%). From 1601 THRs there were two cases (0.12%) of arterial injury. All patients were treated successfully by a vascular surgeon or an interventional radiologist. Patient outcome varied considerably with the poorest results seen in the THR group. Conclusions Iatrogenic vascular complications following elective THR and TKR carry a risk of significant morbidity and mortality. It is important that surgeons and trainees performing these procedures are conscious of these risks and able to identify vascular injuries promptly when they occur. Detailed preoperative assessment, an awareness of anatomical variants and close liaison with a vascular surgeon may all help to reduce the number and severity of adverse outcomes.

Bakirhan, S., Unver, B. et Karatosun, V. (2015). "Effects of two different continuous passive motion protocols on the functional activities of total knee arthroplasty inpatients." Acta Orthop Traumatol Turc 49(5) : 497-502.

OBJECTIVE: The aim of this study was to compare the effects of two different continuous passive motion (CPM) application protocols (low- and high-angle) on the early phase functional activities of total knee arthroplasty inpatients. METHODS: The study included 170 patients who underwent primary TKA. While 84 of the TKA patients underwent low-angle CPM application, 86 of the patients underwent high-angle CPM application. The patients' functional activities were compared using the Iowa Level of Assistance Scale (ILAS), gait speeds using the Iowa Ambulation Velocity Scale (IAVS), knee scores using the Hospital for Special Surgery (HSS) Knee Score, and the duration of hospital stays with the Visual Analog Scale (VAS) preoperatively and on postoperative Day 2, Day 6, and at discharge. RESULTS: It was found that patients in the high-angle group had lower pain levels than did the patients in the low-angle group postsurgery ($p<0.05$). Patients in the high-angle group achieved their functional activities more independently on postoperative Day 2, Day 6, and at discharge than did the patients in the low-angle group ($p<0.05$). However, gait speed of patients in the former group was lower than that of the patients in the latter group ($p<0.05$). CONCLUSION: Although low-angle CPM application produced better results in terms of gait speed following TKA, the high-angle CPM application was superior in terms of independence levels of functional activities in the early postsurgery period. This result suggests that the appropriate use of rehabilitation methods such as CPM applications may guide clinicians to increase patients' level of independence.

Barnett, M. L., Wilcock, A., McWilliams, J. M., et al. (2019). "Two-Year Evaluation of Mandatory Bundled Payments for Joint Replacement." The New England journal of medicine 380(3) : 252-262. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6504974/

BACKGROUND: In 2016, Medicare implemented Comprehensive Care for Joint Replacement (CJR), a national mandatory bundled-payment model for hip or knee replacement in randomly selected metropolitan statistical areas. Hospitals in such areas receive bonuses or pay penalties based on Medicare spending per hip- or knee-replacement episode (defined as the hospitalization plus 90 days after discharge). METHODS: We conducted difference-in-differences analyses using Medicare claims from 2015 through 2017, encompassing the first 2 years of bundled payments in the CJR program. We evaluated hip- or knee-replacement episodes in 75 metropolitan statistical areas randomly assigned to mandatory participation in the CJR program (bundled-payment metropolitan statistical areas, hereafter referred to as "treatment" areas) as compared with those in 121 control areas, before and after

implementation of the CJR model. The primary outcomes were institutional spending per hip- or knee-replacement episode (i.e., Medicare payments to institutions, primarily to hospitals and post-acute care facilities), rates of postsurgical complications, and the percentage of "high-risk" patients (i.e., patients for whom there was an elevated risk of spending - a measure of patient selection). Analyses were adjusted for the hospital and characteristics of the patients and procedures. RESULTS: From 2015 through 2017, there were 280,161 hip- or knee-replacement procedures in 803 hospitals in treatment areas and 377,278 procedures in 962 hospitals in control areas. After the initiation of the CJR model, there were greater decreases in institutional spending per joint-replacement episode in treatment areas than in control areas (differential change [i.e., the between-group difference in the change from the period before the CJR model], -$812, or a -3.1% differential decrease relative to the treatment-group baseline; P<0.001). The differential reduction was driven largely by a 5.9% relative decrease in the percentage of episodes in which patients were discharged to post-acute care facilities. The CJR program did not have a significant differential effect on the composite rate of complications (P=0.67) or on the percentage of joint-replacement procedures performed in high-risk patients (P=0.81). CONCLUSIONS: In the first 2 years of the CJR program, there was a modest reduction in spending per hip- or knee-replacement episode, without an increase in rates of complications. (Funded by the Commonwealth Fund and the National Institute on Aging of the National Institutes of Health.).

Basques, B. A., Tetreault, M. W. et Della Valle, C. J. (2017). "Same-Day Discharge Compared with Inpatient Hospitalization Following Hip and Knee Arthroplasty." J Bone Joint Surg Am 99(23) : 1969-1977.
https://pubmed.ncbi.nlm.nih.gov/29206786

BACKGROUND: Discharge from the hospital on the day of (same-day) hip and knee arthroplasties has become more common; however, to our knowledge, few studies have compared morbidity between same-day and inpatient surgical procedures. The aims of this study were to compare matched cohorts of patients who underwent same-day and inpatient hip or knee arthroplasty in terms of postoperative complications and 30-day readmission rates. METHODS: Patients who underwent primary elective total hip arthroplasty, total knee arthroplasty, or unicompartmental knee arthroplasty from 2005 to 2014 were identified from the National Surgical Quality Improvement Program registry. Patients discharged the day of the surgical procedure were matched 1:1 with patients who had an inpatient stay using propensity scores. The rates of 30-day adverse events and readmission were compared between matched cohorts using the McNemar test. Risk factors for 30-day readmission following same-day procedures were identified using multivariate regression. RESULTS: Of 177,818 patients identified, 1,236 (0.70%) underwent a same-day surgical procedure. After matching, there were no differences in overall adverse events or readmission between same-day and inpatient groups, although inpatients had increased thromboembolic events (p = 0.048) and same-day patients had an increased rate of return to the operating room (p = 0.016). When procedures were assessed individually, the only difference identified was that the same-day total knee arthroplasty cohort had an increased return to the operating room compared with the inpatient total knee arthroplasty cohort (p = 0.046). Body mass index of ≥35 kg/m (p = 0.035), insulin-dependent diabetes (p = 0.041), non-insulin-dependent diabetes (p = 0.013), and age of ≥85 years (p = 0.039) were associated with 30-day readmission following same-day surgical procedures. Infection was the most common reason for reoperation and readmission following same-day procedures. CONCLUSIONS: No significant differences in overall postoperative complications or readmission were found between matched cohorts of patients who underwent same-day and inpatient hip and knee

arthroplasties, although inpatients had a higher rate of thromboembolic events and same-day patients had a higher rate of reoperation. Patients with a body mass index of ≥35 kg/m, diabetes, and an age of ≥85 years had an increased risk of 30-day readmission following same-day procedures, which was most commonly due to infection. LEVEL OF EVIDENCE: Therapeutic Level III. See Instructions for Authors for a complete description of levels of evidence.

Bayliss, L. E., Culliford, D., Monk, A. P., et al. "The effect of patient age at intervention on risk of implant revision after total replacement of the hip or knee: a population-based cohort study." The Lancet 389(10077) : 1424-1430.
http://www.sciencedirect.com/science/article/pii/S0140673617300594

SummaryBackground Total joint replacements for end-stage osteoarthritis of the hip and knee are cost-effective and demonstrate significant clinical improvement. However, robust population based lifetime-risk data for implant revision are not available to aid patient decision making, which is a particular problem in young patient groups deciding on best-timing for surgery. Methods We did implant survival analysis on all patients within the Clinical Practice Research Datalink who had undergone total hip replacement or total knee replacement. These data were adjusted for all-cause mortality with data from the Office for National Statistics and used to generate lifetime risks of revision surgery based on increasing age at the time of primary surgery. Findings We identified 63 158 patients who had undergone total hip replacement and 54 276 who had total knee replacement between Jan 1, 1991, and Aug 10, 2011, and followed up these patients to a maximum of 20 years. For total hip replacement, 10-year implant survival rate was 95·6% (95% CI 95·3–95·9) and 20-year rate was 85·0% (83·2–86·6). For total knee replacement, 10-year implant survival rate was 96·1% (95·8–96·4), and 20-year implant survival rate was 89·7% (87·5–91·5). The lifetime risk of requiring revision surgery in patients who had total hip replacement or total knee replacement over the age of 70 years was about 5% with no difference between sexes. For those who had surgery younger than 70 years, however, the lifetime risk of revision increased for younger patients, up to 35% (95% CI 30·9–39·1) for men in their early 50s, with large differences seen between male and female patients (15% lower for women in same age group). The median time to revision for patients who had surgery younger than age 60 was 4·4 years. Interpretation Our study used novel methodology to investigate and offer new insight into the importance of young age and risk of revision after total hip or knee replacement. Our evidence challenges the increasing trend for more total hip replacements and total knee replacements to be done in the younger patient group, and these data should be offered to patients as part of the shared decision making process. Funding Oxford Musculoskeletal Biomedical Research Unit, National Institute for Health Research.

Behery, O. A., Kouk, S., Chen, K. K., et al. (2018). "Skilled Nursing Facility Partnerships May Decrease 90-Day Costs in a Total Joint Arthroplasty Episode Under the Bundled Payments for Care Improvement Initiative." J Arthroplasty 33(3) : 639-642.
http://www.sciencedirect.com/science/article/pii/S0883540317309075

Background The Bundled Payments for Care Improvement initiative was developed to reduce costs associated with total joint arthroplasty through a single payment for all patient care from index admission through a 90-day post-discharge period, including care at skilled nursing facilities (SNFs). The aim of this study is to investigate whether forming partnerships between hospitals and SNFs could lower the post-discharge costs. We hypothesize that institutionally aligned SNFs have lower post-discharge costs than non-aligned SNFs. Methods A cohort of 615 elective, primary total hip and knee arthroplasty subjects discharged to an

SNF under the Bundled Payments for Care Improvement from 2014 to 2016 were included in our analysis. Patients were grouped into one of the 3 categories of SNF alignment: group 1: non-partners; group 2: agreement-based partners; group 3: institution-owned partners. Demographics, comorbidities, length of stay (LOS) at SNF, and associated costs during the 90-day post-operative period were compared between the 3 groups. Results Mean index hospital LOS was statistically shortest in group 3 (mean 2.7 days vs 3.5 for groups 1 and 2, P = .001). SNF LOS was also shortest in group 3 (mean 11 days vs 19 and 21 days in groups 2 and 1 respectively, P < .001). Total SNF costs and total 90-day costs were both significantly lower in group 3 compared with groups 1 and 2 (P < .001 for all), even after controlling for medical comorbidities. Conclusion Institution-owned partner SNFs demonstrated the shortest patient LOS, and the lowest SNF and total 90-day costs, without increased risk of readmissions, compared with other SNFs.

Bel, J. C. et Carret, J. P. (2015). "Total hip arthroplasty with minimal invasive surgery in elderly patients with neck of femur fractures: our institutional experience." Injury 46 Suppl 1 : S13-17.

The purpose of this study was to investigate whether minimal invasive surgery (MIS) in elderly patients with neck of femur fractures would reduce the peri-operative complications and improve the post-operative ambulation and length of hospital stay in his cohort of patients. Forty elderly patients were treated with either total hip arthroplasty (THA) or bipolar prosthesis using MIS transgluteal approach. A matched reference group treated with a conventional surgical approach formed the control group. All procedures were performed by the same surgeon. Selection of acetabular component included Novae(R) uncemented press fit dual mobility concept socket or Bipolar Hemi-Arthroplasty (BHA). The femoral implant was Corail(R) uncemented stem or Fjord(R) cemented stem when primary instability was encountered. The follow-up was done for all patients and its minimum length was more than thirty-six months. The average length of the skin incision was 7 (6-8) SD 0.7 cm. Eighteen THA, twenty-two BHA, thirty-seven uncemented femoral stems and three cemented stems were implemented. The length of the procedure was the same as those of the reference group. The operative and post-operative blood loss and analgesic use were significantly decreased in the MIS group. Radiographic implants positioning was similar amongst the two groups. No skin complication, no primary infection, no death within ninety days and no dislocations were observed. MIS approach for implanting THA after a femoral neck fracture in the elderly appears to be a reliable procedure.

Beukers, P. D. C., Kemp, R. G. M. et Varkevisser, M. (2014). "Patient Hospital Choice for Hip Replacement: Empirical Evidence from the Netherlands." European Journal of Health Economics 15(9) : 927-936.
http://dx.doi.org/10.1007/s10198-013-0535-7

In the Dutch health care system, hospitals are expected to compete. A necessary condition for competition among hospitals is that patients do not automatically choose the nearest hospital, but are--at least to some extent--sensitive to differences in hospital quality. In this study, an analysis is performed on the underlying features of patient hospital choice in a setting where prices do not matter for patients as a result of health insurance coverage. Using claims data from all Dutch hospitals over the years 2008-2010, a conditional logit model examines the relationship between patient characteristics (age, gender and reoperations) and hospital attributes (hospital quality information, waiting times on treatments and travel time for patients to the hospitals) in the market for general non-emergency hip replacement treatments. The results show that travel time is the most important determinant in patient hospital choice. From our analysis, however, it follows that

publicly available hospital quality ratings and waiting times also have a significant impact on patient hospital choice. The panel data used for this study (2008-2010) is rather short, which may explain why no coherent and persistent changes in patient hospital choice behaviour over time are found.

Bindawas, S. M., Graham, J. E., Karmarkar, A. M., et al. (2014). "Trajectories in functional recovery for patients receiving inpatient rehabilitation for unilateral hip or knee replacement." Arch Gerontol Geriatr 58(3) : 344-349.

The purpose of this study was to explore trajectories of recovery in patients with lower extremity joint replacements receiving post-acute rehabilitation. A retrospective cohort design was used to examine data from the Uniform Data System for Medical Rehabilitation (UDSMR(R)) for 7434 patients with total knee replacement (TKR) and 4765 patients with total hip replacement (THR) who received rehabilitation from 2008 to 2010. Functional Independence Measure (FIM) instrument ratings were obtained at admission, discharge, and 80-180 days after discharge. Random coefficient regression analyses using linear mixed models were used to estimate mean ratings for items within the four motor subscales (self-care, sphincter control, transfers, and locomotion) and the cognitive domain of the FIM instrument. Mean improvements at discharge for motor items ranged from 1.16 (95% confidence interval [CI]: 1.14, 1.19) to 2.69 (95% CI: 2.66, 2.71) points for sphincter control and locomotion, respectively. At follow-up mean motor improvements ranged from 2.17 (95% CI: 2.15, 2.20) to 4.06 (95% CI: 4.03, 4.06) points for sphincter control and locomotion, respectively. FIM cognition yielded smaller improvements: discharge=0.47 (95% CI: 0.46, 0.48); follow-up=0.83 (95% CI: 0.81, 0.84). Persons who were younger, female, non-Hispanic white, unmarried, with fewer comorbid conditions, and who received a TKR demonstrated slightly higher functional motor ratings. Overall, patients with unilateral knee or hip replacement experienced substantial improvement in motor functioning both during and up to six months following inpatient rehabilitation.

Bini, S. A., Fithian, D. C., Paxton, L. W., et al. (2010). "Does discharge disposition after primary total joint arthroplasty affect readmission rates?" J Arthroplasty 25(1) : 114-117.

We reviewed 90-day readmission rates for 9150 patients with a primary total hip or knee arthroplasty performed between April 2001 and December 2004. Patients with an American Society of Anesthesiologists score of 3 or greater or with perioperative complications were excluded. We correlated the readmission rate with discharge disposition to either skilled nursing facilities (SNFs) or Home. Of the 9150 patients identified, 1447 were discharged to an SNF. After statistically adjusting for sex, age and American Society of Anesthesiologists scores, total hip arthroplasty and total knee arthroplasty patients discharged to SNFs had higher odds of hospital readmission within 90 days of surgery than those discharged home (total hip arthroplasty: odds ratio = 1.9; 95% confidence interval, 1.2-3.2; P = .008; total knee arthroplasty: odds ratio = 1.6; 95% confidence interval, 1.1-2.4; P = .01). Healthy patients discharged to SNFs after primary total joint arthroplasty need to be followed closely for complications.

Black, N., Varaganum, M. et Hutchings, A. (2014). "Relationship between patient reported experience (PREMs) and patient reported outcomes (PROMs) in elective surgery." BMJ Qual Saf 23(7) : 534-542. http://www.ncbi.nlm.nih.gov/pubmed/24508681

OBJECTIVE: Our aim was to see if the reporting of better experiences by elective surgical patients was associated with better outcomes (effectiveness and safety). The objectives were

to: describe the distribution of experience scores and any association with patients' characteristics; determine the relationship of experience with effectiveness and with safety; and explore the influence of patient characteristics, year and provider on the relationship between experience and effectiveness. METHODS: Patients undergoing one of three procedures from 2010 to 2012 in England who completed a patient reported outcome measure (PROM) questionnaire before and after surgery and a patient reported experience measure (PREM) questionnaire. Data on 4089 hip replacement patients, 4501 knee replacements and 1793 groin hernia repairs. Regression analysis was used to examine associations between disease-specific and generic PROMs and PREMs. RESULTS: There was a weak positive association between experience and effectiveness for all three procedures (correlation coefficient with disease-specific PROMs for hip and knee replacements 0.2 and with EQ-5D 0.1 for all three procedures). The aspect of experience most strongly associated with a better outcome was the level of communication with and trust in their doctor. A higher experience score of 1 SD (about 1.5 on a 10-point scale) was associated with about 30% less likelihood of the patient reporting a complication. There was no difference between the eight dimensions of experience. All the relationships observed were consistent over time, between different types of patients (age, sex, socioeconomic status) and between providers. CONCLUSIONS: Patients distinguish between the three domains of quality when reporting their experience and outcome. If the weak positive associations between domains were shown to be causal, there would be implications for maximising performance measures for providers.

Buza Iii, J. A., Jancuska, J. M., Slover, J. D., et al. (2017). "Variation in Diagnoses for Hip Arthroplasty Among New York State Hospitals : Implications for the Comprehensive Care for Joint Replacement Model." J Arthroplasty 32(4) : 1117-1120.
http://www.sciencedirect.com/science/article/pii/S0883540316308117

AbstractBackground The Comprehensive Care for Joint Replacement model is designed to minimize costs and improve quality for Medicare patients undergoing joint arthroplasty. The cost of hip arthroplasty (HA) episode varies depending on the preoperative diagnosis and is greater for fracture than for osteoarthritis. Hospitals that perform a higher percentage of HA for OA may therefore have an advantage in the Comprehensive Care for Joint Replacement model. The purposes of this study are to (1) determine the variability in underlying diagnosis for HA in New York State hospitals, and (2) determine hospital characteristics, such as volume, associated with this. Methods The New York Statewide Planning and Research Cooperative System database was used to identify 127,206 primary HA procedures from 2010 to 2014. The data included underlying diagnoses, age, length of stay, and total charges. Hospitals were categorized by volume and descriptive statistics were used. Results

Cary, M. P., Jr., Baernholdt, M. et Merwin, E. I. (2016). "Changes in Payment Regulation and Acute Care Use for Total Hip Replacement: Trends in Length of Stay, Costs, and Discharge, 1997-2012." Rehabil Nurs 41(2) : 67-77.

PURPOSE: To describe trends in the length of stay (LOS), costs, mortality, and discharge destination among a national sample of total hip replacement (THR) patients between 1997 and 2012. DESIGN: Longitudinal retrospective design METHODS: Descriptive analysis of the Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample data. FINDINGS: A total of 3,516,636 procedures were performed over the study period. Most THR patients were women, and the proportion aged 44-65 years increased. LOS decreased from 5 to 3 days. Charges more than doubled, from $22,184 to $53,901. Deaths decreased from 43 to 12 deaths per 10,000 patients. THR patients discharged to an institutional setting declined,

while those discharged to the community increased. CONCLUSION: We found an increase in THR patients, who were younger, women, had private insurance, and among those discharged to community-based settings. CLINICAL RELEVANCE: Findings have implications for patient profiles, workplace environments, quality improvement, and educational preparation of nurses in acute and postacute settings.

Castagnini, F., Sudanese, A., Bordini, B., et al. "Total Knee Replacement in Young Patients: Survival and Causes of Revision in a Registry Population." J Arthroplasty.
http://www.sciencedirect.com/science/article/pii/S0883540317304916

AbstractBackground The incidence of total knee replacements (TKRs) in young patients is increasing. Few reports described encouraging results and acceptable survival rates. However, many concerns still persist, in particular about the high rates of infection and aseptic loosening. Aim of this article was to investigate the survival of TKRs in patients aged 45 years or younger in a registry population. Methods The Emilia-Romagna registry RIPO was enquired about TKRs in patients ≤45 years; 238 TKRs were evaluated at a mean follow-up of 5.4 years (range 0-15.6 years), examining the features of the patients involved, the survival rate, and the reasons for revision of the knee implants. Results The TKRs were generally performed in men, in private hospitals, and almost in half of the cases for other causes rather than primary osteoarthritis. The mean age was 40 years. Bicompartmental, cemented posterior-stabilized implants with fixed bearing were preferred. The survival rate was higher than 90% in the first 7 years, and then it decremented. The choice of implant did not apparently influence the survivorship. The final outcomes were acceptable, substantially in line with the previous literature about young patients. Twenty-one revisions occurred (8.8%), in particular 8 cases for aseptic loosening and 7 TKRs for infection. The rate of revision was higher than in overall population and even in some young cohorts. Conclusion TKRs in patients aged 45 years or younger seem a promising procedure, although the high rates of septic and aseptic loosening should be carefully evaluated. Prospective, well-designed studies are required to confirm and investigate these preliminary findings.

Cavill, S., McKenzie, K., Munro, A., et al. (2016). "The effect of prehabilitation on the range of motion and functional outcomes in patients following the total knee or hip arthroplasty: A pilot randomized trial." Physiother Theory Pract 32(4) : 262-270.

OBJECTIVE: The study investigated the effect of prehabilitation on the quality of life and function in patients having total knee replacement (TKR)/total hip replacement (THR). METHODS: A pilot randomized controlled trial with concealed allocation, assessor blinding, and intention-to-treat analysis was conducted. Sixty-four people undergoing elective lower-limb arthroplasty were included. Prehabilitation included one-hour twice-weekly sessions for at least three and a maximum of four weeks prior to surgery. Control participants did not complete any pre-surgical programs. Health utility and quality of life as measured by the EQ-5D-3L and the patient-specific functional scale were the primary outcomes measured before allocation and eight weeks post-operatively. RESULTS: No between-group differences were evident in health utility (main effect of the group -0.04 (95% Confidence Interval [CI] -0.16 to 0.08, p = 0.50) or patient-specific functional scale (main effect of the group -0.59 (95% CI -1.8 to 0.6, p = 0.73), but the group-by-joint interaction effects for the timed up and go (TUG) (7.6 (95% CI -0.9 to 16.1, p = 0.08)) and the EQ-5D VAS (-18.3 (95% CI -41.1 to 4.5), p = 0.11) were larger. Prehabilitation participants' knee flexion improved by 12.6 degrees (95% CI 5.2-20, p = 0.001). CONCLUSIONS: Prehabilitation improved knee flexion, but this did not translate into improved functional mobility or quality of life.

Chen, A. F., Stewart, M. K., Heyl, A. E., et al. (2012). "Effect of immediate postoperative physical therapy on length of stay for total joint arthroplasty patients." J Arthroplasty 27(6) : 851-856.

The isolated effect of physical therapy (PT) on total joint arthroplasty hospital length of stay (LOS) has not been studied. A prospective cohort study was conducted on 136 primary total joint arthroplasties (58 hips, 78 knees). The LOS was determined by the operative start time until the time of discharge. On postoperative day (POD) 0, 60 joints remained in bed, 51 moved to a chair, and 25 received PT (22 ambulated, 3 moved to a chair). Length of stay differed for patients receiving PT on POD 0 (2.8 +/- 0.8 days) compared with POD 1 (3.7 +/- 1.8 days) (P = .02). There was no difference in PT treatment based on nausea/vomiting, pain levels, or discharge location. Isolated PT intervention on POD 0 shortened hospital LOS, regardless of the intervention performed.

Churchill, L., Malian, S. J., Chesworth, B. M., et al. (2016). "The development and validation of a multivariable model to predict whether patients referred for total knee replacement are suitable surgical candidates at the time of initial consultation." Can J Surg 59(6) : 407-414.

BACKGROUND: In previous studies, 50%-70% of patients referred to orthopedic surgeons for total knee replacement (TKR) were not surgical candidates at the time of initial assessment. The purpose of our study was to identify and cross-validate patient self-reported predictors of suitability for TKR and to determine the clinical utility of a predictive model to guide the timing and appropriateness of referral to a surgeon. METHODS: We assessed pre-consultation patient data as well as the surgeon's findings and post-consultation recommendations. We used multivariate logistic regression to detect self-reported items that could identify suitable surgical candidates. RESULTS: Patients' willingness to undergo surgery, higher rating of pain, greater physical function, previous intra-articular injections and patient age were the factors predictive of patients being offered and electing to undergo TKR. CONCLUSION: The application of the model developed in our study would effectively reduce the proportion of nonsurgical referrals by 25%, while identifying the vast majority of surgical candidates (> 90%). Using patient-reported information, we can correctly predict the outcome of specialist consultation for TKR in 70% of cases. To reduce long waits for first consultation with a surgeon, it may be possible to use these items to educate and guide referring clinicians and patients to understand when specialist consultation is the next step in managing the patient with severe osteoarthritis of the knee.

Cleveland Clinic Orthopaedic, A. (2018). "The Association Between Readmission and Patient Experience in a Total Hip Arthroplasty Population." J Arthroplasty 33(6) : 1668-1674.
https://www.arthroplastyjournal.org/article/S0883-5403(17)31129-4/fulltext

BACKGROUND: Our goal was to determine whether readmissions within 30 or 90 days following discharge are associated with Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores for total hip arthroplasty (THA) patients. METHODS: HCAHPS surveys from all patients who underwent THA between January 2016 and September 2016 in our institution were analyzed. Readmissions, demographics, baseline joint pain, joint function, and Veterans RAND-12 scores were collected. Statistical analyses involved Pearson's chi-squared tests for categorical variables and Student's t-tests for continuous variables. Multivariable logistic regression models were used to determine whether 30-day or 90-day readmissions were independently associated with HCAHPS scores. RESULTS: A total of 1868 patients were identified, the survey was sent to 969 patients and 578 completed the survey (59.6%). Eight patients (1.4%) were readmitted within 30 days, and 28 patients (4.8%) within 90 days. These patients were more likely to undergo revision

THA (P < .001). For the 30-day readmission cohort, 4 of 8 patients (50.0%) rated the hospital a 9 or 10 out of 10 compared to 466 of 567 patients (82.2%) of the non-readmitted cohort (P = .019). Thirty-day readmissions were associated with significantly lower likelihood of rating the hospital a 9 or 10 out of 10 (odds ratio 0.18). CONCLUSIONS: Our results demonstrate a significant negative association between readmission and HCAHPS scores under several dimensions of the survey including nurse communication, doctor communication, pain management, and global satisfaction with the hospital experience.

Cookson, R., Dusheiko, M. et Hardman, G. (2006). Socio-economic inequality in small area use of elective total hip replacement in the English NHS in 1991 and 2001. CHE Research Paper ; n° 15. York University of York **:** 13, tabl., graph., fig.
http://www.york.ac.uk/inst/che/pdf/rp15.pdf

International evidence suggests that there are substantial socio-economic inequalities in the delivery of specialist health services, even in the UK and other high-income countries with publicly funded health systems (Goddard and Smith 2001, Dixon et al. 2003, Van Doorslaer, Koolman and Jones 2004, Van Doorslaer et al. 2000). Studies of total hip replacement in the English NHS have yielded particularly striking examples, given that hip replacement is such a common, effective and longestablished health technology. Administrative data show that people living in deprived areas are less likely to receive hip replacement (Chaturvedi and Ben-Shlomo 1995, Dixon et al. 2004) while survey data suggest they may be more likely to need it (Milner et al. 2004). However, previous studies have not examined change in inequality over time. This paper presents evidence on the change in socio-economic inequality in small area use of elective total hip replacement in the English NHS, comparing 1991 with 2001. This was a period of importantlarge-scale health care reform in England, involving at least two significant reforms that might potentially have influenced socio-economic inequality in health care delivery: (1) the introduction and subsequent abolition of the Conservative "internal market" 1991-7, and (2) the introduction in 1995 of a revised NHS resource allocation formula designed to reduce geographical inequalities in health care delivery. Two datasets, for 1991 and 2001, were assembled from routine NHS data sources: Hospital Episode Statistics (HES) on hospital utilisation in England and the corresponding decennial National Censuses in 1991 and 2001. Both datasets contain information on over 8,000 electoral wards in England (over 95% of the total). To improve comparability, a common geography of frozen 1991 wards was adopted. The Townsend deprivation score was employed as an indicator of socio-economic status. Inequality was analysed in two ways. First, for comparability with previous small area studies of hip replacement, by using simple range measures based on indirectly age-sex standardised utilisation ratios (SURs) by deprivation quintile groups. Second, using concentration indices of deprivationrelated inequality in use based on indirectly age-sex standardised utilisation ratios for each individual small area. Each SUR is the observed use divided by the expected use, if each age and sex group in the study population had the same rates of use as the national population.

Cookson, R., Gutacker, N., Garcia-Armesto, S., et al. (2015). "Socioeconomic inequality in hip replacement in four European countries from 2002 to 2009-area-level analysis of hospital data." Eur J Public Health 25 Suppl 1 : 21-27.
https://academic.oup.com/eurpub/article/25/suppl_1/21/475100

BACKGROUND: Cross-country comparisons of socioeconomic equity in health care typically use sample survey data on general services such as physician visits. This study uses comprehensive administrative data on a specific service: hip replacement. METHODS: We analyse 651 652 publicly funded hip replacements, excluding fractures and accidents, in

adults over 35 in Denmark, England, Portugal and Spain from 2002 to 2009. Sub-national administrative areas are split into socioeconomic quintile groups comprising approximately one-fifth of the national population. Area-level Poisson regression with Huber-White standard errors is used to calculate age-sex standardised hip replacement rates by quintile group, together with gaps and ratios between richest and poorest groups (Q5 and Q1) and the middle group (Q3). RESULTS: We find pro-rich-area inequality in England (2009 Q5/Q1 ratio 1.35 [CI 1.25-1.45]) and Spain (2009 Q5/Q1 ratio 1.43 [CI 1.17-1.70]), pro-poor-area inequality in Portugal (2009 Q5/Q1 ratio 0.67 [CI 0.50-0.83]) and no significant inequality in Denmark. Pro-rich-area inequality increased over time in England and Spain but not significantly. Within-country differences between socioeconomic quintile groups are smaller than between-country differences in general population averages: hip replacement rates are substantially lower in Portugal and Spain (8.6 and 7.4 per 10 000 in 2009) than England and Denmark (20.2 and 27.8 per 10 000 in 2009). CONCLUSION: Despite limitations regarding individual-level inequality and area heterogeneity, analysis of area-level data on publicly funded hospital activity can provide useful cross-country comparisons and longitudinal monitoring of socioeconomic inequality in specific health services. Although this kind of analysis cannot provide definitive answers, it can raise important questions for decision makers.

Cookson, R. et Laudicella, M. (2009). Do the poor still cost more? The relationship between small area income deprivation and length of stay for elective hip replacement in the English NHS from 2001/2 to 2006/7. HEDG Working Paper ; 09/07. York HEDG **:** 24, fig., tabl., annexes.
http://www.york.ac.uk/res/herc/documents/wp/09_07.pdf

We examine whether hospital patients living in low income areas of England cost more to treat, using elective hip replacement as a tracer procedure and length of stay as a cost indicator. Anonymous hospital records are extracted on all 235,813 patients admitted to English NHS Hospital Trusts for elective total hip replacement from 2001/2 through 2006/7. The relationship between length of stay and small area income deprivation is modelled using linear regression, allowing for patient characteristics (age, sex, number of diagnoses, procedure type), time trends and Trust effects. Patients from the most income deprived decile of areas stay 12-15% longer than those from the least deprived decile, or 8% longer after adjusting for patient characteristics and Trust effects. This relationship did not change during the period, despite substantial NHS expenditure growth and reform along with substantial declines in average length of stay and waiting time. The major determinants of length of stay are age and number of diagnoses. Under the current NHS fixed price payment system, there are incentives for hospitals to avoid offering hip replacements to elderly patients, patients with substantial co-morbidity and, to a lesser extent, patients from low income areas.

Coomber, R., Porteous, M., Hubble, M. J. W., et al. (2016). "Total hip replacement for hip fracture: Surgical techniques and concepts." Injury 47(10) : 2060-2064.
http://www.sciencedirect.com/science/article/pii/S0020138316302753

When treating a hip fracture with a total hip replacement (THR) the surgical technique may differ in a number of aspects in comparison to elective arthroplasty. The hip fracture patient is more likely to have poor bone stock secondary to osteoporosis, be older, have a greater number of co-morbidities, and have had limited peri-operative work-up. These factors lead to a higher risk of complications, morbidity and perioperative mortality. Consideration should be made to performing the THR in a laminar flow theatre, by a surgeon experienced in total hip arthroplasty, using an anterolateral approach, cementing the implant in place, using a

large head size and with repair of the joint capsule. Combined Ortho-geriatric care is recommended with similar post-operative rehabilitation to elective THR patients but with less expectation of short length of stay and consideration for fracture prevention measures.

Cooper, H. J., Olswing, A. D., Berliner, Z. P., et al. (2018). "Variation in Treatment Patterns Correlate With Resource Utilization in the 30-Day Episode of Care of Displaced Femoral Neck Fractures." J Arthroplasty 33(7S) : S43-S48.
https://pubmed.ncbi.nlm.nih.gov/29478677

BACKGROUND: We evaluated which treatment decisions in the management of displaced femoral neck fractures (FNFs) may associate with measures of resource utilization relevant to a value-based episode-of-care model. METHODS: A total of 1139 FNFs treated with hip arthroplasty at 7 hospitals were retrospectively reviewed. Treatment choices were procedure (hemiarthroplasty vs total hip arthroplasty [THA]), surgeon training status, admitting service, and time to surgery. Dependent variables were length of stay, discharge disposition, 30-day readmission, and in-hospital mortality. Variation across hospitals was evaluated with analysis of variance and chi-square tests. Treatment choices were evaluated for the dependent variables of interest with univariable and multivariable regression. RESULTS: There was significant variation between hospitals regarding proportion of cases treated with THA (range = 3.0%-73.2%, P < .001), proportion treated by arthroplasty fellowship-trained surgeons (range = 0%-74.9%, P < .001), proportion admitted to the orthopedic service (range = 2.8%-91.3%, P < .001), mean time to surgery (range = 0.9-2.1 days, P < .001), and proportion of discharge home (range = 63.9%-97.8%, P < .001). Multivariable analysis adjusting for age, gender, and Charlson Comorbidity Index demonstrated correlations between (1) decreased length of stay and admission to orthopedics (B = -1.256, P < .001); (2) lower 30-day readmission and THA (odds ratio [OR] = .376, P = .004), and (3) decreased discharge to a care facility and admission to orthopedics (OR = 0.402, P = <.001), THA (OR = 0.435, P = .002), and treatment by an arthroplasty fellowship-trained surgeon (OR = 0.572, P = .016). None of the treatment variables tested associated with in-hospital mortality. CONCLUSION: We observed significant variation in the treatment of displaced FNF patients across 7 hospitals and identified treatment choices that associated with resource utilization within the episode of care. Future, prospective study is necessary to understand whether care pathways that adapt some combination of these characteristics may result in more value-based care.

Cots, F., Chiarello, P., Salvador, X., et al. (2012). "Patient Classification Systems and Hospital Costs of Care for Knee Replacement in 10 European Countries." Health Economics 21 : 116-128.
https://onlinelibrary.wiley.com/doi/full/10.1002/hec.2838

Knee replacement is a common surgical procedure performed to relieve pain and disability from degenerative osteoarthritis. This study evaluates the ability of ten European diagnosis-related group (DRG) systems to explain variations in costs or in length of stay for knee replacements. We assessed three different models in predicting variation of cost and length of stay. The first model, M[subscript D], included only DRG groups as explanatory variables; the second, M[subscript P], used a set of patient-level variables; and the third, M[subscript F], included all variables from both M[subscript D] and M[subscript P]. The total number of DRGs used to group knee replacement is low, ranging from two to six. All DRG systems except one differentiate between primary knee replacement and revision surgery. Considerable differences exist in the rate of revision surgery. There is also high variation in mean cost (from 3809 Euros to 8158 Euros) and in mean length of stay (LoS) (from 4.2 to 13.6 days). The explanatory power of DRGs varies from 21.5 to 72.5% with values of around

40% in most countries of the study. Findings suggest that DRG systems could be enhanced either by the inclusion of patient-level variables, by the use of measures of clinical outcome or by improving cost and administrative information.

Coulter, C., Perriman, D. M., Neeman, T. M., et al. (2017). "Supervised or unsupervised rehabilitation after total hip replacement provides similar improvements for patients: a randomised controlled trial." Arch Phys Med Rehabil.
http://www.sciencedirect.com/science/article/pii/S0003999317303076

AbstractObjective To determine do patients do better with unsupervised home PT or in an outpatient setting Are the outcomes after a supervised (centre-based) and an independent (home-based) physical rehabilitation program delivered in the early post-discharge phase (<8weeks) equivalent in an adult THR population. Setting Acute care public hospital in the region, supporting a population of almost 540,000. Design Single blinded randomised controlled trial. Participants Adult patients (n=98) after unilateral elective total hip replacement (THR) were randomly assigned to supervised/centre-based exercise (n=56) or unsupervised/home exercise (n=42) and followed 6 months post-surgery. Intervention The supervised group attended a 4 week outpatient rehabilitation program supervised by a physiotherapist. The unsupervised group was given written and pictorial instructions to perform rehabilitation independently at home. Outcome measures The WOMAC, SF-36 mental and physical component scores(MCS and PCS) questionnaires, the UCLA activity rating and the Timed up and Go test (TUG). Results There were no differences between groups for any measure. Overall differences between the adjusted means were: WOMAC 0.5 [-6.75, 5.73], SF-36 PCS 0.8 [-6.5 - 8.1], SF-36 MCS 1.7 [-4.1 - 7.4], UCLA 0.3 [5.19, 6.10] and TUG 0 secs [-1.4 - 1.3]. Conclusion Results demonstrated that outcomes in response to rehabilitation after THR are clinically and statistically similar whether the program was supervised or not. The results suggest that early rehabilitation programs can be effectively delivered unsupervised in the home to low-risk patients discharged home after THR. However, the relative effect of late stage rehabilitation was not tested.

Courtney, P. M., Boniello, A. J. et Berger, R. A. (2017). "Complications Following Outpatient Total Joint Arthroplasty: An Analysis of a National Database." J Arthroplasty 32(5) : 1426-1430.

BACKGROUND: As outpatient total hip (THA) and knee arthroplasties (TKA) increase in popularity, concerns exist about the safety of discharging patients home the same day. The purpose of this study is to determine the complications associated with outpatient total joint arthroplasty (TJA) and to identify high-risk patients who should be excluded from these protocols. METHODS: We queried the American College of Surgeons-National Surgical Quality Improvement Program database for all patients who underwent primary TKA or THA from 2011 to 2014. Demographic variables, medical comorbidities, and 30-day complication, readmission, and reoperation rates were compared between outpatient and traditional inpatient procedures. A multivariate logistic regression analysis was then performed to identify independent risk factors of poor short-term outcomes. RESULTS: Of the total 169,406 patients who underwent TJA, 1220 were outpatient (0.7%). The outpatient and inpatient groups had an overall complication rate of 8% and 16%, respectively. Patients aged more than 70 years, those with malnutrition, cardiac history, smoking history, or diabetes mellitus are at higher risk for readmission and complications after THA and TKA (all P < .05). Surprisingly, outpatient TJA alone did not increase the risk of readmission (OR 0.652, 95% CI 0.243-1.746, P = .395) or reoperation (OR 1.168, 95% CI 0.374-3.651, P = .789), and was a negative independent risk factor for complications (OR 0.459, 95% CI 0.371-0.567, P < .001). CONCLUSION: With the resources available in a hospital setting, outpatient TJA may be a safe

option, but only in select, healthier patients. Care should be taken to extrapolate these results to an outpatient facility, where complications may be more difficult to manage.

Cyriac, J., Garson, L., Schwarzkopf, R., et al. (2016). "Total Joint Replacement Perioperative Surgical Home Program: 2-Year Follow-Up." Anesth Analg 123(1) : 51-62.

BACKGROUND: Previously, our group successfully established one of the nation's first Perioperative Surgical Homes (PSHs) aimed at coordinating services to patients undergoing primary total hip arthroplasty (THA) and primary total knee arthroplasty (TKA). As we now focus on extending the PSH to other service lines within the hospital, the long-term sustainability of this practice model is an important factor to consider moving forward. METHODS: We prospectively collected data from all patients who underwent elective primary TKA and THA at our institution between October 1, 2012, and September 30, 2014. Prospectively collected data included length of stay (LOS), 30-day readmission rate, postoperative pain scores, and complications. RESULTS: During the 2-year period, there were 328 primary joint arthroplasty patients. Overall, the median LOS was significantly shorter in the second year of the PSH initiative (P = 0.03). Stratified by procedure, the median LOS for patients undergoing THA was significantly shorter in the second year (P = 0.02), whereas the median LOS for patients undergoing TKA did not differ between the 2 time periods. In the second year of the PSH initiative, significantly more patients were discharged home than to a skilled nursing facility compared with year 1 of the PSH initiative (P = 0.02). Readmission rates within 30 days after surgery to our institution were 0.9% (0.0-4.4) in the first year of the PSH initiative and 3.3% (confidence interval, 1.3%-7.2%) in the second year of the PSH initiative (P = not significant). Pain scores did not change significantly from year 1 to year 2 (P = not significant). CONCLUSIONS: Data for the second year of implementation demonstrate similarly positive results in LOS, pain control, discharge destination, readmission, transfusion rates, and complications.

de Palma, L., Torcianti, M., Meco, L., et al. (2014). "Operative delay and mortality in elderly patients with hip fracture: an observational study." Eur J Orthop Surg Traumatol 24(5) : 783-788.

BACKGROUND: Hip fracture is the third cause of death among the elderly and appears to be increasingly frequent. We analysed the influence of the major variables in hip fracture management in relation to 30-day mortality. MATERIALS AND METHODS: The records of all patients with isolated hip fracture treated at a regional trauma centre from January 1995 to September 2008 were reviewed. Data on demographics, comorbidities, operative delay, complications, functional status at discharge and mortality were collected and subjected to univariate and multivariate analysis. RESULTS: The cohort included 1,199 patients; the mortality rate was 11.7%. Surgery was performed within 48 h of injury in 17.7% and after more than 48 h in 82.3%; the mortality rate was 9.27% in the former and 10.4% in the latter patients; however, at variance with previous reports, operative delay was not associated with a worse outcome in patients with comorbidities. CONCLUSIONS: Our data support the policy envisaging fracture repair within 48 h in stable patients and delayed surgery (>48 h) in those with comorbidity conditions requiring stabilization.

Drummond, A., Edwards, C., Coole, C., et al. (2013). "What do we tell patients about elective total hip replacement in the UK? An analysis of patient literature." BMC Musculoskelet Disord 14 : 152.

BACKGROUND: Although hip information literature is given to people following total hip replacement (THR) almost routinely, little evaluation has been conducted on it to date. Our aim was therefore to analyse and evaluate the literature provided to patients by

occupational therapists concerning elective hip surgery in the UK. METHODS: This was a pragmatic, descriptive analysis of information leaflets routinely given to patients undergoing primary total hip replacement (THR). The literature was collected as part of a national survey of occupational therapy practice. In the absence of a suitable evaluation tool, the patient leaflets were compared using a checklist devised by the researchers. The three areas of interest were: accessibility including presentation of information, breadth of information covered and specific activities of daily living described. RESULTS: 111 information leaflets and booklets were examined. These ranged from hospital publications which were professionally printed to those produced by individual departments. There was a variation in the readability of the leaflets ranging from 13% to 83%; the mean was 45% (SD 15). There was also variation in the content ranging from those covering surgery and possible complications, to those including diet and hip exercises. The most commonly covered activity of daily living was advice on sitting (99; 89%); the least commonly covered was work (26; 23%). Only 3 (2.7%) booklets had involved patients in their production and only 22 (20%) signposted obtaining information in another language or in Braille. CONCLUSIONS: There was a range of literature in terms of presentation and content given to people who had a total hip replacement (THR). Although some booklets and leaflets scored highly, some did not meet basic standards such as providing contact details for help, using good quality diagrams, suggesting further reading or involving patients in their design. These results highlight important and fundamental deficiencies in the literature routinely provided.

Featherall, J., Brigati, D. P., Faour, M., et al. (2018). "Implementation of a Total Hip Arthroplasty Care Pathway at a High-Volume Health System: Effect on Length of Stay, Discharge Disposition, and 90-Day Complications." J Arthroplasty 33(6) : 1675-1680.
https://pubmed.ncbi.nlm.nih.gov/29478678

BACKGROUND: Standardized care pathways are evidence-based algorithms for optimizing an episode of care. Despite the theoretical promise of care pathways, there is an inconsistent literature demonstrating improvements in patient care. The authors hypothesized that implementing a care pathway, across 11 hospitals, would decrease hospital length of stay (LOS), decrease postoperative complications at 90 days, and increase discharges to home. METHODS: A multidisciplinary team developed an evidence-based care pathway for total hip arthroplasty (THA) perioperative care. All patients receiving THA in 2013 (pre-protocol, historical control), 2014 (transition), and 2015 (full protocol implementation) were included in the analysis. Multivariable regression assessed the relationship of the care pathway to 90-day postoperative complications, LOS, and discharge disposition. Cost savings were estimated using previously published postarthroplasty episode and per diem hospital costs. RESULTS: A total of 6090 primary THAs were conducted during the study period. After adjusting for the covariates, the full protocol implementation was associated with a decrease in LOS (mean ratio, 0.747; 95% confidence interval [CI; 0.727, 0.767]) and an increase in discharges to home (odds ratio, 2.079; 95% CI [1.762, 2.456]). The full protocol implementation was not associated with a change in 90-day complications (odds ratio, 1.023; 95% CI [0.841, 1.245]). Payer-perspective-calculated theoretical cost savings, including both index admission and postdischarge costs, were $2533 per patient. CONCLUSION: The THA care pathway implementation was successful in reducing LOS and increasing discharges to home. The care pathway was not associated with a change in 90-day complications; further targeted interventions in this area are needed. Despite care standardization efforts, high-volume hospitals and surgeons had higher performance. Extrapolation of theoretical cost savings indicates that widespread THA care pathway adoption could lead to national healthcare savings of $1.2 billion annually.

Fry, D. E., Pine, M., Nedza, S. M., et al. (2017). "Risk-Adjusted Hospital Outcomes in Medicare Total Joint Replacement Surgical Procedures." J Bone Joint Surg Am 99(1) : 10-18.

BACKGROUND: Comparative measurement of hospital outcomes can define opportunities for care improvement and will assume great importance as alternative payment models for inpatient total joint replacement surgical procedures are introduced. The purpose of this study was to develop risk-adjusted models for Medicare inpatient and post-discharge adverse outcomes in elective lower-extremity total joint replacement and to apply these models for hospital comparison. METHODS: Hospitals with >/=50 qualifying cases of elective total hip replacement and total knee replacement from the Medicare Limited Data Set database of 2010 to 2012 were studied. Logistic risk models were designed for adverse outcomes of inpatient mortality, prolonged length-of-stay outliers in the index hospitalization, 90-day post-discharge deaths without readmission, and 90-day readmissions after excluding non-related readmissions. For each hospital, models were used to predict total adverse outcomes, the number of standard deviations from the mean (z-scores) for hospital performance, and risk-adjusted adverse outcomes for each hospital. RESULTS: A total of 253,978 patients who underwent total hip replacement and 672,515 patients who underwent total knee replacement were studied. The observed overall adverse outcome rates were 12.0% for total hip replacement and 11.6% for total knee replacement. The z-scores for 1,483 hospitals performing total hip replacements varied from -5.09 better than predicted to +5.62 poorer than predicted; 98 hospitals were >/=2 standard deviations better than predicted and 142 hospitals were >/=2 standard deviations poorer than predicted. The risk-adjusted adverse outcome rate for these hospitals was 6.6% for the best-decile hospitals and 19.8% for the poorest-decile hospitals. The z-scores for the 2,349 hospitals performing total knee replacements varied from -5.85 better than predicted to +11.75 poorer than predicted; 223 hospitals were >/=2 standard deviations better than predicted and 319 hospitals were >/=2 standard deviations poorer than predicted. The risk-adjusted adverse outcome rate for these hospitals was 6.4% for the best-decile hospitals and 19.3% for the poorest-decile hospitals. CONCLUSIONS: Risk-adjusted outcomes demonstrate wide variability and illustrate the need for improvement among poorer-performing hospitals for bundled payments of joint replacement surgical procedures. CLINICAL RELEVANCE: Adverse outcomes are known to occur in the experience of all clinicians and hospitals. The risk-adjusted benchmarking of hospital performance permits the identification of adverse events that are potentially preventable.

Fu, M. C., Samuel, A. M., Sculco, P. K., et al. (2017). "Discharge to Inpatient Facilities After Total Hip Arthroplasty Is Associated With Increased Postdischarge Morbidity." J Arthroplasty 32(9S) : S144-S149.e141.
https://pubmed.ncbi.nlm.nih.gov/28455181

BACKGROUND: Discharge disposition accounts for significant variability in costs after elective total hip arthroplasty (THA). Therefore, institutions must evaluate the short-term clinical outcomes associated with postdischarge care options. The present study intends to characterize the associations between short-term morbidity after primary THA and discharge destination. METHODS: Primary elective unilateral THA cases performed for osteoarthritis were identified in the American College of Surgeons National Surgical Quality Improvement Program registry from 2011 to 2014. Propensity scores were used to adjust for selection bias in discharge destination, based on demographics, obesity class, preoperative functional status, modified Charlson comorbidity index, American Society of Anesthesiologists (ASA) class, and the presence of predischarge complications. Propensity-adjusted multivariate logistic regressions were used to examine associations between discharge destination and

postdischarge complications, controlling for selection bias based on observable patient characteristics. RESULTS: Among 54,837 THA cases included in the study, 40,576 (74%) were discharged home, and 14,261 (26%) were discharged to inpatient facilities. In multivariate propensity-adjusted analyses, patients discharged to continued inpatient care after THA were more likely to have septic complications (odds ratio, 2.34; 95% confidence interval, 1.58-3.45), urinary complications (1.51; 1.21-1.90), readmission (1.44; 1.29-1.59), wound complications (1.31; 1.09-1.57), and respiratory complications (1.93; 1.21-3.07). CONCLUSION: Discharge to continued inpatient care following THA is associated with increased odds of postdischarge morbidity and unplanned readmission, after propensity score adjustment for predischarge characteristics. Additional research is needed on the impact of devoting resources toward facilitating discharge to home after THA.

Gaughan, J., Gravelle, H., Santos, R., et al. (2013). Long term care provision, hospital length of stay and discharge destination for hip fracture and stroke patients. CHE Research Paper Series ; 86. York University of York **:** 36, fig., tabl.
http://www.york.ac.uk/media/che/documents/papers/researchpapers/CHERP86_longterm_care_provision_hospital_length_of_stay_discharge_destination_hip_fracture_stroke.pdf

Expenditure on long term care is expected to rise, driven by an ageing population. Coordination between health and long term care is increasingly a priority for policymakers. Elderly individuals living at home who suffer trauma, such as hip fracture or stroke, generally require immediate acute hospital care, followed by long term care and assistance which can be provided either in their home or in a residential or nursing home. However, little is known about the effects of one sector on the other. This study examines the association between formal long term care supply and the probability of being discharged to a long-term care institution (a nursing home or a care home) and length of stay in hospital for patients admitted for hip fracture or stroke.

Gaughan, J., Mason, A., Street, A., et al. (2012). English hospitals can improve their use of resources: an analysis of costs and length of stay for ten treatments. CHE Research Paper Series ; 78. York University of York**:** 71 , tabl., fig.
http://www.york.ac.uk/media/che/documents/papers/researchpapers/CHERP78_English_hospitals_improve_use_of_resources_analysis_costs_length_of_stay.pdf

This study investigates variations in costs and length of stay (LoS) among hospitals for ten clinical treatments to assess: 1. The extent to which resource use is driven by the characteristics of patients and of the type and quality of care they receive; 2. After taking these characteristics into account, the extent to which resource use is related to the hospital in which treatment takes place ; 3. If conclusions are robust to whether resource use is described by costs or by LoS. Data analysed came from patient-level data from the Hospital Episode Statistics (HES) data for 2007/8, which contains approximately 16.5 million inpatient records. This dataset was merged with costs derived from the Reference Cost database. Data were extracted on three medical ?conditions? (acute myocardial infarction (AMI); childbirth; stroke) and seven surgical treatments (appendectomy; breast cancer (mastectomy); coronary artery bypass graft (CABG); cholecystectomy; inguinal hernia; hip replacement; and knee replacement). For each treatment, the study used a two-stage approach to investigate variations in cost and LoS. In stage I, it ran fixed effects models to explore which patient-level factors explain variations. In stage II, it regressed the fixed effects from stage I against an array of hospital characteristics.

Gauthier-Kwan, O. Y., Dobransky, J. S. et Dervin, G. F. (2018). "Quality of Recovery, Postdischarge Hospital Utilization, and 2-Year Functional Outcomes After an Outpatient Total Knee Arthroplasty Program." J Arthroplasty 33(7) : 2159-2164.e2151.
https://pubmed.ncbi.nlm.nih.gov/29506929

BACKGROUND: Outpatient total knee arthroplasty (TKA) has been made possible with advances in perioperative care and standardized clinical inpatient pathways. While many studies report on benefits of outpatient programs, none explore patient-reported outcome measures. As such, our goals were to compare the short-term quality of recovery; highlight postdischarge hospital resources utilization; and report on 2-year functional outcomes scores. METHODS: This was a prospective comparative cohort study of 43 inpatients (43 TKAs) and 43 outpatients (43 TKAs) operated on by a single surgeon between September 28, 2010 and May 5, 2015. All patients were given a diary to complete at 1, 3, 7, 14, and 28 days postoperatively; we collected 90-day complications, readmissions, and emergency department visits; Knee Injury and Osteoarthritis Outcome Score and Western Ontario and McMaster Universities Osteoarthritis Index scores were completed preoperatively and 2 years postoperatively. SPSS (IBM, version 22.0) was used for all statistical analyses. RESULTS: Quality of recovery (QoR-9) was similar in the outpatient TKA group compared with the inpatient group. No statistically significant differences were observed for Knee Injury and Osteoarthritis Outcome Score and Western Ontario and McMaster Universities Osteoarthritis Index subscores (P > .05). There was 1 readmission in both outpatient and inpatient groups. Six inpatients and 8 outpatients returned to the emergency department for any reason within 90 days, with no statistical significance observed between the 2 groups (P = .771). CONCLUSION: Outpatient TKA in selected patients produced similar short-term and 2-year patient-reported outcome measures and a comparable 90-day postdischarge hospital resource utilization when compared to an inpatient cohort, supporting further investigation into outpatient TKA.

Geissler, A., Scheller-Kreinsen, D. et Quentin, W. (2012). "Do Diagnosis-Related Groups Appropriately Explain Variations in Costs and Length of Stay of Hip Replacement? A Comparative Assessment of DRG Systems across 10 European Countries." Health Economics 21 : 103-115.
https://onlinelibrary.wiley.com/doi/full/10.1002/hec.2848

This paper assesses the variations in costs and length of stay for hip replacement cases in Austria, England, Estonia, Finland, France, Germany, Ireland, Poland, Spain and Sweden and examines the ability of national diagnosis-related group (DRG) systems to explain the variation in resource use against a set of patient characteristic and treatment specific variables. In total, 195|810 cases clustered in 712 hospitals were analyzed using OLS fixed effects models for cost data (n = 125,698) and negative binominal models for length-of-stay data (n = 70,112). The number of DRGs differs widely across the 10 European countries (range: 2-14). Underlying this wide range is a different use of classification variables, especially secondary diagnoses and treatment options are considered to a different extent. In six countries, a standard set of patient characteristics and treatment variables explain the variation in costs or length of stay better than the DRG variables. This raises questions about the adequacy of the countries' DRG system or the lack of specific criteria, which could be used as classification variables.

George, J., Chughtai, M., Khlopas, A., et al. (2018). "Readmission, Reoperation, and Complications: Total Hip vs Total Knee Arthroplasty." J Arthroplasty 33(3) : 655-660.
https://pubmed.ncbi.nlm.nih.gov/29107491

BACKGROUND: Total hip arthroplasty (THA) and total knee arthroplasty (TKA) are currently grouped under the same Diagnosis-Related Group (DRG). With the introduction of bundled payments, providers are accountable for all the costs incurred during the episode of care, including the costs of readmissions and management of complications. However, it is unclear whether readmission rates and short-term complications are similar in primary THA and TKA. METHODS: The National Surgical Quality Improvement Project database was queried from 2011 to 2015 to identify 248,150 primary THA/TKA procedures using Current Procedural Terminology codes. After excluding 1602 hip fractures and 5062 bilateral procedures, 94,326 THAs and 147,160 TKAs were included in the study. Length of stay, discharge disposition, and 30-day readmission, reoperation and complication rates were compared between THA and TKA using multivariate regression models. RESULTS: After adjusting for baseline characteristics, length of stay (P = .055) and discharge disposition (P = .304) were similar between THA and TKA. But the 30-day rates of readmission (P < .001) and reoperation (P < .001) were higher in THA. Of the 18 complications evaluated in the study, 7 were higher in THA, 3 were higher in TKA, and 8 were similar between THA and TKA. CONCLUSION: THA patients had higher 30-day rates of readmission and reoperation. As both readmissions and reoperations can result in higher episode costs, a common target price for both THA and TKA may be inappropriate. Further studies are required to fully understand the extent of differences in the episode costs of THA and TKA.

Goldstein, J. P., Babikian, G. M., Rana, A. J., et al. (2016). "The Cost and Outcome Effectiveness of Total Hip Replacement: Technique Choice and Volume-Output Effects Matter." Applied Health Economics and Health Policy 14(6) : 703-718.
http://dx.doi.org/10.1007/s40258-016-0260-3

Gonzalez-Zabaleta, J., Pita-Fernandez, S., Seoane-Pillado, T., et al. (2016). "Comorbidity as a predictor of mortality and mobility after hip fracture." Geriatr Gerontol Int 16(5) : 561-569.

AIM: To determine mortality and mobility rates after hip fracture. METHODS: A prospective study (n = 199 patients) was carried out in the Health Care Center of A Coruna (Spain) during the period between January 2009 and December 2011. A descriptive study, and Cox and logistic regression analysis were carried out. Informed consent and ethical review board approval were obtained (code 2010/120 CEIC Galicia). RESULTS: The patients' mean age was 82.5 +/- 8.4 years and 76% were female. The average Charlson Comorbidity Index score was 6.1 +/- 2.1. Creatinine clearance <60 mL/min/1.73 m(2) was 44%. The probability of survival 6 months after hip fracture was 89.2% and the survival rate at 12 months was 81.4%. Cox regression analysis showed that the indicator that most influenced mortality rate was comorbidity (HR = 1.133; P = 0.020) and age approaching borderline statistical significance (HR = 1.034; P = 0.064). The Parker Mobility Score decreased significantly (P < 0.001) after hip fracture. Before fracture, 19% of the patients were able to get about the house, 26% were able to get out of the house and 55% were able to go shopping. After hip fracture (90 days), the percentages changed to 56.2%, 19.1% and 24.7%, respectively (P < 0.001). After taking into account age, sex, type of fracture, surgical delay, previous fracture and comorbidity, the only indicator capable of predicting incapacity to walk was comorbidity. CONCLUSIONS: Comorbidity is the best predictor of mortality and mobility after hip fracture. Geriatr Gerontol Int 2016; 16: 561-569.

Gravelle, H., Moscelli, G., Santos, R., et al. (2014). Patient Choice and the Effects of Hospital Market Structure on Mortality for AMI, Hip Fracture and Stroke Patients. CHE Research Paper Series ;106. York University of York **:** 49, tabl., cartes.

http://www.york.ac.uk/media/che/documents/papers/researchpapers/CHERP106_patient_choice_hospital_mortality.pdf

We examine (a) the effect of market structure on the level of mortality for AMI, hip fracture, and stroke between 2002/3 and 2010/11 and (b) whether this effect changed after the introduction of Choice policy in 2006 which gave patients the right to a wider choice of hospital. For AMI and hip fracture, hospitals with more rivals had higher mortality at the beginning of the period but this effect became smaller over the period. We find that the decline in the detrimental effect of market structure predated the introduction of Choice. Market structure had no effect on stroke mortality.

Gray, C. F., Prieto, H. A., Deen, J. T., et al. (2019). "Bundled Payment "Creep": Institutional Redesign for Primary Arthroplasty Positively Affects Revision Arthroplasty." J Arthroplasty 34(2) : 206-210.
https://pubmed.ncbi.nlm.nih.gov/30448324

BACKGROUND: Revision total joint arthroplasty (TJA) is associated with increased readmissions, complications, and expense compared to primary TJA. Bundled payment methods have been used to improve value of care in primary TJA, but little is known of their impact in revision TJA patients. The purpose of this study is to evaluate the impact of a care redesign for a bundled payment model for primary TJA on quality metrics for revision patients, despite absence of a targeted intervention for revisions. METHODS: We compared quality metrics for all revision TJA patients including readmission rate, use of post-acute care facility after discharge, length of stay, and cost, between the year leading up to the redesign and the 2 years following its implementation. Changes in the primary TJA group over the same time period were also assessed for comparison. RESULTS: Despite a volume increase of 37% over the study period, readmissions declined from 8.9% to 5.8%. Use of post-acute care facilities decreased from 42% to 24%. Length of stay went from 4.84 to 3.92 days. Cost of the hospital episode declined by 5%. CONCLUSION: Our health system experienced a halo effect from our bundled payment-influenced care redesign, with revision TJA patients experiencing notable improvements in several quality metrics, though not as pronounced as in the primary TJA population. These changes benefitted the patients, the health system, and the payers. We attribute these positive changes to an altered institutional mindset, resulting from an invested and aligned care team, with active physician oversight over the care episode.

Grosso, M. J., Neuwirth, A. L., Boddapati, V., et al. (2019). "Decreasing Length of Hospital Stay and Postoperative Complications After Primary Total Hip Arthroplasty: A Decade Analysis From 2006 to 2016." J Arthroplasty 34(3) : 422-425.
https://pubmed.ncbi.nlm.nih.gov/30503306

BACKGROUND: In an attempt to decrease costs without increasing complication burden, the development of rapid recovery protocols has led to an increased push for decreased length of hospital stay (LOS) following total hip arthroplasty (THA). The purpose of this study was to analyze trends in LOS and complications following THA over a 10-year period. METHODS: Using the National Surgical Quality Improvement Program registry from 2006 to 2016, we identified all patients who underwent primary THA. Patients were placed into 3 cohorts based on the year of surgery (2006-2009 [N = 3873], 2010-2013 [N = 45,992], 2014-2016 [N = 86,099]). Differences in LOS, operative time, readmission rates, and 30-day postoperative medical complications were compared using bivariate and multivariate analyses. RESULTS: Multivariate regression analysis identified a significant decrease in LOS in days for the 2010-2013 cohort (3.2 ± 4.8, P < .001) and 2014-2016 cohort (2.7 ± 2.5, P < .001) compared to the

2006-2009 cohort (3.8 ± 2.5). Despite decreasing LOS, there were significantly lower complications in the later cohorts, with significantly lower rates of all complications (5.27% [2006-2009], 3.77% [2009-2013], 3.14% [2013-2016]), sepsis (0.70%, 0.31%, 0.16%), and urinary tract infection (1.94%, 1.23%, 0.83%) using both bivariate and multivariate analyses (P < .001). In addition, there was no significant difference in unplanned 30-day readmissions (3.66% [2010-2013] vs 3.5% [2014-2016], P = .142). CONCLUSION: Over the last decade, there has been a decrease in LOS and an improved short-term complication profile for THA. With continually increasing rates of utilization of THA along broader patient demographics, these changes are important to help mitigate the costs of higher volume.

Gwam, C. U., Mistry, J. B., Khlopas, A., et al. (2017). "Does Addition of Multimodal Periarticular Analgesia to Adductor Canal Block Improve Lengths of Stay, Pain, Discharge Status, and Opioid Use After Total Knee Arthroplasty?" J Arthroplasty 32(5) : 1470-1473.

BACKGROUND: Postoperative pain after total knee arthroplasty (TKA) can be burdensome. Multiple methods of pain control have been used, including adductor canal block (ACB) and multimodal periarticular analgesia (MPA). These two techniques have been studied have proven to be efficacious separately. The purpose of this study was to compare: (1) lengths of stay (LOS), (2) pain level, (3) discharge status, and (4) opioid use in TKA patients who received ACB alone vs patients who received ACB and MPA. METHODS: A single surgeon database was reviewed for patients who had a TKA between January 2015 and April 2016. Patients who received ACB with or without MPA were included. This yielded 127 patients who had a mean age of 63 years. Patients were grouped into having received ACB alone (n = 52) and having received ACB and MPA (n = 75). Patient records were reviewed to obtain demographic and end point data (LOS, pain, discharge status, and opioid use). Student t test and chi-squared test were used to compare continuous and categorical variables respectively. RESULTS: There were no significant difference in mean LOS (P = .934), pain level (P = .142), discharge status (P = .077), or total opioid use (P = .708) between the 2 groups. CONCLUSION: There was no significant difference in LOS, pain levels, discharge status, and opiate requirements between the 2 groups. ACB alone may be as effective as combined ACB and MPA in TKA patients for postoperative pain control. Larger prospective studies are needed to verify these findings and to improve generalization.

Halawi, M. J., Vovos, T. J., Green, C. L., et al. (2015). "Current Evidence Does Not Support Medicare's 3-Day Rule in Primary Total Joint Arthroplasty." Am J Orthop (Belle Mead NJ) 44(10) : E370-372.

Patients who undergo total joint arthroplasty and are destined for discharge to an extended-care facility--particularly Medicare beneficiaries--are required to have an inpatient stay of at least 3 consecutive days. The primary objective of this study was to explore the effect of this policy on length of stay. Secondary outcomes were 30-day readmission rate and inpatient rehabilitation gains. We retrospectively reviewed 284 consecutive cases of patients who underwent primary total hip or knee arthroplasty and were discharged to an extended-care facility. Based on readiness-for-discharge criteria, delaying discharge until postoperative day 3 increased length of stay by 1.08 days (P < .001) and had no effect on risk for 30-day readmission (P = .073). Although rehabilitation status improved with stays past discharge readiness (P = .038), the gains were not clinically sufficient to affect discharge destination. This study calls into question the validity of Medicare's 3-day rule in primary total joint arthroplasty. Larger, prospective, multicenter studies are needed to confirm these findings.

Halawi, M. J., Vovos, T. J., Green, C. L., et al. (2015). "Patient expectation is the most important predictor of discharge destination after primary total joint arthroplasty." J Arthroplasty 30(4) : 539-542.

> The purpose of this study was to identify preoperative predictors of discharge destination after total joint arthroplasty. A retrospective study of three hundred and seventy-two consecutive patients who underwent primary total hip and knee arthroplasty was performed. The mean length of stay was 2.9 days and 29.0% of patients were discharged to extended care facilities. Age, caregiver support at home, and patient expectation of discharge destination were the only significant multivariable predictors regardless of the type of surgery (total knee versus total hip arthroplasty). Among those variables, patient expectation was the most important predictor (P < 0.001; OR 169.53). The study was adequately powered to analyze the variables in the multivariable logistic regression model, which had a high concordance index of 0.969.

Halawi, M. J., Vovos, T. J., Green, C. L., et al. (2015). "Preoperative pain level and patient expectation predict hospital length of stay after total hip arthroplasty." J Arthroplasty 30(4) : 555-558.

> The purpose of this study was to identify preoperative predictors of length of stay after primary total hip arthroplasty in a patient population reflecting current trends toward shorter hospitalization and using readily obtainable factors that do not require scoring systems. A retrospective review of 112 consecutive patients was performed. High preoperative pain level and patient expectation of discharge to extended care facilities (ECFs) were the only significant multivariable predictors of hospitalization extending beyond 2 days (P=0.001 and P<0.001 respectively). Patient expectation remained significant after adjusting for Medicare's 3-day requirement for discharge to ECFs (P<0.001). The study was adequately powered to analyze the variables in the multivariable logistic regression model, which had a concordance index of 0.857.

Han, A. S., Nairn, L., Harmer, A. R., et al. (2015). "Early rehabilitation after total knee replacement surgery: a multicenter, noninferiority, randomized clinical trial comparing a home exercise program with usual outpatient care." Arthritis Care Res (Hoboken) 67(2) : 196-202.

> OBJECTIVE: To determine, at 6 weeks postsurgery, if a monitored home exercise program (HEP) is not inferior to usual care rehabilitation for patients undergoing primary unilateral total knee replacement (TKR) surgery for osteoarthritis. METHODS: We conducted a multicenter, randomized clinical trial. Patients ages 45-75 years were allocated at the time of hospital discharge to usual care rehabilitation (n = 196) or the HEP (n = 194). Outcomes assessed 6 weeks after surgery included the Western Ontario and McMaster Universities Osteoarthritis Index pain and physical function subscales, knee range of motion, and the 50-foot walk time. The upper bound of the 95% confidence interval (95% CI) mean difference favoring usual care was used to determine noninferiority. RESULTS: At 6 weeks after surgery there were no significant differences between usual care and HEP, respectively, for pain (7.4 and 7.2; 95% CI mean difference [MD] -0.7, 0.9), physical function (22.5 and 22.4; 95% CI MD -2.5, 2.6), knee flexion (96 degrees and 97 degrees ; 95% CI MD -4 degrees , 2 degrees), knee extension (-7 degrees and -6 degrees ; 95% CI MD -2 degrees , 1 degrees), or the 50-foot walk time (12.9 and 12.9 seconds; 95% CI MD -0.8, 0.7 seconds). At 6 weeks, 18 patients (9%) allocated to usual care and 11 (6%) to the HEP did not achieve 80 degrees knee flexion. There was no difference between the treatment allocations in the number of hospital readmissions. CONCLUSION: The HEP was not inferior to usual care as an early rehabilitation protocol after primary TKR.

Hansen, V. J., Gromov, K., Lebrun, L. M., et al. (2015). "Does the Risk Assessment and Prediction Tool predict discharge disposition after joint replacement?" Clin Orthop Relat Res 473(2) : 597-601.

BACKGROUND: Payers of health services and policymakers place a major focus on cost containment in health care. Studies have shown that early planning of discharge is essential in reducing length of stay and achieving financial benefit; tools that can help predict discharge disposition would therefore be of use. The Risk Assessment and Prediction Tool (RAPT) is a preoperative survey constructed to predict discharge disposition after total joint arthroplasty (TJA). The RAPT was developed and tested on a population of Australian patients undergoing joint replacement, but its validity in other populations is unknown. A low RAPT score is reported to indicate a high risk of needing any form of inpatient rehabilitation after TJA, including short-term nursing facilities. QUESTIONS/PURPOSES: This study attempts (1) to assess predictive accuracy of the RAPT on US patients undergoing total hip and knee arthroplasty (THA/TKA); and (2) to determine predictive accuracy of each individual score (1-12). METHODS: Between June 2006 and December 2011, RAPT scores of 3213 patients (1449 THAs; 1764 TKAs) were prospectively captured during the preoperative clinical visit. Scores were stored along with other clinical data, including discharge disposition, in a dedicated database on a secure server. The database was queried by the nursing case manager to retrieve the RAPT scores of all patients captured during this time period. Binary logistic regression was used to analyze the scores and determine predictive accuracy. RESULTS: Overall predictive accuracy was 78%. RAPT scores<6 and >10 (of 12) predicted with >90% accuracy discharge to inpatient rehabilitation and home, respectively. Predictive accuracy was lowest for scores between 7 and 10 at 65.2% and almost 50% of patients received scores in this range. Based on our findings, the risk categories in our populations should be high risk<7, intermediate risk 7 to 10, and low risk>10. CONCLUSIONS: The RAPT accurately predicted discharge disposition for high- and low-risk patients in our cohort. Based on our data, intermediate-risk patients should be defined as those with scores of 7 to 10. Predictive accuracy for these patients could potentially be improved through the identification and addition of other factors correlated to discharge disposition. The RAPT allows for identification of patients who are likely to be discharged home or to rehabilitation, which may facilitate preoperative planning of postoperative care. Additionally, it identifies intermediate-risk patients and could be used to implement targeted interventions to facilitate discharge home in this group of patients. LEVEL OF EVIDENCE: Level III, diagnostic study. See the Guidelines for Authors for a complete description of levels of evidence.

Hass, S., Jaekel, C. et Nesbitt, B. (2015). "Nursing strategies to reduce length of stay for persons undergoing total knee replacement: integrative review of key variables." J Nurs Care Qual 30(3) : 283-288.

Decreasing the length of stay for persons undergoing total knee replacement surgery can improve patient and organizational outcomes while reducing health care costs. This integrative review examined selected nurse-driven variables that assist the interdisciplinary team to reduce length of stay. Findings suggest that a targeted clinical pathway including comprehensive preoperative patient education, physical therapy on the day of surgery, multimodal pain control, and proactive discharge planning may provide the best practice with this patient population.

Haynes, J. A., Stambough, J. B., Sassoon, A. A., et al. (2016). "Contemporary Surgical Indications and Referral Trends in Revision Total Hip Arthroplasty: A 10-Year Review." J Arthroplasty 31(3) : 622-625.

BACKGROUND: Revision total hip arthroplasty (THA) represents nearly 15% of all hip arthroplasty procedures in the United States and is projected to increase. The purpose of our study was to summarize the contemporary indications for revision THA surgery at a tertiary referral medical center. We also sought to identify the indications for early and late revision surgery and define the prevalence of outside institution referral for revision THA. METHODS: Using our institution's arthroplasty registry, we identified a retrospective cohort of 870 consecutive patients who underwent revision THA at our hospital from 2004 to 2014. Records were reviewed to collect data on patient's primary and revision THA procedures, and the interval between primary THA and revision surgery was determined. RESULTS: Aseptic loosening (31.3%), osteolysis (21.8%), and instability (21.4%) were the overall most common indications for revision THA and the most common indications for revision surgery within 5 years of primary THA. Aseptic loosening and osteolysis were the most common indications for revision greater than 5 years from primary THA. Only 16.4% of revised hips had their index arthroplasty performed at our hospital, whereas 83.6% were referred to our institution. CONCLUSIONS: Aseptic loosening, osteolysis, and instability remain the most common contemporary indications for revision THA in an era of alternative bearings and modular components. Most of our revisions were referred from outside institutions, which highlights the transfer of a large portion of the revision THA burden to tertiary referral centers, a pattern that could be exacerbated under future bundled payment models.

Herbold, J. A., Bonistall, K. et Walsh, M. B. (2011). "Rehabilitation following total knee replacement, total hip replacement, and hip fracture: a case-controlled comparison." J Geriatr Phys Ther 34(4) : 155-160.

PURPOSE: To determine whether clinical outcomes and reimbursement for care differed between patients with hip fracture, total knee replacement (TKR), and total hip replacement (THR) undergoing an inpatient rehabilitation facility (IRF) versus skilled nursing facility (SNF). METHOD: A total of 541 patients (IRF = 409, SNF = 131) with unilateral hip fracture, TKR, and THR were recruited. The IRF and SNF patients were matched on age, sex, diagnosis, severity index, and ambulation Functional Independence Measure (FIM) score on admission. Comparisons of discharge motor FIM scores, length of stay, discharge ambulation devices, discharge disposition, use of home health services, transfer to acute care, and total reimbursement for the inpatient stay were carried out between matched pair groups. RESULTS: From a sample of 541 patients, 102 matched IRF-SNF pairs were created. The mean length of stay for those receiving care in IRF was 10.7 (4.2) days, compared to 25.5 (16.5) days for those receiving care in SNF ($P < .001$). Costs of care in the IRF setting were $11,984 ($5254) compared to that in the SNF setting, that is, $10,001 ($7141) ($P = .008$). As compared to patients receiving care in the SNF setting, those in the IRF were more likely to ambulate independently (87.5% vs 74.0%; $P = .019$), manage stairs independently (68.4% vs 34.7%; $P < .001$), require less home care (33.7% vs 76.4%; $P < .001$), and were less likely to use a walker at discharge (41.7% vs 67.7%; $P < .001$). There were no differences between settings in terms of transfers to acute care, ability to dress the lower body, toilet transfers, and discharge to home. CONCLUSION: When patients were matched for age, gender, operative diagnosis, severity index, and admission ambulation FIM score, those who received rehabilitation in the IRF had shorter length of stay and superior functional outcomes than those in the SNF setting. Cost of stay in an IRF was, however, significantly greater.

Herrera-Espineira, C., Escobar, A., Navarro-Espigares, J. L., et al. (2013). "[Total knee and hip prosthesis: variables associated with costs]." Cir Cir 81(3) : 207-213.

BACKGROUND: The elevated prevalence of osteoarthritis in Western countries, the high costs of hip and knee arthroplasty, and the wide variations in the clinical practice have generated considerable interest in comparing the associated costs before and after surgery. OBJECTIVE: To determine the influence of a number of variables on the costs of total knee and hip arthroplasty surgery during the hospital stay and during the one-year post-discharge. METHODS: A prospective multi-center study was performed in 15 hospitals from three Spanish regions. Relationships between the independent variables and the costs of hospital stay and postdischarge follow-up were analyzed by using multilevel models in which the "hospital" variable was used to group cases. Independent variables were: age, sex, body mass index, preoperative quality of life (SF-12, EQ-5 and Womac questionnaires), surgery (hip/knee), Charlson Index, general and local complications, number of beds and economic-institutional dependency of the hospital, the autonomous region to which it belongs, and the presence of a caregiver. RESULTS: The cost of hospital stay, excluding the cost of the prosthesis, was 4,734 Euros, and the post-discharge cost was 554 Euros. With regard to hospital stay costs, the variance among hospitals explained 44-46% of the total variance among the patients. With regard to the post-discharge costs, the variability among hospitals explained 7-9% of the variance among the patients. CONCLUSIONS: There is considerable potential for reducing the hospital stay costs of these patients, given that more than 44% of the observed variability was not determined by the clinical conditions of the patients but rather by the behavior of the hospitals.

Huang, A., Ryu, J. J. et Dervin, G. (2017). "Cost savings of outpatient versus standard inpatient total knee arthroplasty." Can J Surg 60(1) : 57-62.

BACKGROUND: With diminishing reimbursement rates and strained public payer budgets, a high-volume inpatient procedure, such as total knee arthroplasty (TKA), is a common target for improving cost efficiencies. METHODS: This prospective case-control study compared the cost-minimization of same day discharge (SDD) versus inpatient TKA. We examined if and where cost savings can be realized and the magnitude of savings that can be achieved without compromising quality of care. Outcome variables, including detailed case costs, return to hospital rates and complications, were documented and compared between the first 20 SDD cases and 20 matched inpatient controls. RESULTS: In every case-control match, the SDD TKA was less costly than the inpatient procedure and yielded a median cost savings of approximately 30%. The savings came primarily from costs associated with the inpatient encounter, such as surgical ward, pharmacy and patient meal costs. At 1 year, there were no major complications and no return to hospital or readmission encounters for either group. CONCLUSION: Our results are consistent with previously published data on the cost savings associated with short stay or outpatient TKA. We have gone further by documenting where those savings were in a matched cohort design. Furthermore, we determined where cost savings could be realized during the patient encounter and to what degree. In carefully selected patients, outpatient TKA is a feasible alternative to traditional inpatient TKA and is significantly less costly. Furthermore, it was deemed to be safe in the perioperative period.

Huber, E. O., de Bie, R. A., Roos, E. M., et al. (2013). "Effect of pre-operative neuromuscular training on functional outcome after total knee replacement: a randomized-controlled trial." BMC Musculoskelet Disord 14 : 157.

BACKGROUND: Total Knee Replacement (TKR) is the standard treatment for patients with severe knee osteoarthritis (OA). Significant improvement in pain and function are seen after TKR and approximately 80% of patients are very satisfied with the outcome. Functional status prior to TKR is a major predictor of outcome after the intervention. Thus, improving

functional status prior to surgery through exercise may improve after surgery outcome. However, results from several previous trials testing the concept have been inconclusive after surgery. METHODS/DESIGN: In a randomized controlled trial (RCT) we will test the effect of a pre-operative neuromuscular training program versus an attention control program on lower extremity function - before and after surgery. We will enroll 80 participants, aged between 55-90 years, who are scheduled for TKR. In this single-blinded RCT, the intervention group will receive a minimum of 8 and a maximum of 24 training sessions plus 3 educational sessions of the knee school. The control group will receive the 3 educational sessions only. Assessments are performed immediately before and after the intervention (before surgery), at 6 weeks, 3 months and 12 months (after surgery). The primary outcome will include the Chair Stand Test as a measure of leg strength and reaction time. Secondary outcomes are knee function and pain assessed with the self-reported Knee Injury and Osteoarthritis Outcome Score (KOOS). All measurements will be carried out by a specially trained physical therapist, blinded to group allocation. DISCUSSION: To our knowledge this is the first single-blinded RCT to test the effect of pre-operative neuromuscular training plus knee school against knee school alone--on knee function and pain, assessed immediately after the interventions prior to surgery and repeatedly after surgery. TRIAL REGISTRATION: Clinical Trials NCT00913575.

Jacobs, C. A., Christensen, C. P. et Karthikeyan, T. (2015). "Assessing the utility of routine first annual follow-up visits after primary total knee arthroplasty." J Arthroplasty 30(4) : 552-554.

The combination of increased TKA utilization and a decreased number of arthroplasty specialists has resulted in a growing need to maximize efficiency without sacrificing the level of care being provided. The purpose of this study was to evaluate the utility of routine first annual follow-up visits for patients that have undergone primary TKA. Of 339 TKAs performed by a single surgeon in 2012, 23% failed to attend scheduled first annual visits. Furthermore, none of the revisions performed at our facility since 2003 were the direct result of information gained at a patient's routine first annual visit. As such, we question the clinical utility of the first annual visit.

Jahic, D., Omerovic, D., Tanovic, A. T., et al. (2018). "The Effect of Prehabilitation on Postoperative Outcome in Patients Following Primary Total Knee Arthroplasty." Medical archives (Sarajevo, Bosnia and Herzegovina) 72(6) : 439-443.
https://pubmed.ncbi.nlm.nih.gov/30814777

INTRODUCTION: Osteoarthritis (OA) is the most common joint disease in the world. At the end stage of the disease, usually when patients cannot handle the pain anymore, the knee replacement surgery is the most common and effective treatment to reduce pain and improve functionality. The effect of preoperative exercise (prehabilitation) for patients undergoing total knee arthroplasty (TKA) is still controversial. AIM: To investigate the effect of prehabilitation on postoperative outcome and compare the results of the intervention with the control group. MATERIAL AND METHODS: This prospective study included 20 patients with a diagnosis of gonarthrosis, aged 48-70, who were randomly allocated to either the intervention group or control. Ten patients (intervention group) underwent a 6-week home-based exercise program before the TKA surgery. All patients were assessed by Knee Score (KS), Function Score (FS), and Body Mass Index (BMI) according to the following schedule: 6 weeks before surgery (for intervention group it meant before the prehabilitation program), just prior to surgery (for intervention group it meant after the prehabilitation program), after the surgery, at 3(rd) month, 6(th) month, and 12(th) month postoperatively. They were all operated by the same surgeon, for the primary total knee replacement

(Zimmer NexGen Complete Knee Solution) at the Clinic for Orthopaedics and Traumatology, Clinical Centre University of Sarajevo, from October 2016 to June 2017. RESULTS: There is statistically significant difference for Knee and Function Score between the intervention and control group in testing time: just before surgery-meaning that KS and FS increased after the prehabilitation program. Knee Score was significantly different between the two observed groups postoperatively, 3 months postoperatively and 6 months postoperatively, while the Function Score was not significantly different in that period. Prehabilitation program provides better preoperative KS and FS, and better KS up to 6 months postoperatively. However, 12 months postoperatively there was no significant difference between the intervention and control group for the Knee and Function Score. CONCLUSION: Prehabilitation brings significant difference regarding the Knee Score in favor of the intervention group preoperatively and up to 6 months postoperatively.

Jordan, C. J., Goldstein, R. Y., Michels, R. F., et al. (2012). "Comprehensive program reduces hospital readmission rates after total joint arthroplasty." Am J Orthop (Belle Mead NJ) 41(11) : E147-151.

Hospital readmissions are quality indicators of healthcare delivery. Our purpose is to examine the effect of a program designed to reduce readmissions after total joint replacement. We initiated a comprehensive program with 4 goals: (1) outpatient workup of venous thromboembolism; (2) decrease surgical site infection; (3) early follow-up with primary care physicians; and (4) increase physician awareness of the financial and quality-related ramifications of unplanned readmissions. We then compared readmission rates before our initiative was instituted (2005-2006) to 3 years after implementation (2007-2009). Readmission rates preintervention were 3.70 and 3.29 for total hip replacement (THR) and knee replacement (TKR), respectively. Postintervention rates fell to 1.78 and 1.98, respectively, representing a 47.2% reduction of readmission for THR and 39.8% for TKR (P<.05). These results demonstrate the success of our program in reducing readmissions. This may result in reductions in healthcare costs and improvement in quality of care.

Jordan, R. W., Smith, N. A., Chahal, G. S., et al. (2014). "Enhanced education and physiotherapy before knee replacement; is it worth it? A systematic review." Physiotherapy 100(4) : 305-312.

BACKGROUND: Around 20% of knee replacement have an unsatisfactory outcome. Pre-operative physiotherapy and education have been proposed to improve post-operative outcomes. OBJECTIVES: This systematic review evaluated whether these factors improved length of stay and patient reported outcomes after knee replacement surgery. DATA SOURCES: Medline, Embase, CINAHL, Cochrane Central Register of Controlled Trials, PsycINFO and PEDro were searched on the 1st January 2013. STUDY SELECTION OR ELIGIBILITY CRITERIA: Randomised or quasi-randomised studies assessing either pre-operative education or physiotherapy on patients undergoing a planned total or partial knee replacement were included in the review. Only studies with a control group receiving a defined standard of pre-operative care were included. RESULTS: Eleven studies met the inclusion criteria set. Two studies analysed the effect of pre-operative education, seven pre-operative treatment by a physiotherapist and two studies used both factors. No study found significant differences in validated joint specific patient reported outcome measures. The education studies found a decrease in pre-operative expectation and an improvement in knowledge, flexion and regularity of exercise. Two studies found an improvement in muscle strength in the group treated by a physiotherapist at three months. The combination of education and physiotherapy was shown to reduce patient length of stay and cost in one study. CONCLUSION: The evidence reviewed is insufficient to support the implementation of either pre-operative education or physiotherapy programmes. The combination of pre-

operative education and treatment by a physiotherapist may reduce the medical costs associated with surgery.

Karim, A., Pulido, L. et Incavo, S. (2016). "Does Accelerated Physical Therapy After Elective Primary Hip and Knee Arthroplasty Facilitate Early Discharge?" Am J Orthop (Belle Mead NJ) 45(6) : E337-e342.

Accelerated physical therapy (PT) protocols are a potential mechanism for achieving early mobilization and safe discharge from hospital after elective primary total hip arthroplasty (THA) or total knee arthroplasty (TKA). We compared 2 groups of patients who underwent elective unilateral THA or TKA-those who started PT the same day (Day 0) and those who started PT the next day (Non-Day 0). The difference in mean (SD) hospital length of stay between the Day 0 and Non-Day 0 groups was not statistically significant for THA patients, 2.26 (0.11) days vs 2.50 (0.15) days (P = .270), or TKA patients, 2.28 (0.66) days vs 2.35 (0.75) days (P > .05). A higher proportion of THA patients in the Day 0 group (16%) vs the Non-Day 0 group (6%) achieved discharge goals on postoperative day 1 (P = .04). This effect was not present for TKA patients. Day-of-surgery PT helped THA patients (but not TKA patients) achieve discharge goals on postoperative day 1.

Kathrins, B., Kathrins, R., Marsico, R., et al. (2013). "Comparison of day rehabilitation to skilled nursing facility for the rehabilitation for total knee arthroplasty." Am J Phys Med Rehabil 92(1) : 61-67.

OBJECTIVES: Day rehabilitation (DR) is emerging in the United States as an alternative postacute rehabilitation setting. There have been no published studies focused on the efficacy of DR for a postacute orthopedic population. This study investigated the efficacy of DR as an alternative to inpatient skilled nursing facility (SNF) status post total knee arthroplasty. DESIGN: A retrospective chart review was conducted. Subjects were 50-75 yrs old, underwent total knee arthroplasty in 2009, and were discharged from an SNF or DR affiliated with a postacute healthcare system. The sample consisted of all DR (n = 56) and randomly selected SNF (n = 45) subjects. RESULTS: Upon admission, there were no differences between DR and SNF groups for age, sex, comorbidity score, pain score, knee range of motion, ambulation distance, locomotion Functional Independent Measure score, or body mass index. Upon discharge, there was no difference in knee range of motion or pain between groups. Discharge ambulation distance (P = 0.000) and locomotion Functional Independent Measure score (P = 0.001) were greater for the DR compared with the SNF group. Cost was lower (P = 0.000) and length of stay was shorter (P = 0.000) for the DR compared with the SNF group. CONCLUSIONS: Subjects discharged from DR had similar or improved outcomes compared with subjects discharged from SNF at a lower cost and shorter stay. Results suggest that DR delivered significant cost savings when compared with SNF without compromising patient outcomes.

Kee, J. R., Edwards, P. K. et Barnes, C. L. (2017). "Effect of Risk Acceptance for Bundled Care Payments on Clinical Outcomes in a High-Volume Total Joint Arthroplasty Practice After Implementation of a Standardized Clinical Pathway." J Arthroplasty 32(8) : 2332-2338. https://www.arthroplastyjournal.org/article/S0883-5403(17)30209-7/fulltext

BACKGROUND: The Bundled Payments for Care Improvement (BPCI) initiative and the Arkansas Payment Improvement (API) initiative seek to incentivize reduced costs and improved outcomes compared with the previous fee-for-service model. Before participation, our practice initiated a standardized clinical pathway (CP) to reduce length of stay (LOS),

readmissions, and discharge to postacute care facilities. METHODS: This practice implemented a standardized CP focused on patient education, managing patient expectations, and maximizing cost outcomes. We retrospectively reviewed all primary total joint arthroplasty patients during the initial 2-year "at risk" period for both BPCI and API and determined discharge disposition, LOS, and readmission rate. RESULTS: During the "at risk" period, the average LOS decreased in our total joint arthroplasty patients and our patients discharged home >94%. Patients within the BPCI group had a decreased discharge to home and decreased readmission rates after total hip arthroplasty, but also tended to be older than both API and nonbundled payment patients. CONCLUSION: While participating in the BPCI and API, continued use of a standardized CP in a high-performing, high-volume total joint practice resulted in maintenance of a low-average LOS. In addition, BPCI patients had similar outcomes after total knee arthroplasty, but had decreased rates of discharge to home and readmission after total hip arthroplasty.

Keren, B. et Pliskin, J. S. (2011). "Optimal Timing of Joint Replacement Using Mathematical Programming and Stochastic Programming Models." Health Care Management Science 14(4) : 361-369.
http://dx.doi.org/10.1007/s10729-011-9172-9

The optimal timing for performing radical medical procedures as joint (e.g., hip) replacement must be seriously considered. In this paper, we show that under deterministic assumptions the optimal timing for joint replacement is a solution of a mathematical programming problem, and under stochastic assumptions the optimal timing can be formulated as a stochastic programming problem. We formulate deterministic and stochastic models that can serve as decision support tools. The results show that the benefit from joint replacement surgery is heavily dependent on timing. Moreover, for a special case where the patient's remaining life is normally distributed along with a normally distributed survival of the new joint, the expected benefit function from surgery is completely solved. This enables practitioners to draw the expected benefit graph, to find the optimal timing, to evaluate the benefit for each patient, to set priorities among patients and to decide if joint replacement should be performed and when.

Kester, B. S., Merkow, R. P., Ju, M. H., et al. (2014). "Effect of post-discharge venous thromboembolism on hospital quality comparisons following hip and knee arthroplasty." J Bone Joint Surg Am 96(17) : 1476-1484.

BACKGROUND: Symptomatic pre-discharge venous thromboembolism (VTE) rates after total or partial hip or knee arthroplasty have been proposed as patient safety indicators. However, assessing only pre-discharge VTE rates may be suboptimal for quality measurement as the duration of stay is relatively short and the VTE risk extends beyond the inpatient setting. METHODS: Patients who underwent total or partial hip or knee arthroplasty were identified in the 2008 through 2010 American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) database. Outcomes of interest were the deep venous thrombosis (DVT), pulmonary embolism (PE), and overall VTE rates within thirty days after surgery and the rates during the pre-discharge and post-discharge portions of this time period. Risk-adjusted hospital rankings based on only pre-discharge (inpatient) events were compared with those based on both pre-discharge and post-discharge events within thirty days of surgery. RESULTS: A total of 23,924 patients underwent total or partial hip arthroplasty (8499) or knee arthroplasty (15,425) at ninety-five hospitals. For hip arthroplasty, the VTE rate was 0.9%, with 57.9% of the events occurring after discharge. For knee arthroplasty, the VTE rate was 1.9%, with 38.3% of the events occurring after discharge.

The median time of VTE occurrence was eleven days postoperatively for hip arthroplasty and three days for knee arthroplasty. The median duration of stay was three days for both hip and knee arthroplasty. When hospitals were ranked according to VTE rates, hospital outlier status designations changed when post-discharge events were included (kappa = 0.386; 44% false-positive rate for low outliers). The median change in hospital quality ranking was 7 (interquartile range, 2 to 17), with a rank correlation of r = 0.82. CONCLUSIONS: Nearly twice as many VTE complications were captured if both pre-discharge and post-discharge events were considered, and inclusion of post-discharge events changed hospital quality rankings. These data suggest that inclusion of post-discharge events should be considered when comparing the quality of hospitals on the basis of postoperative VTE rates. LEVEL OF EVIDENCE: Therapeutic Level IV. See Instructions for Authors for a complete description of levels of evidence.

Kirksey, M., Chiu, Y. L., Ma, Y., et al. (2012). "Trends in in-hospital major morbidity and mortality after total joint arthroplasty: United States 1998-2008." Anesth Analg 115(2) : 321-327.

BACKGROUND: The use of total joint arthroplasties is increasing worldwide. In this work we aim to elucidate recent trends in demographics and perioperative outcomes of patients undergoing total hip (THA) or total knee arthroplasty (TKA). METHODS: Data from the US Nationwide Impatient Sample between 1998 and 2008 were gathered for primary THAs and TKAs. Trends in patient age, comorbidity burden, length of hospitalization, frequency of major perioperative complications, and in-hospital mortality were analyzed. In-hospital outcomes were reported as events per 1000 inpatient days to account for changes in length of hospitalization over time. Deyo index, discharge status, and the interaction effect of time and discharge status were included in the adjusted trend analysis for morbidity. RESULTS: Between 1998 and 2008, the average age of patients undergoing TKA and THA decreased by 2 to 3 years (P < 0.001). The average length of stay decreased by approximately 1 day over the time interval studied (P < 0.001). The percentage of patients being discharged home declined from 29.7% to 25.4% after TKA and from 29.3% to 24.2% after THA, in favor of dispositions to long- and short-term care facilities (P < 0.0001). Comorbidity burden as measured by the Deyo comorbidity index increased by 35% and 30% for TKA and THA patients, respectively (P < 0.0001). After TKA, there was an increase in the incidence of the following major complications: pulmonary embolism (coefficient estimate [CE] 0.069; 95% confidence interval [CI], 0.059-0.079; P < 0.0001), sepsis (CE 0.034; 95% CI, 0.014-0.054; P = 0.001), nonmyocardial infarction cardiac complications (CE 0.038; 95% CI, 0.035-0.041; P < 0.0001), and pneumonia (CE 0.039; 95% CI, 0.031-0.047; P < 0.0001). After THA, there was an increase in the incidence of the following major complications: pulmonary embolism (CE 0.031; 95% CI, 0.012-0.049; P = 0.001), sepsis (CE 0.060; 95% CI, 0.039-0.081; P < 0.0001), nonmyocardial infarction cardiac complications (CE 0.040; 95% CI, 0.036-0.043; P < 0.0001), and pneumonia (CE 0.039; 95% CI, 0.029-0.048). In-hospital mortality declined after both TKA (CE -0.059; 95% CI, -0.077 to -0.040; P < 0.0001) and THA (CE -0.068; 95% CI, -0.086 to -0.051; P < 0.0001). CONCLUSION: Between 1998 and 2008, trends show increases in several major in-hospital complications after THA and TKA, including pulmonary embolism, sepsis, nonmyocardial infarction cardiac complications, and pneumonia. Despite the increase in complications, declining in-hospital mortality was noted over this period.

Klika, A. K., Small, T. J., Saleh, A., et al. (2014). "Primary total knee arthroplasty allogenic transfusion trends, length of stay, and complications: nationwide inpatient sample 2000-2009." J Arthroplasty 29(11) : 2070-2077.

Perioperative blood loss leading to blood transfusion continues to be an issue for total knee arthroplasty (TKA) patients. The US Nationwide Inpatient Sample (NIS) was used to determine annual trends in allogenic blood transfusion rates, and effects of transfusion on in-hospital mortality, length of stay (LOS), costs, discharge disposition, and complications of primary TKA patients. TKA patients between 2000 and 2009 were included (n = 4,544,999) and categorized as: (1) those who received a transfusion of allogenic blood, and (2) those who did not. Transfusion rates increased from 7.7% to 12.2%. For both transfused and not transfused groups, mortality rates and mean LOS declined, while total costs increased. Transfused patients were associated with adjusted odds ratios of in-hospital mortality (AOR 1.16; P = 0.184), 0.71 +/- 0.01 days longer LOS (P < 0.0001), and incurred ($1777 +/- 36; P < 0.0001) higher total costs per admission.

Klingenstein, G. G., Schoifet, S. D., Jain, R. K., et al. "Rapid Discharge to Home after Total Knee Arthroplasty is Safe in Eligible Medicare Patients." J Arthroplasty.
http://www.sciencedirect.com/science/article/pii/S0883540317305636

AbstractBackground This study was aimed at assessing the risk of readmission for Medicare patients discharged home within a day of total knee arthroplasty (TKA) compared to those discharged on day two or beyond in a community medical center. Methods A hospital impatient database was queried for all unilateral, primary total knee replacements performed on patients 65 years or older from January 1, 2013 to December 31, 2015. 2,287 patients met the study criteria, of which 1,502 were discharged within a day (short stay), and 785 were discharged on day 2 or beyond (traditional stay). The main outcome measures were all-cause 30-day and unplanned 90-day readmissions. Results Short stay patients did not experience a higher 30-day readmission rate (1.1%) compared to the traditional stay patients (2.7%), nor did they experience a higher rate of unplanned 90-day readmissions (1.7% vs. 3.6%). The short stay group had more favorable demographics compared to the traditional stay group. Logistic regression results revealed that none of the demographic factors considered had a statistically significant impact on 30-day readmission odds for either group. For unplanned 90-day readmissions, the results showed that for the short stay patients, with the exception of age, none of the other demographic factors had significant impact on readmission odds and none were significant for the traditional stay group. Conclusion Our results suggest that the Medicare patients meeting discharge criteria and discharged home within a day of TKA do not have an increased risk of 30-day and 90-day readmission.

Kristensen, M. T., Öztürk, B., Röck, N. D., et al. (2019). "Regaining pre-fracture basic mobility status after hip fracture and association with post-discharge mortality and readmission—a nationwide register study in Denmark." Age and Ageing 48(2) : 278-284.
https://doi.org/10.1093/ageing/afy185

early mobilization after hip fracture (HF) is an important predictor of outcome, but knowledge of the consequences of not achieving the pre-fracture basic mobility status in acute hospital recovery is sparse.we examined whether the regain of pre-fracture basic mobility status evaluated with the cumulated ambulation score (CAS) at hospital discharge was associated with 30-day post-discharge mortality and readmission.this is a population-based cohort study.using the nationwide Danish Multidisciplinary HF Database from January 2015 through December 2015, 5,147 patients 65 years or older undergoing surgery for a first-time HF were included. The pre-fracture and discharge CAS score (0–6 points with six points indicating an independent basic mobility status) were recorded. CAS was dichotomized as regained or not and entered into adjusted Cox regression overall analysis

and stratified by sex, age, body mass index, Charlson comorbidity index, type of fracture, residential status and length of acute hospital stay. Outcome measures were 30-day post-discharge mortality and readmission.overall mortality and readmission were 8.3% (n = 425) and 17.1% (n = 882), respectively. Mortality was 3.5% (n = 71) among patients who regained their pre-fracture CAS score compared with 11.4% (n = 354) among those who did not. Adjusted hazard ratios for 30-day mortality and readmission were 2.76 (95% confidence interval [CI] = 2.01–3.78) and 1.26 (95% CI = 1.07, 1.48), respectively, for patients who did not regain their pre-fracture CAS compared with those who did.we found that the loss of pre-fracture basic mobility level upon acute hospital discharge was associated with increased 30-day post-discharge mortality and readmission after a first time HF.

Levine, M. E., Nace, J., Kapadia, B. H., et al. (2013). "Treatment of primary hip osteoarthritis for the primary care physician and the indications for total hip arthroplasty." J Long Term Eff Med Implants 23(4) : 323-330.

Osteoarthritis is a degenerative condition that commonly affects knees and hips with an annual incidence of 88 in 100,000 people in the United States. The purpose of this study was to review the clinical presentation of osteoarthritis of the hip as well as the available management options. We reviewed the recent literature in regard to epidemiology, presentation, and treatment options available to patients. Nonoperative treatments include weight loss and low-impact, aerobic exercises. Along with weight loss and exercise, nonsteroidal anti-inflammatory drugs (NSAIDS), narcotics, and intra-articular steroid injections have been used to improve patient's symptoms. Surgical intervention is a viable option; however, indications such as severe pain that is refractory to nonsurgical management, osteophytes, or joint space narrowing on radiographic films, or impairment of function should be present. The most common surgical option, total hip arthroplasty, has been shown to improve a patient's physical and psychological well-being. However, inherent risks are present with surgery and these should be addressed with the patient so a sound decision can be made. Osteoarthritis of the hip can be bothersome to patients, but physicians can begin management with lifestyle changes or pharmaceuticals. In the event nonoperative measures fail to markedly improve quality of life, total hip arthroplasty remains a viable option.

Liebs, T. R., Herzberg, W., Rüther, W., et al. (2016). "Quality-Adjusted Life Years Gained by Hip and Knee Replacement Surgery and Its Aftercare." Arch Phys Med Rehabil 97(5) : 691-700. http://www.sciencedirect.com/science/article/pii/S0003999316000095

AbstractObjectives To determine the lifetime quality-adjusted life years (QALYs) gained by total joint arthroplasty (TJA), and assess the QALYs attributed to specific postoperative rehabilitation interventions. Design Secondary analysis of 2 multicenter, randomized controlled trials (RCTs) with 3-, 6-, 12-, and 24-month follow-up. Setting Two university hospitals, 2 municipal hospitals, and 1 rural hospital. Participants Patients (N=827) who underwent total hip arthroplasty (THA) or total knee arthroplasty (TKA). Interventions RCT A: 465 patients were randomly assigned to receive aquatic therapy (pool exercises aimed at training of proprioception, coordination, and strengthening) 6 versus 14 days after THA or TKA. RCT B: 362 patients were randomly assigned to either perform or not perform ergometer cycling beginning 2 weeks after THA or TKA. Main Outcome Measure QALYs, based on the Short Form–6 Dimensions utility, measured at baseline and 3, 6, 12, and 24 months' follow-up. Results After hip arthroplasty, the lifetime QALYs increased by 2.35 years in the nonergometer group, and by 2.30 years in the early aquatic therapy group. However, after knee arthroplasty, the lifetime QALYs increased by 1.81 years in the nonergometer

group, and by 1.60 years in the early aquatic therapy group. By ergometer cycling, .55 additional QALYs could be gained after hip and .10 additional QALYs after knee arthroplasty, while the additional QALYs attributed to the timing of aquatic therapy were .12 years after hip and .01 years after knee arthroplasty. Conclusions This analysis provides a sound estimate for the determination of the lifetime QALYs gained by THA and TKA. In addition, this analysis demonstrates that specific postoperative rehabilitation can result in an additional mean QALY gain of .55 years, which represents one fourth of the effect of surgery. Even if this is interpreted as a small effect at an individual level, it is important when extrapolated to all patients undergoing TJA. At a national level, these improvements appear to have a similar magnitude of QALY gain when compared with published data regarding medications to lower blood pressure in all persons with arterial hypertension.

Lin, F.-J., Samp, J., Munoz, A., et al. (2014). "Evaluating Change Using Patient-Reported Outcome Measures in Knee Replacement: The Complementary Nature of the EQ-5D Index and VAS Scores." European Journal of Health Economics 15(5) : 489-496.
http://dx.doi.org/10.1007/s10198-013-0489-9

Using the UK National Health Service's Patient Reported Outcome Measures data, we examined the magnitude of changes and relationship among the EQ-5D index, EQ-5D Visual Analog Scale (EQ-VAS), and Oxford Knee Score (OKS) in patients undergoing knee replacement. Patients undergoing knee replacements in 2009-2011 completed the EQ-5D and OKS before and after surgery. Responsiveness was compared using the standardized response mean (SRM). Stratified analyses based on change scores in the OKS were utilized to investigate how changes in the outcome measures related to each other. Patients were grouped based on the preoperative OKS to examine the relationship of change in the EQ-5D index and EQ-VAS with respect to initial health status. For the overall cohort (54,486 patients), mean change scores pre/post knee replacement were 0.30 for the EQ-5D index (SD 0.33; SRM = 0.90), 3.3 for the EQ-VAS (SD 21.0; SRM = 0.16), and 14.9 for the OKS (SD 9.9; SRM = 1.50). The OKS changed uniformly with the EQ-5D index, but less concordantly with the EQ-VAS in response to knee replacement surgery. Substantial functional improvement was needed before mean EQ-VAS change scores showed improvement. Patients with worse preoperative health status had greater improvement following surgery, but the improvement in the EQ-5D index did not necessarily translate into comparable improvement in self-perceived well-being measured by the EQ-VAS. On average, patients self-rated their health systematically lower using the EQ-VAS compared to the EQ-5D index and OKS following knee replacement. The EQ-VAS captured information about how patients feel about their health pre-/post-surgical intervention that contrasted with more functional measures of health. Additional qualitative research is needed to better understand these differences.

Lo, C. K., Lee, Q. J. et Wong, Y. C. (2017). "Predictive factors for length of hospital stay following primary total knee replacement in a total joint replacement centre in Hong Kong." Hong Kong Med J 23(5) : 435-440.
https://www.hkmj.org/abstracts/v23n5/435.htm

INTRODUCTION: The demand for total knee replacement in Hong Kong places tremendous economic burden on our health care system. Shortening hospital stay reduces the associated cost. The aim of this study was to identify perioperative predictors of length of hospital stay following primary total knee replacement performed at a high-volume centre in Hong Kong. METHODS: We retrospectively reviewed all primary total knee replacements performed at Yan Chai Hospital Total Joint Replacement Centre from October 2011 to October 2015. Perioperative factors that might influence length of stay were recorded. RESULTS: A total of

1622 patients were identified. The mean length of hospital stay was 6.8 days. Predictors of prolonged hospital stay following primary total knee replacement were advanced age; American Society of Anesthesiologists physical status class 3; bilateral total knee replacement; in-patient complications; and the need for blood transfusion, postoperative intensive care unit admission, and urinary catheterisation. CONCLUSIONS: Evaluating factors that can predict length of hospital stay is the starting point to improve our current practice in joint replacement surgery. Prediction of high-risk patients who will require a longer hospitalisation enables proactive discharge planning.

Loftus, T., Agee, C., Jaffe, R., et al. (2014). "A simplified pathway for total knee arthroplasty improves outcomes." J Knee Surg 27(3) : 221-228.

Care pathways for total knee arthroplasty (TKA) demonstrate improved quality and utilization outcomes. Standardizing these processes over large systems is difficult due to the variability of practice patterns and the complexity of multistep pathways. A simplified approach to this process focusing on early activity and avoidance of continuous urinary catheters was performed to overcome these perceived barriers for implementing a system-wide care pathway. Data were collected from a total of 6,154 consecutive patients during the time period of 1 year before and 1 year after implementation of a pathway focusing on two key drivers: early activity and continuous urinary catheter avoidance. Patients included were adults admitted for elective primary TKA. A composite score was calculated based on the successful completion of the two key drivers. Outcome measures were tracked before and after implementation. Following implementation of a simplified TKA care pathway, there was a significant increase in the composite score with increases attributable to both increased early activity ($p < 0.0001$) and continuous urinary catheter avoidance ($p < 0.0001$). This improvement in composite score was associated with a significant decrease in hospital length of stay (HLOS) ($p < 0.0001$), costs ($p < 0.0001$), complications ($p < 0.0001$), and 30-day readmissions ($p < 0.0106$). A fixed-effect model analysis demonstrated early activity was associated with improvements in HLOS ($p < 0.0001$), complications ($p = 0.0240$), and 30-day readmissions ($p = 0.0046$). Avoidance of a continuous urinary catheter was associated with improvements in HLOS ($p = 0.0001$), costs ($p < 0.0001$), complications ($p = 0.0006$), and 30-day readmissions ($p = 0.0008$). A simplified care pathway for TKA focusing on early activity and continuous urinary catheter avoidance is associated with improved complications, costs, HLOS, and 30-day readmissions.

London, D. A., Vilensky, S., O'Rourke, C., et al. (2016). "Discharge Disposition After Joint Replacement and the Potential for Cost Savings: Effect of Hospital Policies and Surgeons." J Arthroplasty 31(4) : 743-748.

BACKGROUND: Up to 55% of total joint arthroplasty costs come from post-acute care, with large variability dependent on a patient's discharge location. At our institution, we identified a group of surgeons using a preoperative discharge planning protocol emphasizing the merits of home discharge. We hypothesized that using the protocol would increase patients' odds for discharge home. METHODS: Administrative data from 14,315 total hip and knee arthroplasties performed over a 3-year period were retrospectively analyzed to determine predictors of patient discharge location. Bayesian hierarchical logistic regression modeling was used to account for the complex multilevel structure within the data as we considered patient-, surgeon-, and hospital-level predictors. A simplified case-control data structure with logistic regression analysis was also used to better understand the impact of the preoperative discharge planning protocol. RESULTS: A variety of patient- and surgeon-level variables are predictive of patients being discharged home after total joint arthroplasty

including a patient's length of stay, age, illness severity, and insurance, as well as surgeon's affiliation. In the case-control data, patients exposed to the rapid recovery protocol had 45% increased odds of being discharged home compared to patients not exposed to the protocol. CONCLUSIONS: Although patient factors are known to play a role in predicting postdischarge destination, this analysis describes additional surgeon- and hospital-level factors that predict discharge location. Exogenous factors based on how surgeons and hospital staff practice and interact with patients may impact the postdischarge decision-making process and provide a cost savings opportunity.

Lopez-Liria, R., Padilla-Gongora, D., Catalan-Matamoros, D., et al. (2015). "Home-Based versus Hospital-Based Rehabilitation Program after Total Knee Replacement." Biomed Res Int 2015 : 450421.

OBJECTIVES: To compare home-based rehabilitation with the standard hospital rehabilitation in terms of improving knee joint mobility and recovery of muscle strength and function in patients after a total knee replacement. MATERIALS AND METHODS: A non-randomised controlled trial was conducted. Seventy-eight patients with a prosthetic knee were included in the study and allocated to either a home-based or hospital-based rehabilitation programme. Treatment included various exercises to restore strength and joint mobility and to improve patients' functional capacity. The primary outcome of the trial was the treatment effectiveness measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). RESULTS: The groups did not significantly differ in the leg side (right/left) or clinical characteristics ($P > 0.05$). After the intervention, both groups showed significant improvements ($P < 0.001$) from the baseline values in the level of pain (visual analogue scale), the range of flexion-extension motion and muscle strength, disability (Barthel and WOMAC indices), balance, and walking. CONCLUSIONS: This study reveals that the rehabilitation treatments offered either at home or in hospital settings are equally effective.

MacKay, C., Webster, F., Venkataramanan, V., et al. (2017). "A prospective cohort study examining medical and social factors associated with engagement in life activities following total hip replacement." Osteoarthritis and Cartilage 25(7) : 1032-1039.
http://www.sciencedirect.com/science/article/pii/S1063458417308506

SummaryObjectives Studies show limited improvement in the frequency of engaging in life activities after joint replacement. However, there is a paucity of research that has examined factors, including other life events, which influence engagement following total hip replacement (THR). This research sought to identify factors associated with engaging in life activities following THR. Methods A prospective cohort study was conducted with 376 people who had a THR for osteoarthritis (OA). Data were collected pre-surgery and 1 year post-surgery. The primary outcome was change in frequency in engagement in life activities (Late Life Disability Index (LLDI): higher scores indicate higher frequency of engagement (range 0–80)). Analyses included multivariable regression. Factors considered included: positive/negative life events, a new comorbidity, another joint replacement and complications post-surgery. Results Participants' mean age was 64 years; 46% were male. 68% of participants had at least one comorbidity pre-surgery; 36% reported at least one new comorbidity after surgery. The mean change in LLDI frequency was an increase of 6.29 (±8.10). 36% reported one or more positive impact life events in the year following surgery; 63% reported one or more negative life events. The number of positive life events (beta = 1.24; 95% CI: 0.49, 1.99) was significantly associated with change in LLDI frequency after adjusting for age, sex, education, body mass index (BMI), comorbidities pre-surgery,

number of symptomatic joints and pre-surgery pain and function, LLDI limitations and depression. Conclusions These findings highlight the significant influence of social factors and life circumstances on engagement in life activities following THR.

Mak, J. C., Fransen, M., Jennings, M., et al. (2014). "Evidence-based review for patients undergoing elective hip and knee replacement." ANZ J Surg 84(1-2) : 17-24.

BACKGROUND: The objective of this study was to evaluate the evidence for different interventions in the preoperative, perioperative and post-operative care for people undergoing elective total hip (THR) and knee (TKR) replacement surgery. METHOD: A multidisciplinary working group comprising consumers, managers and clinicians from the areas of orthopaedics, rheumatology, aged care and rehabilitation evaluated randomized controlled trials (RCTs) and systematic reviews/meta-analyses concerning aspects of preoperative, perioperative and post-operative clinical care periods for THR/TKR through systematic searching of Medline, Embase, CENTRAL and the Cochrane Database of Systematic Reviews from May 2007 to April 2011. Multiple reviewers determined study eligibility and one or more members extracted primary study findings. The body of evidence were assessed and specific recommendations made according to NHMRC guidelines. RESULTS: Twenty-five aspects were identified for review. Recommendations for 16 of 25 areas of care were made: impact of waiting, multidisciplinary preparation, preoperative exercise, smoking cessation, interventions for comorbid conditions, predictors of outcome, clinical pathways, implementation of a blood management programme, antibiotic prophylaxis, regional anaesthesia and analgesia, use of a tourniquet in knee replacement, venous thromboembolism prophylaxis, early post-operative cryotherapy, early mobilization and continuous passive motion. In the post-operative period, study heterogeneity across all aspects of care precluded specific recommendations. CONCLUSIONS: There was a deficiency in the quality of the evidence supporting key aspects of the continuum of care for primary THR/TKR surgery. Consequently, recommendations were limited. Prioritization and funding for research into areas likely to impact clinical practice and patient outcomes after elective joint replacement surgery are the next important steps.

Malley, A. M., Bourbonniere, M. et Naylor, M. (2018). "A qualitative study of older adults' and family caregivers' perspectives regarding their preoperative care transitions." J Clin Nurs 27(15-16) : 2953-2962.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6545899/

AIMS AND OBJECTIVES: To explore how older patients with multiple chronic conditions and their family caregivers perceive their engagement and overall care experience throughout the preoperative phase of elective orthopaedic hip or knee joint replacement. BACKGROUND: Patient engagement is a critical component of care necessary for improving patient outcomes. Little is known about how older adults with multiple chronic conditions and their family caregivers engage in preoperative care transitions and the subsequent impact of this experience on postoperative health outcomes. DESIGN: Prospective qualitative descriptive design was used. METHODS: Semi-structured telephone interviews with a convenience sample of older adults coping with multiple chronic conditions and their family caregivers. Interviews were conducted prior to surgery and, again 21 days postsurgery, were audio-recorded and transcribed for qualitative content analysis. The Quality Health Outcomes Model was used to categorise study findings. RESULTS: Eleven patients and five family caregivers participated. Guided by the Quality Health Outcomes Model, four major themes were identified. (i) Older adults perceive that joint replacement is about quality of life. (ii) Standardised interventions often fail to address the unique needs of complex older

adults. (iii) Family caregivers perceive they are the primary care coordinators. (iv) Postoperative outcomes and resource utilisation vary widely in complex older adults. CONCLUSION: Findings suggest that current preoperative care interventions are often not designed to effectively engage complex older patients and their family caregivers. Coordinated patient-centred preoperative care that reflects the needs and goals of complex older patients and their family caregivers may positively influence perioperative care transitions and outcomes beyond this episode of care. RELEVANCE TO CLINICAL PRACTICE: The current research documents the need for more in-depth knowledge about the relationship between older adults' and their family caregivers' engagement preoperatively and postoperative outcomes and resource utilisation.

Mallinson, T., Deutsch, A., Bateman, J., et al. (2014). "Comparison of discharge functional status after rehabilitation in skilled nursing, home health, and medical rehabilitation settings for patients after hip fracture repair." Arch Phys Med Rehabil 95(2) : 209-217.

OBJECTIVE: To examine differences in rehabilitation outcomes across 3 post-acute care (PAC) rehabilitation settings for patients after hip fracture repair. DESIGN: Prospective, observational cohort study. SETTING: Six skilled nursing facilities (SNFs), 4 inpatient rehabilitation facilities (IRFs), and 8 home health agencies (HHAs) in 10 states. PARTICIPANTS: Patients (N=181) receiving PAC rehabilitation following hip fracture with internal fixation (n=116) or total hip replacement (n=64), or no surgical intervention (n=1). INTERVENTIONS: Not applicable. MAIN OUTCOME MEASURE: Self-care and mobility status at PAC discharge measured by the Inpatient Rehabilitation Facility Patient Assessment Instrument. RESULTS: IRF and HHA patients had lower self-care function at discharge relative to SNF patients controlling for patient characteristics, severity, comorbidities, and services. Adding length of stay (LOS) resulted in nonsignificant differences between IRFs and SNFs. In contrast, there was no setting-specific advantage in discharge mobility for patients with or without the addition of LOS. The average LOS of HHA patients was 2 weeks longer than that of SNF patients, whose average LOS was 9 days longer than that of IRF patients (average, 15d). IRF and SNF patients received about the same total minutes of therapy over their PAC stays (approximately 2100min on average), whereas HHA patients received only approximately 25% as many minutes. CONCLUSIONS: Setting-specific effects varied depending on whether self-care or mobility was the outcome of focus. It remains unclear to what extent rehabilitation intensity or natural recovery effects changes in functional status for patients with hip fracture. This study points to important directions for PAC setting comparative effectiveness studies in the future, including uniform measurement, limited consensus on factors affecting recovery, accounting for selection bias, and using end-point data collection that is at the same follow-up time periods for all settings.

Mandl, L. A. (2013). "Determining who should be referred for total hip and knee replacements." Nat Rev Rheumatol 9(6) : 351-357.

Total hip and total knee replacements (THR and TKR respectively), the definitive treatments for end-stage arthritis, are both safe and extremely successful in relieving pain and improving function. However, physicians who care for patients with chronic hip and knee arthritis are often the 'gatekeepers' to total joint replacement (TJR) procedures as they select patients for referral to an orthopaedic surgeon to be considered for arthroplasty. Currently, no evidence-based criteria exist to guide physicians in this decision-making process, and this situation raises the possibility that conscious or unconscious biases may influence referral patterns, potentially leading to systematic inequities regarding which patients are eventually offered TJR. This article reviews why TJRs are particularly important procedures, and highlights

common misperceptions among physicians regarding TJR risk assessment. This article also underscores the benefits of ongoing discussion regarding TJR with all patients with moderate-to-severe chronic hip or knee pain and disability.

McLawhorn, A. S., Fu, M. C., Schairer, W. W., et al. (2017). "Continued Inpatient Care After Primary Total Knee Arthroplasty Increases 30-Day Post-Discharge Complications: A Propensity Score-Adjusted Analysis." J Arthroplasty 32(9S) : S113-S118.
https://pubmed.ncbi.nlm.nih.gov/28285902

BACKGROUND: Discharge destination, either home or skilled care facility, after total knee arthroplasty (TKA) may be associated with significant variation in postacute care outcomes. The purpose of this study was to characterize the 30-day postdischarge outcomes after primary TKA relative to discharge destination. METHODS: All primary unilateral TKAs performed for osteoarthritis from 2011-2014 were identified in the National Surgical Quality Improvement Program database. Propensity scores based on predischarge characteristics were used to adjust for selection bias in discharge destination. Propensity-adjusted multivariable logistic regressions were used to examine associations between discharge destination and postdischarge complications. RESULTS: Among 101,256 primary TKAs identified, 70,628 were discharged home and 30,628 to skilled care facilities. Patients discharged to facilities were more frequently were female, older, higher body mass index class, higher Charlson comorbidity index and American Society of Anesthesiologists scores, had predischarge complications, received general anesthesia, and classified as nonindependent preoperatively. Propensity adjustment accounted for this selection bias. Patients discharged to skilled care facilities after TKA had higher odds of any major complication (odds ratio = 1.25; 95% confidence interval, 1.13-1.37) and readmission (odds ratio = 1.81; 95% confidence interval, 1.50-2.18). Skilled care was associated with increased odds for respiratory, septic, thromboembolic, and urinary complications. Associations with death, cardiac, and wound complications were not significant. CONCLUSION: After controlling for predischarge characteristics, discharge to skilled care facilities vs home after primary TKA is associated with higher odds of numerous complications and unplanned readmission. These results support coordination of care pathways to facilitate home discharge after hospitalization for TKA whenever possible.

McPherson, K., Gon, G. et Scott, M. (2013). International Variations in a Selected Number of Surgical Procedures. OECD Health Working Paper ; 61. Paris OCDE **:** 79, tabl., fig.
http://dx.doi.org/10.1787/5k49h4p5g9mw-en

Ce document présente des données récentes concernant les taux d'interventions chirurgicales pour 5 actes (accouchement par césarienne, hystérectomie, prostatectomie, arthroplastie de la hanche et appendicectomie) dans les pays de l'OCDE. Il examine les tendances et compare les taux standardisés par âge et sexe pour un sous-ensemble de pays. Le rapport met en évidence d'importantes variations entre pays pour la plupart des interventions, mais également de frappantes similarités : pour plusieurs interventions, les tendances observées sont universelles et les taux par tranche d'âge (et genre) se comportent de manière similaire.

Mears, S. C., Edwards, P. K. et Barnes, C. L. (2016). "How to Decrease Length of Hospital Stay After Total Knee Replacement." J Surg Orthop Adv 25(1) : 2-7.

Hospital stays have been decreasing for hip and knee arthroplasty procedures. Short stay or outpatient procedures were first pioneered in hip replacement; however, short-stay knee

replacement is now being routinely performed by some surgeons. Changes in pain control and mobilization have allowed for quicker discharge for knee replacement patients. Combined with specific pathways of care as well as changes in patient expectations and early mobilization, patients can now routinely go home the day after knee replacement. This review seeks to give the reader practical ways to facilitate rapid discharge after knee arthroplasty.

Mehrotra, A., Sloss, E. M., Hussey, P. S., et al. (2013). "Evaluation of centers of excellence program for knee and hip replacement." Med Care 51(1) : 28-36.
PM:23222470

BACKGROUND: Medicare and private plans are encouraging individuals to seek care at hospitals that are designated as centers of excellence. Few evaluations of such programs have been conducted. This study examines a large national initiative that designated hospitals as centers of excellence for knee and hip replacement. OBJECTIVE: : Comparison of outcomes and costs associated with knee and hip replacement at designated hospitals and other hospitals. RESEARCH DESIGN: : Retrospective claims analysis of approximately 54 million enrollees. STUDY POPULATION: : Individuals with insurance from one of the sponsors of this centers of excellence program who underwent a primary knee or hip replacement in 2007-2009. OUTCOMES: : Primary outcomes were any complication within 30 days of discharge and costs within 90 days after the procedure. RESULTS: : A total of 80,931 patients had a knee replacement and 39,532 patients had a hip replacement of which 52.2% and 56.5%, respectively, were performed at a designated hospital. Designated hospitals had a larger number of beds and were more likely to be an academic center. Patients with a knee replacement at designated hospitals did not have a statistically significantly lower overall complication rate with an odds ratio of 0.90 (P=0.08). Patients with hip replacement treated at designated hospitals had a statistically significant lower risk of complications with an odds ratio of 0.80 (P=0.002). There was no significant difference in 90-day costs for either procedure. CONCLUSIONS: : Hospitals designated as joint replacement centers of excellence had lower rates of complications for hip replacement, but there was no statistically significant difference for knee replacement. It is important to validate the criteria used to designate centers of excellence

Miller, L. E., Gondusky, J. S., Bhattacharyya, S., et al. (2018). "Does Surgical Approach Affect Outcomes in Total Hip Arthroplasty Through 90 Days of Follow-Up? A Systematic Review With Meta-Analysis." J Arthroplasty 33(4) : 1296-1302.
https://pubmed.ncbi.nlm.nih.gov/29195848

BACKGROUND: The choice between anterior approach (AA) and posterior approach (PA) in primary total hip arthroplasty (THA) is controversial. Previous reviews have predominantly relied on data from retrospective studies. METHODS: This systematic review included prospective studies comparing postoperative outcomes through 90 days of AA vs PA in primary THA. Outcomes were pain severity, narcotic usage, hip function using Harris Hip Score, and complications. Random effects meta-analysis was performed for all outcomes. Efficacy data were reported as standardized mean difference (SMD) where values of 0.2, 0.5, 0.8, and 1.0 were defined as small, medium, large, and very large effect sizes, respectively. Complications were reported as the absolute risk difference (RD) where a positive value implied higher risk with AA and a lower value implied lower risk with AA. RESULTS: A total of 13 prospective comparative studies (7 randomized) with patients treated with AA (n = 524) or PA (n = 520) were included. The AA was associated with lower pain severity (SMD = -0.37, P < .001), lower narcotic usage (SMD = -0.36, P = .002), and improved hip function (SMD =

0.31, P = .002) compared to PA. No differences between surgical approaches were observed for dislocation (RD = 0.2%, P = .87), fracture (RD = 0.2%, P = .87), hematoma (RD = 0%, P = .99), infection (RD = 0.2%, P = .85), thromboembolic event (RD = -0.9%, P = .42), or reoperation (RD = 1.3%, P = .26). Conclusions of this study were unchanged when subjected to sensitivity analyses. CONCLUSION: In this systematic review and meta-analysis of prospective studies comparing postoperative outcomes through 90 days of AA vs PA in primary THA, patients treated with AA reported less pain, consumed fewer narcotics, and reported better hip function. No statistical differences in complication rates were detected between AA and PA. Ultimately, the choice of surgical approach in primary THA should consider preference and experience of the surgeon as well as preference and anatomy of the patient.

Minns Lowe, C. J., Barker, K. L., Holder, R., et al. (2012). "Comparison of postdischarge physiotherapy versus usual care following primary total knee arthroplasty for osteoarthritis: an exploratory pilot randomized clinical trial." Clin Rehabil 26(7) : 629-641.

OBJECTIVE: To evaluate a pilot trial of a postdischarge physiotherapy intervention to improve patient function versus usual physiotherapy in patients undergoing total knee arthroplasty aiming to assess: recruitment rate, feasibility and acceptability of the intervention and control, suitability of outcomes, retention and adverse events and to inform sample size calculation for a definitive trial. DESIGN: Exploratory pilot randomized controlled trial using independent assessment. SETTING: Mixed urban and rural, UK. PARTICIPANTS: Patients undergoing primary, elective unilateral knee arthroplasty for osteoarthritis. INTERVENTION: Two additional home physiotherapy visits of functional weight-bearing exercises, functional task-specific training versus treatment as usual. MAIN OUTCOME: Oxford Knee Score at 12 months. SECONDARY OUTCOMES: completion rates, adverse events, Knee Injury and Osteoarthritis Outcome Score, leg extensor power, timed 10-m walk, timed sit-to-stand, resource use diaries. Assessments completed at baseline (pre-operatively), 3, 6 and 12 months. RESULTS: Of 181 eligible participants 107 (59.1%) were randomized over 13 months, one participant withdrew, no adverse events. Intervention group n = 56 (mean age 67.8), control group n = 51 (mean age 70.8). The difference in mean change of Oxford Knee Scores between groups (intervention--control) at 12 months was 0.2 (95% confidence interval (CI) -3.8, 4.2), P = 0.94. Patient diaries revealed non-trial additional physiotherapy requires improved measurement. CONCLUSIONS: Successful recruitment and retention rates were achieved. The intervention appeared feasible and acceptable but may be suboptimal in intensity given recent research. A sample size of 1271 participants would be required for a fully powered randomized controlled trial using the main outcome. However new outcomes, potentially of greater validity and responsiveness, require consideration.

Mitchell, J. M., Reschovsky, J. D. et Reicherter, E. A. (2016). "Use of Physical Therapy Following Total Knee Replacement Surgery: Implications of Orthopedic Surgeons' Ownership of Physical Therapy Services." Health Serv Res 51(5) : 1838-1857.

OBJECTIVE: To examine whether the course of physical therapy treatments received by patients who undergo total knee replacement (TKR) surgery differs depending on whether the orthopedic surgeon has a financial stake in physical therapy services. DATA: Sample of Medicare beneficiaries who underwent TKR surgery during the years 2007-2009. STUDY DESIGN: We used regression analysis to evaluate the effect of physician self-referral on the following outcomes: (1) time from discharge to first physical therapy visit; (2) episode length; (3) number of physical therapy visits per episode; (4) number of physical therapy service units per episode; and (5) number of physical therapy services per episode expressed in

relative value units. PRINCIPAL FINDINGS: TKR patients who underwent physical therapy treatment at a physician-owned clinic received on average twice as many physical therapy visits (8.3 more) than patients whose TKR surgery was performed by a orthopedic surgeon who did not self-refer physical therapy services ($p < .001$). Regression-adjusted results show that TKR patients treated at physician-owned clinics received almost nine fewer physical therapy service units during an episode compared with patients treated by nonself-referring providers ($p < .001$). In relative value units, this difference was 4 ($p < .001$). In contrast, episodes where the orthopedic surgeon owner does not profit from physical therapy services rendered to the patient look virtually identical to episodes where the TKR surgery was performed by a surgeon nonowner. CONCLUSIONS: Physical therapists not involved with physician-owned clinics saw patients for fewer visits, but the composition of physical therapy services rendered during each visit included more individualized therapeutic exercises.

Morri, M., Franchini, N., Gerini, G., et al. (2015). "Measuring functional performance at discharge from hospital after total joint arthroplasty as a pre-requisite for planning early rehabilitation: a prognostic study." Orthop Nurs 34(2) : 95-100.

BACKGROUND: The autonomy achieved by discharge after total knee and hip arthroplasty is important for planning early rehabilitation. PURPOSE: Describe functional performance using the Iowa Level of Assistance (ILOA) scale and investigate possible prognostic factors. METHODS: A prospective cohort study design was used. Autonomy at discharge was measured using the ILOA scale. Postoperative factors such as time to remove surgical drains, the length of hospitalization, preoperative physical therapy, and the number of physiotherapy treatments were collected. RESULTS: The sample was composed of 452 patients: 191 men (42.3%) and 261 women (57.7%). The mean ILOA score was 12.34 (SD = 5.4), representing a level of autonomy of 68.4%. Gait speed was the activity with the highest score and it ranged from 0.26 m/s to 0.32 m/s. Based on univariate and multivariate analysis, gender and age were the only significant variables to influence achieving autonomy at discharge. CONCLUSION: The rehabilitative program in its acute phase should be planned with particular attention paid to elderly women, unifying the physiotherapy protocol for total hip arthroplasty (THA) and total knee arthroplasty (TKA), reviewing the modalities of preoperative treatment sessions and with a specific training for the speed gait.

Napier, R. J., Spence, D., Diamond, O., et al. (2013). "Modifiable factors delaying early discharge following primary joint arthroplasty." Eur J Orthop Surg Traumatol 23(6) : 665-669.

AIMS: Recent NHS reforms have incentivised reduction in length of stay, with the UK department of health expecting health trusts to reduce bed days and ultimately reduce overall costs. The aim of this study was to identify avoidable causes for protracted hospital admission following total hip arthroplasty (THA) or total knee arthroplasty (TKA) within a fast-track unit. METHODS: During a 6-month period, 535 consecutive patients underwent primary THA or TKA under the care of a single surgeon. All patients with a post-operative stay of greater than 72 h were identified, and reasons for delayed discharge were determined. RESULTS: The majority of arthroplasty patients were discharged within 3 days post-operatively. Twenty-one per cent of THA patients and 25 % of TKA patients remained as inpatients for greater than 72 h. For the THA population, this equates to 43 % of bed days used by 21 % of patients, and for the TKA population, 44 % of bed days were used by 25 % of patients. The major factor within both groups for delayed discharge was attributed to inadequate social support. CONCLUSIONS: Delayed discharge can never be totally prevented. This unit aims to develop improvement in social work provision, with a greater focus on pre-admission discharge planning to reduce the number of delayed discharges and ultimately

reduce the cost burden of joint replacement surgery. It is not conducive with the ethos of fast-track arthroplasty to only identify social circumstances upon admission.

Nedza, S. M., Fry, D. E., DesHarnais, S., et al. (2017). "Emergency Department Visits Following Joint Replacement Surgery in an Era of Mandatory Bundled Payments." Academic emergency medicine : official journal of the Society for Academic Emergency Medicine 24(2) : 236-245. https://onlinelibrary.wiley.com/doi/full/10.1111/acem.13080

OBJECTIVES: The Center for Medicare & Medicaid Services (CMS) is actively testing bundled payments models. This study sought to identify relevant details for 90-day postdischarge emergency department (ED) visits of Medicare beneficiaries following total joint replacement (TJR) surgery meeting eligibility for a CMS bundled payment program. METHODS: The CMS research identifiable file for the State of Texas for 2011-2012 was used to identify patients who underwent TJR. Qualifying inpatient claims were linked to 90-day postdischarge ED claims. The claims associated with live discharge were divided into three cohorts: elective total hip replacement (THR), emergent (THR), and total knee replacement. The frequency, distribution, diagnoses, and disposition for these ED visits were identified and stratified by timing within the postdischarge period as well as discharge diagnosis. Visits were correlated with age, sex, joint replaced, and fracture. RESULTS: There were 50,838 TJR surgeries in Texas in 2011-2012 that would have been eligible for inclusion in the CMS defined CJR program. A total of 12,747 ED visits by 9,299 patients occurred in the 90-day postdischarge period. Visits to the ED by patients 85 and older predominated in the case of THR performed secondary to a hip fracture. Patients 65-74 years predominated in both elective surgery categories. There were 2,370 ED visits within 90 days of 10,786 elective THRs, of which 55.5% were discharged home, 34.6% were hospitalized or transferred, and 6.9% were admitted to observation. Of the 3,438 ED visits among 8,475 emergent hip replacement cases, 22.4% were discharged home, 50.2% were hospitalized or transferred, and 5.3% were admitted to observation. Of the 6,939 visits among 31,387 knee replacement cases, 61.9% were discharged home, 30.6% were readmitted or transferred, and 7.1% were admitted to observation. The discharge diagnoses varied by volume and timing in the postdischarge period. The most prevalent diagnoses across groups included injury/trauma, physiologic decompensation, cardiopulmonary events, and infection. CONCLUSIONS: ED services are frequent for Medicare TJR bundle-eligible patients within the postdischarge period. ED utilization, discharge diagnosis and disposition varied by age, and elective and emergent surgeries. The ED is an important site for identifying and managing postoperative adverse outcomes.

Nelson, S. J., Webb, M. L., Lukasiewicz, A. M., et al. (2017). "Is Outpatient Total Hip Arthroplasty Safe?" J Arthroplasty 32(5) : 1439-1442.

BACKGROUND: Safety data for outpatient total hip arthroplasty (THA) remains scarce. METHODS: The present study retrospectively reviews prospectively collected data from the 2005-2014 American College of Surgeons National Surgical Quality Improvement Program Database. Patients who underwent THA were categorized by day of hospital discharge to be outpatient (length of stay [LOS] 0 days) or inpatient (LOS 1-5 days). Those with extended LOS beyond 5 days were excluded. To account for baseline nonrandom assignment between the study groups, propensity score matching was used. The propensity matched populations were then compared with multivariate Poisson regression to compare the relative risks of adverse events during the initial 30 postoperative days including readmission. RESULTS: A total of 63,844 THA patients were identified. Of these, 420 (0.66%) were performed as outpatients and 63,424 (99.34%) had LOS 1-5 days. Outpatients tended to be younger, male,

and to have fewer comorbidities. After propensity score matching, outpatients had no difference in any of 18 adverse events evaluated other than blood transfusion, which was less for outpatients than those with a LOS of 1-5 days (3.69% vs 9.06%, P < .001). CONCLUSION: After adjusting for potential confounders using propensity score matching and multivariate logistic regression, patients undergoing outpatient THA were not at greater risk of 30 days adverse events or readmission than those that were performed as inpatient procedures. Based on the general health outcome measures assessed, this data supports the notion that outpatient THA can appropriately be considered in appropriately selected patients.

Nowak, L. L. et Schemitsch, E. H. (2019). "Same-day and delayed hospital discharge are associated with worse outcomes following total knee arthroplasty." Bone Joint J 101-B(7_Supple_C) : 70-76. https://online.boneandjoint.org.uk/doi/abs/10.1302/0301-620X.101B7.BJJ-2018-1402.R1?journalCode=bjj

AIMS: To evaluate the influence of discharge timing on 30-day complications following total knee arthroplasty (TKA). PATIENTS AND METHODS: We identified patients aged 18 years or older who underwent TKA between 2005 and 2016 from the American College of Surgeons' National Surgical Quality Improvement Program (NSQIP) database. We propensity score-matched length-of-stay (LOS) groups using all relevant covariables. We used multivariable regression to determine if the rate of complications and re-admissions differed depending on LOS. RESULTS: Our matched cohort consisted of 76 246 TKA patients (mean age 67 years (sd 9)). Patients whose LOS was zero and four days had an increased risk of major complications by an odds ratio (OR) of 1.8 (95% confidence interval (CI) 1.0 to 3.2) and 1.5 (95% CI 1.2 to 1.7), respectively, compared with patients whose LOS was two days. Patients whose LOS was zero, three, and four days had an increased risk of minor complications (OR 1.8 (95% CI 1.3 to 2.7), 1.2 (95% CI 1.0 to 1.4), and 1.6 (95% CI 1.4 to 1.9), respectively), compared with patients whose LOS was two days. In addition, a LOS of three days increased the risk of re-admission by an OR of 1.2 (95% CI 1.0 to 1.3), and a LOS of four days increased the risk of re-admission by an OR of 1.5 (95% CI 1.3 to 1.6), compared with a LOS of two days. CONCLUSION: Patients discharged on days one to two postoperatively following TKA appear to have reduced major and minor complications compared with discharge on the day of surgery, or on days three to four. Prospective clinical data are required to confirm these findings. Cite this article: Bone Joint J 2019;101-B(7 Supple C):70-76.

OCDE (2014). Geographic Variations in Health Care: What Do We Know and What Can Be Done to Improve Health System Performance? Paris OCDE **:** 415, fig., tabl. http://dx.doi.org/10.1787/9789264216594-en

Geographic variations in health care use across and within countries have been widely documented, for a limited number of countries including the United States, Canada, the United Kingdom and Nordic countries. While some of these variations reflect differences in patient needs and/or preferences, others do not. Instead, they are due to variations in medical practice styles, the ability of providers to generate demand beyond what is clinically necessary, or to unequal access to health care services. These unwarranted variations raise concerns about the equity and the efficiency of health systems. This report presents new information on geographic variations in health care utilisation within and across 13 OECD countries: Australia, Belgium, Canada, the Czech Republic, Finland, France, Germany, Israel, Italy, Portugal, Spain, Switzerland and the United Kingdom (England). The analysis focusses on a selected set of high-volume and high-cost health care activities. Data are reported for the most recent year (often 2011) and sometimes for several years, allowing some analysis of

trends. Health care utilisation is recorded at the patient's place of residence. Hence, the level of use in a given area cannot be explained by patients receiving treatment in other geographic areas. Utilisation rates have been standardised by age and sex to remove the effect of differences in population structures. The report considers possible causes of these variations and explores health policies expected to reduce unwarranted variations. (résumé de l'éditeur).

Okoro, T., Ramavath, A., Howarth, J., et al. (2013). "What does standard rehabilitation practice after total hip replacement in the UK entail? Results of a mixed methods study." BMC Musculoskelet Disord **14** : 91.

BACKGROUND: There is evidence of prolonged poor function in patients following total hip replacement (THR). Studies of progressive resistance training (PRT) interventions to improve function are often compared to 'standard' practice which is not well defined. This study aimed to investigate 'standard' rehabilitation care in the UK after total hip replacement (THR) as well as determine whether PRT was part of 'standard' care. METHODS: After ethical approval, questionnaire item development about rehabilitation practice was guided by a focus group interview (after informed consent) with physiotherapists (n = 4; >5 years post-qualification) who regularly treated THR patients. An online questionnaire investigating the exercises prescribed and rehabilitation practice following THR was developed and sent to physiotherapists working in hospitals in the UK. The survey was performed from January to May 2011. The survey results were analysed (frequency (%) of responses) focusing on the exercises the physiotherapists considered important, as well as their use of PRT in prescribed regimes. RESULTS: 106 responses were obtained from physiotherapists in the UK. The survey respondents considered that the most important muscles to target in all phases of rehabilitation were the hip abductors (62.2%), followed by the quadriceps (16.9%), and other muscles (21%). Exercise type prescribed revealed no consensus, with weight bearing (42%), functional (45%) and Bed-based/Bridging/Postural exercises (13%) favoured. 83.7% were able to define the basis of progressive resistance training (PRT), but only 33% prescribed it. CONCLUSIONS: Standard physiotherapy rehabilitation in the UK after THR is variable, and appears to rarely include PRT. This may be a factor in prolonged poor function in some patients after this common operation.

Olsson, L. E., Karlsson, J., Berg, U., et al. (2014). "Person-centred care compared with standardized care for patients undergoing total hip arthroplasty--a quasi-experimental study." J Orthop Surg Res 9 : 95.

BACKGROUND: A common approach to decrease length of stay has been to standardize patient care, for example, by implementing clinical care pathways or creating fast-track organizations. In a recent national report, it was found that Sweden's healthcare system often fails to anticipate and respond to patients as individuals with particular needs, values and preferences. We compared a standardized care approach to one of person-centred care for patients undergoing total hip replacement surgery. METHODS: A control group (n =138) was consecutively recruited between 20th September 2010 and 1st March 2011 and an intervention group (n =128) between 12th December 2011 and 12th November 2012, both scheduled for total hip replacement. The primary outcome measures were length of stay and physical function at both discharge and 3 months later. RESULTS: The mean length of stay in the control group was 7 days (SD 5.0) compared to 5.3 days in the intervention group (SD 2.2). Physical functional performance, as assessed using activities of daily living, was similar at baseline for both groups. At discharge, 84% in the control group had regained activities of daily living level A vs. 72% in the intervention group. At 3 months after surgery, 88% in the

control group had regained their independence vs. 92.5% in the person-centred care group. CONCLUSIONS: Focusing attention on patients as people and including them as partners in healthcare decision-making can result in shorter length of stay. The present study shows that the patients should be the focus and they should be involved as partners.

Owens, J. M., Callaghan, J. J., Duchman, K. R., et al. (2018). "Short-term Morbidity and Readmissions Increase With Skilled Nursing Facility Discharge After Total Joint Arthroplasty in a Medicare-Eligible and Skilled Nursing Facility-Eligible Patient Cohort." J Arthroplasty 33(5) : 1343-1347.
https://www.arthroplastyjournal.org/article/S0883-5403(18)30010-X/fulltext

BACKGROUND: The benefits of discharge to a skilled nursing facility (SNF) in Medicare-eligible patients after total joint arthroplasty (TJA) have recently been scrutinized. The purpose of this study was to determine short-term complication and readmission rates for SNF versus home discharge in patients eligible for Medicare and SNF discharge. METHODS: Patients who underwent TJA between 2012 and 2013 were identified in the National Surgical Quality Improvement Project database. Patients over 65 years and who discharged at or after postoperative day 3, and thus SNF eligible by Medicare rule, were included. Patient demographics and comorbidities were compared in the 2 cohorts (home versus SNF), and subsequent univariate and multivariate analyses were used to determine risk factors for short-term complications. RESULTS: We identified 34,610 Medicare- and SNF-eligible TJA patients; 54.8% discharged home. Patients with SNF discharge were older, had higher rates of comorbidities, and were more frequently American Society of Anesthesiologists class 3 or 4 (P < .001). Univariate analysis revealed that patients with SNF discharge had higher rates of any complication (7.9% vs. 4.7%, P < .001) and readmission (5.3% vs. 3.3%, P < .001). Multivariate regression analysis identified SNF discharge (adjusted odds ratio 1.9, 95% confidence interval 1.7-2.0) as an independent risk factor for a 30-day complication and readmission. CONCLUSIONS: In a cohort of Medicare- and SNF-eligible patients, SNF discharge was the strongest predictor of 30-day complication after TJA. SNF discharge was also an independent predictor of readmission after TJA.

Papanicolas, I. et McGuire, A. (2015). "Do Financial Incentives Trump Clinical Guidance? Hip Replacement in England and Scotland." Journal of Health Economics 44 : 25-36.
http://dx.doi.org/10.1016/j.jhealeco.2015.08.001

Following devolution in 1999 England and Scotland's National Health Services diverged, resulting in major differences in hospital payment. England introduced a case payment mechanism from 2003/4, while Scotland continued to pay through global budgets. We investigate the impact this change had on activity for Hip Replacement. We examine the financial reimbursement attached to uncemented Hip Replacement in England, which has been more generous than for its cemented counterpart, although clinical guidance from the National Institute for Clinical Excellence recommends the later. In Scotland this financial differential does not exist. We use a difference-in-difference estimator, using Scotland as a control, to test whether the change in reimbursement across the two countries had an influence on treatment. Our results indicate that financial incentives are directly linked to the faster uptake of the more expensive, uncemented Hip Replacement in England, which ran against the clinical guidance.

Pua, Y. H. et Ong, P. H. (2014). "Association of early ambulation with length of stay and costs in total knee arthroplasty: retrospective cohort study." Am J Phys Med Rehabil 93(11) : 962-970.

OBJECTIVE: The objective of this study was to evaluate the association of early ambulation with length of stay, costs, and outcomes in inpatients undergoing total knee arthroplasty. DESIGN: This is a retrospective study of 1504 patients who underwent total knee arthroplasty between August 2009 and January 2011 in a tertiary teaching hospital. All patients commenced physiotherapy interventions on postoperative day 1. The patients were categorized into an early ambulation group (began ambulating on postoperative day 1; n = 803) or a late ambulation group (began ambulating on postoperative day 2; n = 701). Multivariable regression and propensity score analyses were used to reduce selection biases. RESULTS: Early ambulation was associated with a statistically significant reduction in the adjusted average length of stay (-0.44 day; P < 0.001) and adjusted average total hospitalization costs (Singapore, -$385; United States, -$315; P < 0.001). Both groups did not differ significantly in the 90-day readmission rate; however, early ambulation was associated with higher odds of achieving at least 90 degrees of knee flexion (adjusted odds ratio, 1.33; P < 0.01) and requiring a walking aid with a smaller base of support (adjusted proportional odds ratio, 1.36; P < 0.001). CONCLUSIONS: As little as a 1-day difference in the day of first ambulation was associated with a shorter length of stay, lower hospitalization costs, and improved knee function. The results of this study provide the first empirical support for the usefulness of early ambulation after total knee arthroplasty.

Qiu, C., Cannesson, M., Morkos, A., et al. (2016). "Practice and Outcomes of the Perioperative Surgical Home in a California Integrated Delivery System." Anesth Analg 123(3) : 597-606.

BACKGROUND: In this article, we report on the implementation and impact of a Perioperative Surgical Home (PSH) model for the total knee arthroplasty at an integrated delivery system (Kaiser Permanente). METHODS: A multidisciplinary committee developed and implemented a series of PSH protocols that included the entire continuum of care from the decision for surgery until 30 days after surgery. Five hundred forty-six subjects were included in the preimplementation phase (Fast Track [T-fast]), and 518 patients were included in the postimplementation phase (PSH). The primary end points of this report are hospital length of stay (LOS), postoperative skilled nursing facility (SNF) bypass rate, and 30-day readmission rate. We used a generalized linear model to assess the effect on LOS while adjusting for potential confounding variables. RESULTS: We found that patients assigned to the PSH pathway had a significantly shorter mean LOS compared with patients in the T-fast group (2.4 +/- 2.1 days [confidence interval {CI}, 2.2-2.8] vs 3.4 +/- 2.9 days [CI, 2.9-3.9]). The SNF bypass rate was significantly higher in the PSH group compared with the T-fast group (94% vs 80%, P = 0.00002, CI, -0.102 to -0.036). There was no difference in the 30 readmission rates between patients managed in the PSH track and the T-fast track (1.2% vs 0.98%). CONCLUSIONS: Introduction of the PSH into an integrated delivery system resulted in a simultaneous reduction of LOS and SNF admission for total knee arthroplasty patients.

Rachet-Jacquet, L., Gutacker, N. et Siciliani, L. (2019). The Causal Effect of Hospital Volume on Health Gains from Hip Replacement Surgery. CHE Research Paper Series ; 168. York University of York**:** 27. https://www.york.ac.uk/media/che/documents/papers/researchpapers/CHERP168_hospital_volume_health_gains.pdf

This study investigates the causal effect of hospital volume on health gains from hip replacement surgery in the English National Health Service. We exploit a unique dataset, which links routine hospital records and patient-reported outcome measures (PROMs) for all public hospitals in England. PROMs assess patients' health along key dimensions of pain and mobility shortly before and six months after the surgery. We investigate whether higher hospital volume increases patient health six months post-surgery, conditioning on pre-

surgery health and other patient medical and socioeconomic indicators. We address possible reverse-causality bias due to hospital demand being responsive to quality by constructing a measure of predicted hospital volumes based on a patient choice model. The results suggest that the observed volume-outcome effect in hip replacement surgery is clinically small and no longer statistically significant once we account for the endogeneity of volume.

Radcliff, T. A., Cote, M. J., Olson, D. L., et al. (2012). "Rehabilitation settings after joint replacement: an application of multiattribute preference elicitation." Eval Health Prof 35(2) : 182-198.

While advances in medical treatment and technologies have the potential to improve the delivery of health care, their use typically involves making multiple, complex decisions. Patients and their medical providers may share in the decision-making processes and balance a variety of criteria and/or attributes in the pursuit of improved health. This necessitates a stronger understanding of the role of human behavior in health care processes and presents a timely opportunity to use decision analysis tools to contribute to this important aspect of health care operations. This article reports on the application of multiattribute preference elicitation to identify postsurgical rehabilitation setting options for elective hip and knee replacement patients and their discharge planning team prior to placement in these settings. These preferences are analyzed to identify trends in emphases across patients and the discharge planning team, including a comparison with actual outcomes to determine the extent of congruence with each other, an important component of patient-centered care. Variances are identified in what patients and the discharge planning team expected and what actually happened. Reasons for these variances are discussed.

Ramaswamy, A., Marchese, M., Cole, A. P., et al. (2019). "Comparison of Hospital Readmission After Total Hip and Total Knee Arthroplasty vs Spinal Surgery After Implementation of the Hospital Readmissions Reduction Program." JAMA network open 2(5) : e194634-e194634. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6547226/

IMPORTANCE: The Hospital Readmissions Reduction Program (HRRP) was recently expanded to penalize excessive readmissions after total hip arthroplasty (THA) and total knee arthroplasty (TKA). These are the first surgical procedures to be included in the HRRP. OBJECTIVE: To determine whether the HRRP was associated with a greater decrease in readmissions after targeted procedures (THA and TKA) compared with similar nontargeted procedures (lumbar spine fusion and laminectomy). DESIGN, SETTING, AND PARTICIPANTS: A retrospective cohort study was conducted of patients 50 years or older among all payers in the Nationwide Readmissions Database who underwent THA, TKA, lumbar spine fusion, or laminectomy between January 1, 2010, and September 30, 2015. Multivariable logistic regression and interrupted time-series models were used to calculate and compare 30-day readmission trends in 3 periods associated with the HRRP: preimplementation (January 2010-September 2012), implementation (October 2012-September 2014), and penalty (October 2014-September 2015). Statistical analysis was performed from January 1, 2010, to September 30, 2015. EXPOSURES: Announcement and implementation of the HRRP. MAIN OUTCOMES AND MEASURES: Readmission within 30 days after hospitalization for THA, TKA, lumbar spine fusion, or laminectomy surgery. RESULTS: The study included 6 687 077 (58.3% women and 41.7% men; mean age, 66.7 years; 95% CI, 66.7-66.8 years) weighted hospitalizations for THA, TKA, lumbar spine fusion, and laminectomy surgery: 4 765 466 hospitalizations for targeted conditions and 1 921 611 for nontargeted conditions. After passage of the Patient Protection and Affordable Care Act, the risk-adjusted rates of readmission after all procedures decreased in a similar fashion. Implementation of the HRRP was associated with a 0.018% per month decrease in the rate of readmission (95% CI, -

0.025% to -0.010%) after targeted procedures, which was not observed after nontargeted procedures (slope per month, -0.003%; 95% CI, -0.016% to 0.010%). Penalties were not associated with a greater decrease in readmission for either targeted or nontargeted procedures. CONCLUSIONS AND RELEVANCE: These results appear to be consistent with hospitals responding to the future possibility of penalties by reducing readmissions after surgical procedures targeted by the HRRP.

Ramos, N. L., Wang, E. L., Karia, R. J., et al. (2014). "Correlation between physician specific discharge costs, LOS, and 30-day readmission rates: an analysis of 1,831 cases." J Arthroplasty 29(9) : 1717-1722.

There is currently wide variation in the use and cost of post acute care following total joint arthroplasty. Additionally the optimum setting to which patients should be discharged after surgery is controversial. Discharge patterns following joint replacement vary widely between physicians at our institution, however, only weak correlations were found between the cost of discharge and length of stay or readmission rates. The inter-physician variance in discharge cost did not correlate to a difference in quality, as measured by length of stay and readmission rates, but does imply there is significant opportunity to modify physician discharge practices without impacting patient outcomes and the quality of care.

Reay, P. A., Horner, B. et Duggan, R. (2015). "The patient's experience of early discharge following total hip replacement." Int J Orthop Trauma Nurs 19(3) : 131-139.

BACKGROUND: Strategies within the public health system to curtail costs, increase efficiency and service utilisation have resulted in reduced hospital stays following elective orthopaedic procedures. Although there are advantages that support the concept of early discharge from hospital, very little is known about how patients manage the transition from hospital to home. AIM: The aim of this qualitative study was to describe the post-discharge experience of elderly patients following primary total hip replacement (THR). METHODS: Ten patients, six women and four men, provided descriptions of their experience. Data were collected by face-to-face interviews and the analysis process was based on Giorgi's phenomenological scientific methodology (Giorgi, 1994, 1997, 2000). RESULTS: The analysis of the data resulted in four themes, namely; an inadequate assessment of suitable adaptive aids and personal needs; personal frustration; coping with the physical and mobility and limited social interaction. CONCLUSION: Findings from this study demonstrated a need to review the discharge process and implement strategies to prepare patients for the stressors that the participants in this study encountered as a result of their early discharge.

Ribinik, P., Le Moine, F., de Korvin, G., et al. (2012). "Physical and rehabilitation medicine (PRM) care pathways: "patients after total knee arthroplasty"." Ann Phys Rehabil Med 55(8): 533-539.

This document is part of a series of documents designed by the French Physical and Rehabilitation Medicine Society (SOFMER) and the French Federation of PRM (FEDMER). These documents describe the needs for or a specific type of patients; PRM care objectives, human and material resources to be implemented, chronology as well as expected outcomes. "Care pathways in PRM" is a short document designed to enable the reader (physicians, decision-maker, administrator, lawyer or finance manager) to quickly apprehend the needs of these patients and the available therapeutic care structures for proper organization and pricing of these activities. Patients after total knee arthroplasty are classified into three care sequences and two clinical categories, each one being treated with the same six parameters according to the International Classification of Functioning,

Disability and Health (WHO), while taking into account personal and environmental factors that could influence the needs of these patients.

Ricciardi, B. F., Oi, K. K., Daines, S. B., et al. (2017). "Patient and Perioperative Variables Affecting 30-Day Readmission for Surgical Complications After Hip and Knee Arthroplasties: A Matched Cohort Study." J Arthroplasty 32(4) : 1074-1079.
https://www.arthroplastyjournal.org/article/S0883-5403(16)30746-X/fulltext

BACKGROUND: Changes in reimbursement for total hip and knee arthroplasties (THA and TKA) have placed increased financial burden of early readmission on hospitals and surgeons. Our purpose was to characterize factors of 30-day readmission for surgical complications after THA and TKA at a single, high-volume orthopedic specialty hospital. METHODS: Patients with a diagnosis of osteoarthritis and who were readmitted within 30 days of their unilateral primary THA or TKA procedure between 2010 and 2014. Readmitted patients were matched to nonreadmitted patients 1:2. Patient and perioperative variables were collected for both cohorts. A conditional logistic regression was performed to assess both the patient and perioperative factors and their predictive value toward 30-day readmission. RESULTS: Twenty-one thousand eight hundred sixty-four arthroplasties (THA = 11,105; TKA = 10,759) were performed between 2010 and 2014 at our institution, in which 60 patients (THA = 37, TKA = 23) were readmitted during this 5-year period. The most common reasons for readmission were fracture (N = 14), infection (N = 14), and dislocation (N = 9). Thirty-day readmission for THA was associated with increased procedure time (P = .05), length of stay (LOS) shorter than 2 days (P = .04), discharge to a skilled nursing facility (P = .05), and anticoagulation use other than aspirin (P = .02). Thirty-day readmission for TKA was associated with increased tourniquet time (P = .02), LOS <3 days (P < .01), and preoperative depression (P = .02). In the combined THA/TKA model, a diagnosis of depression increased 30-day readmission (odds ratio 3.5 [1.4-8.5]; P < .01). CONCLUSION: Risk factors for 30-day readmission for surgical complications included short LOS, discharge destination, increased procedure/tourniquet time, potent anticoagulation use, and preoperative diagnosis of depression. A focus on risk factor modification and improved risk stratification models are necessary to optimize patient care using readmission rates as a quality benchmark.

Riggs, R. V., Roberts, P. S., Aronow, H., et al. (2010). "Joint replacement and hip fracture readmission rates: impact of discharge destination." Pm r 2(9) : 806-810.

OBJECTIVE: To determine if discharge destination after hospitalization for hip replacement or repair influences the hospital readmission rate. DESIGN: A retrospective cohort study that included consecutive patients with a primary diagnosis of hip replacement or repair who were discharged from the acute hospital in a 3-year period. SETTING: Urban academic nonprofit hospital. PATIENTS: Data for 606 orthopedic patients discharged alive from the acute hospital between January 2004 and September 2006 were abstracted from the University Health-System Consortium (UHC) Clinical DataBase/Resource Manager clinical database for the study hospital. MAIN OUTCOME MEASURES: Unplanned readmission rate to the study-site hospital within 180 days after discharge after hip replacement or repair. RESULTS: Unplanned readmission within 180 days occurred at a rate of 8.3% and varied significantly by discharge destination: home 5.1%, home with home health care services 10.5%, skilled nursing facility 12.3%, inpatient rehabilitation 4.2%, and other 42.9%. Variables from the surgical admission that were significantly associated with higher risk of readmission included admission severity, burden of comorbidities, any days in the intensive care unit, long length of stay, and cost. When controlling for multiple independent risk factors, discharge to inpatient rehabilitation (P = .015) remained a significant independent predictor

of lower risk of readmission within 180 days. CONCLUSION: Discharge to acute inpatient rehabilitation was associated with a lower risk of hospital readmission. Identification of patients with orthopedic procedures who may benefit from inpatient rehabilitation and further medical management before discharge from the acute hospital may be an important strategy in prevention of hospital readmission.

Rissman, C. M., Keeney, B. J., Ercolano, E. M., et al. (2016). "Predictors of Facility Discharge, Range of Motion, and Patient-Reported Physical Function Improvement After Primary Total Knee Arthroplasty: A Prospective Cohort Analysis." J Arthroplasty 31(1) : 36-41.

BACKGROUND: Patients are discharged to home or inpatient settings after primary unilateral total knee arthroplasty (TKA). Few studies have compared patient outcomes following these 2 rehabilitation models for TKA patients. We identified predictors of inpatient discharge, 3-month postoperative range of motion (ROM), and 3-month postoperative patient-reported physical function improvement (Veterans RAND 12-Item Physical Component Score [PCS]) between these discharge settings. METHODS: We studied prospectively collected cohort data for 738 TKAs between April 2011 and April 2013 at a high-volume tertiary academic medical center in a rural setting. All patients followed a standardized care pathway that involved prospective data collection as part of routine clinical care. Adjusting variables included age, sex, preoperative PCS, surgeon, modified Charlson Comorbidity Index, preoperative body mass index, laterality, and preoperative ROM; the 3-month models also included length of stay and discharge disposition as adjusters. RESULTS: Significant adjusted predictors of inpatient discharge included older age, female sex, surgeon, comorbidity, lower PCS, and body mass index greater than 40. Only lower preoperative ROM predicted postoperative ROM. Inpatient discharge and higher preoperative PCS predicted lower PCS improvement. Home-based rehabilitation was associated with greater 3-month PCS improvement and showed no difference with 3-month ROM. CONCLUSION: Discharge to home-based rehabilitation after TKA, rather than inpatient facility, is associated with higher physical function at 3 months postsurgery and shows no difference with 3-month ROM. Total knee arthroplasty inpatient discharge should be based on patient care requirements rather than perceived benefit of improved ROM and physical function.

Royse, C. F., Williams, Z., Ye, G., et al. (2014). "Knee surgery recovery: Post-operative Quality of Recovery Scale comparison of age and complexity of surgery." Acta Anaesthesiol Scand 58(6) : 660-667.

BACKGROUND: Initial validation and feasibility for the Post-operative Quality of Recovery Scale (PQRS) was published in 2010. Ongoing validation includes studies to determine whether this scale can discriminate differences in recovery between cohorts. METHODS: A prospective cohort study included 61 patients, 18-40 years, and 61 patients, aged >/= 65 years, undergoing knee arthroscopy under general anaesthesia; and 13 patients, aged >/= 65 years, undergoing total knee replacement under general anaesthesia. Patients were assessed using the PQRS. Assessments were performed pre-surgery, at 15 and 40 min, 1 and 3 days, and 3 months after surgery. RESULTS: The effect of age was assessed by comparing young versus older arthroscopy patients. There were minimal differences in recovery profiles, other than for the nociceptive domain, where pain recovery was significantly better in the older arthroscopy patients ($P < 0.001$). The effect of surgery was assessed by comparing older patients undergoing knee arthroscopy with knee replacement patients. Recovery was significantly worse for the knee replacement group for cognition ($P = 0.015$), nociception (pain and nausea, $P < 0.001$), activities of daily living ($P < 0.001$), emotive recovery ($P = 0.029$), and all-domains recovery ($P < 0.001$). Despite differences in quality of recovery,

satisfaction was high in all cohorts. CONCLUSIONS: Knee replacement had a large effect on recovery compared with knee arthroscopy. Age had minimal effect on recovery after knee arthroscopy. The study showed the ability of the PQRS to discriminate recovery in different domains.

Salmon, P., Hunt, G. R., Murthy, B. V., et al. (2013). "Patient evaluation of early discharge after hip arthroplasty: development of a measure and comparison of three centres with differing durations of stay." Clin Rehabil 27(9) : 854-863.

OBJECTIVE: We compared patients' evaluation of care between a surgical unit with a rapid discharge policy and two comparison units to test the hypothesis that the centre with rapid discharge has outcomes that are not inferior to those of the comparison sites. DESIGN: Cross-sectional cohort study. SUBJECTS: Consecutive consenting patients undergoing primary hip arthroplasty during 12 months in: a unit that had reduced postoperative stay to median three days; a specialised orthopaedic surgery treatment centre with median stay of five days; a traditional unit with median stay of six days (N = 316, 125, 119, respectively). METHODS: Six weeks postoperatively, patients completed a specially developed questionnaire measuring their evaluation of care and recovery, together with measures of function and quality of life for validation purposes. RESULTS: Factor analysis of questionnaire responses identified two independent components of patients' evaluation: problems in staff care and problems in physical recovery. Neither component was impaired in the unit with rapid discharge: similar proportions of patients reported recovery problems in each site (odds radios (ORs) for the two comparators versus unit with rapid discharge: 0.96, 1.18); and more patients reported care problems in the two comparator sites (ORs 2.97, 2.16). CONCLUSION: Duration of stay after primary hip arthroplasty can be reduced to three days without intensive pre- or postoperative care, without detriment to patient evaluation.

Sassoon, A., D'Apuzzo, M., Sems, S., et al. (2013). "Total hip arthroplasty for femoral neck fracture: comparing in-hospital mortality, complications, and disposition to an elective patient population." J Arthroplasty 28(9) : 1659-1662.

Patients treated with total hip arthroplasty (THA) for osteoarthritis (OA) and femoral neck fracture (FNF) between 1990-2007 were compared using the National Hospital Discharge Survey (NHDS). In-hospital, post-operative complications and disposition were compared at six-year intervals to establish trends over time. A total of 2,160,061 THAs were performed for OA, while 174,641 were performed for FNF. Peri-operative mortality and pulmonary embolism rates following elective THA were lower at each interval when compared to THA performed for FNF (P<0.001). Hematomas, infections, and dislocations were also higher in the traumatic group. The FNF group showed improvements with respect to mortality and rates of pulmonary embolism, infection, and dislocation over time. During the most recent interval, there was no difference in dislocation rates between the two groups. The length of stay and the percentage of patients discharging to a rehab facility were significantly higher in the FNF group at each time interval.

Scharli, M., Hantikainen, V. et Bischofberger, I. (2013). "[Hospital discharge preparation: enhancing self-care competence of patients after minimally invasive hip arthroplasty]." Pflege 26(5) : 303-310.

Increasing numbers of hip replacement implant surgeries in Switzerland today are minimally invasive. Patients undergoing such procedures become mobile faster and are discharged from hospital to home within an average of four days. Using a qualitative descriptive design, this study examined how post-operative self-care is taught to patients in the orthopaedic

department of a rehabilitation hospital after a minimally invasive hip arthroplasty and explored ways to optimise such teaching methods. Data were collected by conducting three focus groups with nine nursing professionals and expert interviews with the chief surgeon and the assigned physiotherapist. Data were analysed by using qualitative content analysis procedures. Results showed that teaching to enhance self-care competence of patients was not carried out systematically. Instead, the primary focus was to inform and prescribe rather than empower patients. Empowerment, however, would be necessary to assure adherence to the treatment regime. Hospital discharge often takes place surprisingly early and prevents assessment-based counselling of patients. The researchers concluded that the introduction of the minimally invasive surgical technique requires that the multidisciplinary rehabilitation team adapts its teaching methods. Self-care confidence in patients should be enhanced by following participatory clinical pathways. This demands modification in discharge and rehabilitation teaching plans to make them patient-oriented, and the plans should be supported by the entire team and the management.

Schweppe, M. L., Seyler, T. M., Plate, J. F., et al. (2013). "Does surgical approach in total hip arthroplasty affect rehabilitation, discharge disposition, and readmission rate?" Surg Technol Int 23 : 219-227.

There is a substantial preoccupation with different surgical approaches and minimally invasive techniques that may improve clinical outcomes for patients who undergo total hip arthroplasty. This study assessed the impact on hospital-related outcomes of the direct anterior approach (DAA) compared with the posterior approach (PA) performed by a single surgeon in 100 consecutive patients in each cohort. Patient age was similar in the DAA (61 +/- 1.1 years) compared with the PA (62 +/- 1.3, p = 0.733); however, BMI tended to be lower in DAA patients (29.1 +/- 0.8) compared with PA patients (31.3 +/- 0.7, p = 0.057). The DAA compared with the PA was associated with significantly less blood loss (285 +/- 15 vs. 367 +/- 21ml, p = 0.002) and transfusions (18 vs. 39 units, p = 0.009), less narcotic usage on postoperative days 1-3 (101 +/- 12 vs. 146 +/- 12 morphine equivalent dose, p = 0.010), a quicker hospital discharge (70 +/- 3.3 vs. 97 +/- 5.5 hours, p < 0.001), and a more favorable disposition (97% vs. 84% discharged home, p = 0.003). Thirty-day readmission rate was significantly higher with the PA (9%) compared with the DAA (1%, p = 0.030). The number of cups in the safe zone (5 degrees to 25 degrees anteversion and 30 degrees to 50 degrees inclination) was significantly higher with the DAA (92%) compared with the PA (75%, p = 0.002), possibly attributed to fluoroscopy used with the DAA. The DAA muscle-preservation technique may have led to the benefits observed in this study compared with the muscle-splitting technique associated with the PA.

Sedrakyan, A., Kamel, H., Mao, J., et al. (2016). "Hospital Readmission and Length of Stay Over Time in Patients Undergoing Major Cardiovascular and Orthopedic Surgery: A Tale of 2 States." Med Care 54(6) : 592-599.

BACKGROUND: Readmission and length of stay (LOS) are increasingly accepted as quality measures for surgical care. Centers for Medicare & Medicaid Services will soon assess penalties for excessive readmissions after coronary artery bypass graft (CABG) surgery and hip and knee replacements. OBJECTIVE: To determine and compare population level changes in LOS and relationship with 30-day readmission over time for patients undergoing CABG and hip and knee replacements. Secondary objective was to determine relationship between LOS and discharge disposition as well as mortality. RESEARCH DESIGN: Observational cohort study of patients undergoing CABG and hip and knee replacements in New York and California. Temporal trends in LOS, discharge disposition, 30-day readmission, and mortality were

examined. Generalized linear-mixed models, accounting for hospital clustering, were used to assess differences in outcomes. SUBJECTS: Patients undergoing CABG and hip and knee replacements in New York and California between 2005 and 2011. MEASURES: Trends in LOS, discharge disposition, 30-day readmission and mortality, and risk-adjusted odds of all-cause 30-day readmission. RESULTS: We identified 206,784, 336,271, and 416,391 patients who underwent CABG, hip, and knee replacements, respectively, in New York State and California between 2005 and 2011. The risks of readmission within 30 days decreased over time in both states. LOS decreased by 1 day after hip and knee surgery and remained unchanged after CABG. Adjusted analysis confirmed these trends. In secondary analyses patients in New York had higher overall odds of 30-day readmission compared with patients in California. CONCLUSIONS: We found no evidence of inverse relationship between LOS and readmission over time. In hip and knee replacement there is strong evidence that both LOS and readmission have been reduced simultaneously.

Sharareh, B., Le, N. B., Hoang, M. T., et al. (2014). "Factors determining discharge destination for patients undergoing total joint arthroplasty." J Arthroplasty 29(7) : 1355-1358.e1351.

Discharge destination to skilled nursing facilities (SNF) following total joint arthroplasty (TJA) plays an important role in healthcare costs. The pre-operative, intra-operative, and post-operative factors of 50 consecutive patients discharged to an SNF following TJA were compared to that of 50 consecutive patients discharged to home. Patients discharged to SNFs had slower pre-operative Get Up and Go scores (TGUG), lower pre-operative EQ-5D scores, higher ASA scores, increased hospital length of stay, increased self-reported post-operative pain, and decreased physical therapy achievements. We believe that the results of this study indicate that patients who get discharged to SNFs fit a certain criteria and this may be used to guide post-operative discharge destination during pre-operative planning, which can help lower costs while helping decrease the length of inpatient stay.

Sher, A., Keswani, A., Yao, D.-H., et al. (2017). "Predictors of Same-Day Discharge in Primary Total Joint Arthroplasty Patients and Risk Factors for Post-Discharge Complications." J Arthroplasty 32(9S) : S150-S156.e151.
https://www.arthroplastyjournal.org/article/S0883-5403(16)30902-0/fulltext

BACKGROUND: Same-day (<24 h) discharge total joint arthroplasty (TJA) may be a safe and effective option for certain patients with end-stage osteoarthritis. Given the growing pressure to improve quality and lower TJA episode costs, surgeons must identify which TJA patients can be appropriately discharged home quickly and safely. This study identifies characteristics associated with same-day discharge post-TJA as well as assesses risk factors for complications in this select patient population. METHODS: Bivariate and multivariate analyses were performed using perioperative variables from the 2011 to 2014 National Surgical Quality Improvement Program database. RESULTS: In total, 7474 primary TJAs among 120,847 TJA patients were discharged within 24 h post-surgery. These patients were more likely to be younger (<50 years), male sex, American Society of Anesthesiologists class 1 or 2, and less likely to be obese or taking steroids (P < .05 for all). They were also less likely to have co-morbidities. Rates of severe adverse event (SAE) or unplanned readmission post-discharge were 1.3% and 1.9%, respectively. Multivariate analysis identified age >80 (odds ratio [OR] 4.16, P = .001), smoking (OR 1.61, P = .03), bleeding-causing disorders (OR 2.56, P = .01), American Society of Anesthesiologists class 3 or 4 (OR 1.42, P < .05), and SAE pre-discharge (OR 13.13, P < .0001) as independent predictors for adverse events or readmission in this population. CONCLUSION: Patient characteristics, co-morbidities, and SAEs pre-discharge can be used to assess potential for discharge within 24 h. The results of our

analysis may be used to develop risk stratification tools for identification of patients that are truly appropriate for same-day discharge TJA.

Siciliani, L., Sivey, P. et Street, A. (2013). "Differences in Length of Stay for Hip Replacement between Public Hospitals, Specialised Treatment Centres and Private Providers: Selection or Efficiency?" Health Economics 22(2) : 234-242.
https://onlinelibrary.wiley.com/doi/abs/10.1002/hec.1826

We investigate differences in patients' length of stay between National Health Service (NHS) public hospitals, specialised public treatment centres and private treatment centres that provide elective (non-emergency) hip replacement to publicly funded patients. We find that the specialised public treatment centres and private treatment centres have, on average, respectively 18% and 40% shorter length of stay compared with NHS public hospitals, even after controlling for differences in age, gender, number and type of diagnoses, deprivation, and regional variation. Therefore, we interpret such differences as because of efficiency as opposed to selection of less complex patients. Quantile regression suggests that the proportional differences between different provider types are larger at the higher conditional quantiles of length of stay.

Siebens, H. C., Sharkey, P., Aronow, H. U., et al. (2016). "Variation in Rehabilitation Treatment Patterns for Hip Fracture Treated With Arthroplasty." Pm r 8(3) : 191-207.

BACKGROUND: Recommendations for health care redesign often advocate for comparative effectiveness research that is patient-centered. For patients who require rehabilitation services, a first step in this research process is to understand current practices for specific patient groups. OBJECTIVE: To document in detail the physical and occupational therapy treatment activities for inpatient hip fracture rehabilitation among 3 patient subgroups distinguished by their early rate of functional recovery between time of surgery to rehabilitation admission. DESIGN: Multicenter prospective observational cohort, practice-based evidence, study. SETTING: Seven skilled nursing facilities and 11 inpatient rehabilitation facilities across the United States. PARTICIPANTS: A total of 226 patients with hip fractures treated with hip arthroplasty. METHODS: Comparisons of physical and occupational therapy treatment activities among 3 groups with different initial recovery trajectory (IRT) rates (slower, moderate, faster). MAIN OUTCOME MEASURE(S): Percent of patients in each IRT group exposed to each physical and occupational therapy activity (exposure), and mean minutes per week for each activity (intensity). RESULTS: The number of patients exposed to different physical or occupational therapy activities varied within the entire sample. More specifically, among the 3 IRT groups, significant differences in exposure occurred for 44% of physical therapy activities and 39% of occupational therapy activities. More patients in the slower recovery group, IRT 1, received basic activities of daily living treatments and more patients in the faster recovery group, IRT 3, received advanced activities. The moderate recovery group, IRT 2, had some treatments similar to IRT 1 group and others similar to IRT 3 group. CONCLUSIONS: Analyses of practice-based evidence on inpatient rehabilitation of hip fracture patients treated with arthroplasty identified differences in therapy activities among three patient groups classified by IRT rates. These results may enhance physiatrists', other physicians', and rehabilitation teams' understanding of inpatient rehabilitation for these patients and help design future comparative effectiveness research.

Sikora-Klak, J., Zarling, B., Bergum, C., et al. (2017). "The Effect of Comorbidities on Discharge Disposition and Readmission for Total Joint Arthroplasty Patients." J Arthroplasty 32(5) : 1414-1417.

BACKGROUND: As the annual demand and number of total joint arthroplasty cases increase, so do concerns of outcomes of patient with specific comorbidities relative to outcomes and costs of care. METHODS: The study cohort included 2009 primary total knee arthroplasty (TKA) patients and 905 total hip arthroplasty patients. Discharge disposition was classified as discharge to any facility or home. The comorbidities of the patients who were readmitted and those without a 90-day event were also evaluated. RESULTS: In the TKA population, age, female gender, nonsmoking status, venous thromboembolism (VTE) history, and diabetes were significantly associated with discharge to extended care facility (ECF) on univariate analysis, unlike body mass index. With multivariate analyses, female gender, age, VTE history, and diabetes were associated with ECF placement, but smoking was not. In the total hip arthroplasty population, age, female gender, and nonsmoking status were significantly associated with discharge to ECF on univariate analysis, whereas body mass index, diabetes, and VTE history were not. On multivariate analyses, female gender and age were associated with ECF, but smoking was not. The only significant finding for the readmission data was an increased rate of readmission for TKA patients of older age. CONCLUSION: The potential of projecting patient discharge and readmission allows physicians to counsel patients and improve patient expectations.

Siljander, M. P., Cross, J., Koueiter, D. M., et al. (2019). "Order of Total Hip or Total Knee Arthroplasty Does Not Affect Length of Stay or Discharge Disposition in Patients With Coexisting Hip and Knee Arthritis." Orthopedics 42(6) : e528-e531.
https://www.healio.com/orthopedics/journals/ortho/2019-11-42-6/%7Ba24e2d57-fce4-474f-a886-8f2163ece7ef%7D/order-of-total-hip-or-total-knee-arthroplasty-does-not-affect-length-of-stay-or-discharge-disposition-in-patients-with-coexisting-hip-and-knee-arthritis

Primary total joint arthroplasty (TJA) of the hip and knee are effective procedures for improving pain and function in patients with arthritis. This study examined whether order of surgery (TKA or THA first) affects length of stay (LOS) and discharge disposition among patients with coexisting knee and hip arthritis. A total joint arthroplasty database review was performed to collect all available data for arthroplasties performed at 2 campuses of a single institution between July 2013 and April 2017. Inclusion criteria were patients who underwent both primary THA and TKA within 18 months and were age 18 years or older. Patients were divided into 2 groups based on whether THA or TKA was performed first. For all procedures, the following data were collected: age, body mass index (BMI), time between cases, LOS, discharge disposition, and the number of 90-day adverse postoperative events. Adverse 90-day events included deep infection, fracture, hardware failure, urinary tract infection, other return to the operating room, emergency department visit, readmission, or death. A total of 211 patients underwent both THA and TKA within 18 months; 124 patients underwent THA first and 87 underwent TKA first. There was no difference in age or BMI between the 2 groups. There was a significantly longer time between the first and second arthroplasty in patients with TKA first by a mean of 2 months (P=.001). There was no difference in 90-day adverse postoperative events following THA whether done first or second (P=.371), and no difference in 90-day events following TKA whether done first or second (P=.524). There was no difference in discharge disposition (P=.833 and P=.395) or LOS (P=.695 and P=.473) between groups for the first or second procedure, respectively. In a patient with coexisting hip and knee arthritis, the current results do not support recommending THA or TKA first based on cost related to LOS and discharge disposition. [Orthopedics. 2019; 42(6):e528-e531.].

Sisko, Z. W., Lu, M. et Puri, L. (2016). "The 72-Hour Medicare Mandate After Total Joint Arthroplasty: Is This Medically Necessary?" J Arthroplasty 31(5) : 947-951.

> INTRODUCTION: Currently, Medicare total joint arthroplasty patients are required to stay postoperatively 3 days in the hospital before discharge to a skilled nursing facility (SNF). We evaluated Medicare's mandated 3-night hospital stay rule to find out how many total joint arthroplastic patients are safe for discharge to SNFs on postoperative day 2 (POD2). METHODS: This is a retrospective case series analyzing Medicare primary total hip or total knee arthroplastic patients at a single hospital over 1 year. Patients meeting 15 separate criteria by POD2 were considered safe for discharge home rather than to a SNF. RESULTS: Of 259 patients, 47.88% met discharge criteria to SNF POD2. 31.66% did not meet 1, 13.13% did not meet 2, and 6.95% did not meet >/=3 criteria on POD2. Common criteria delaying discharge were blood pressure abnormalities, increasing or elevated white blood cell count, cardiac abnormalities, and fever. Thirty-day readmission rate for patients in the group safe for discharge POD2 was 1.75%. CONCLUSION: Of the total, 47.88% of patients required to stay by the Medicare 3-night stay rule were safe for discharge to SNF on POD2 without an increase in readmission rate at 30 days when compared to our institutional mean.

Sjøveian, A. K. H. et Leegaard, M. (2017). "Hip and knee arthroplasty - patient's experiences of pain and rehabilitation after discharge from hospital." Int J Orthop Trauma Nurs 27 : 28-35. https://www.sciencedirect.com/science/article/abs/pii/S187812411730014X?via%3Dihub

> BACKGROUND: Fast-track clinical pathways for hip and knee arthroplasty is being implemented in several western countries. The treatment entails patient involvement, optimal pain management, intensive mobilization and early discharge. Limited research has been carried out on patient's experiences after discharge. PURPOSE: The purpose of the study is to describe how patients experience pain and manage the rehabilitation process the first six weeks after discharge. METHOD: The study followed a qualitative descriptive design. Semi-structured interviews were conducted with 12 participants three months after discharge from hip or knee arthroplasty. FINDINGS: Patients experienced varying degrees of pain the first three to five weeks after discharge. Walking-training and sleep were affected by pain or stiffness in joints and muscles, and several needed help from family members to perform activities of daily living (ADL). Several participants would have like more individualized information about pain and exercises before discharge. Some experienced that the municipal care services failed to follow up on issues related to pain. CONCLUSION: The study illuminates that patients may need more individualized and adapted information prior to discharge, as well as more multidisciplinary follow-up by doctors, physiotherapists and possibly home care nurses. We recommend more studies examining how patients experience pain and rehabilitation during the first weeks after completing arthroplasty.

Slover, J., Mullaly, K., Karia, R., et al. (2017). "The use of the Risk Assessment and Prediction Tool in surgical patients in a bundled payment program." Int J Surg 38 : 119-122.

> OBJECTIVES: The purpose of this study was to evaluate the relationship between the Risk Assessment and Predictor Tool (RAPT) and patient discharge disposition in an institution participating in bundled payment program for total joint replacement, spine fusion and cardiac valve surgery patients. METHOD: Between April 2014 and April 2015, RAPT scores of 767 patients (535 primary unilateral total joint arthroplasty; 150 cardiac valve replacement; 82 spinal fusions) were prospectively captured. Total RAPT scores were grouped into three levels for risk of complications: <6 = 'high risk', between 6 and 9 = 'medium risk', and >9 = 'low risk' for discharge to a post-acute facility. Associations between RAPT categories and

patient discharge to home versus any facility were conducted. Multivariate analysis was performed to determine if there was any correlation between RAPT score and discharge to any facility. RESULTS: 70.5% of total joint patients, 80.7% of cardiac valve surgery patients and 70.7% of spine surgery patients were discharged home rather than to a post-acute facility. RAPT risk categories were related to discharge disposition as 72% of those in the high risk group were discharged to a facility and 91% in the low risk group were discharged to home in the total joint replacement cohort. In the cardiac cohort, only 33% of the high risk group was discharged to a facility, and 94% of the low risk group was discharged to home. In the spinal fusion cohort, 60% of those in the high risk group were discharged to a facility and 86% in the low risk group were discharged to home. Multivariate analysis showed that being in the high risk category versus low risk category was significantly associated with substantially increased odds of discharge to a facility. CONCLUSION: The RAPT tool has shown the ability to predict discharge disposition for total joint and spine surgery patients, but not cardiac valve surgery patients, where the majority of patients in all categories were discharged home, at an institution participating in a bundled payment program. The ability to identify discharge disposition pre-operatively is valuable for improving care coordination, directing care resources and establishing and maintaining patient and family expectations.

Spieser, A., Mittag, O., Bruggemann, S., et al. (2012). "[Acceptance and practicability of the rehab therapy standards for rehabilitation after total hip and knee arthroplasty - findings of a user survey of the pilot version]." Rehabilitation (Stuttg) 51(4) : 229-236.

Implementation of the pilot version of the rehab therapy standards for rehabilitation following total hip or knee replacement was accompanied by a user survey. This survey allowed rehab centres to comment on the standards and suggest changes.Early 2010 a total of 160 rehab centres that had treated at least 50 German Pension Fund insurees following total hip or knee replacement in 2008 received a written survey together with an overview of performance data according to KTL (Classification of Therapeutic Procedures), data that reflect the degree to which the centres had complied with the requirements of the therapy standards.69% of the centres returned the questionnaire. The centres included predominantly agreed that the rehab standards fulfil the quality attributes "scientific foundation (evidence)", "relevance for day-to-day work", "up-to-dateness", and "inter- and multidisciplinary development". There were no statistically significant differences between centres with previously high or low compliance with the requirements of the standards relative to the ratings given for these global quality criteria. Almost all responders considered comprehensiveness and structure of the standards adequate. Between 55 and 94% found that therapeutic procedures were sufficiently represented by the treatment modules. Minimum percentages of patients requiring the respective treatment were considered adequate for 8 out of 13 modules. Responders suggested restricting continuous passive motion to knee replacement. Psychological interventions were considered less important. Among the main reasons for non-adherence to therapy standards in 2008 were: coding problems, too high demands, contraindications, and shortage of staff. Implementation of the standards was associated with both positive and negative expectations on the part of the rehab centres; an issue raised in addition was the effort involved in internal restructuring.The results of the user survey show that the concept of the rehab standards and its implementation basically are accepted. Criticism had mainly concerned continuous passive motion and the need for psychological interventions. Coding problems should not be overrated since the underlying performance data referred to a period of time before the standards were implemented. General appraisal of the rehab standards was independent of previous performance. This emphasizes the weight of user feedback. The rehab standards already have been revised in light of the results of the user survey.

Stone, A. H., Dunn, L., MacDonald, J. H., et al. (2018). "Reducing Length of Stay Does Not Increase Emergency Room Visits or Readmissions in Patients Undergoing Primary Hip and Knee Arthroplasties." J Arthroplasty 33(8) : 2381-2386.
https://www.arthroplastyjournal.org/article/S0883-5403(18)30301-2/fulltext

BACKGROUND: Total hip and total knee arthroplasty (total joint arthroplasty [TJA]) are 2 of the most common elective surgeries. Identifying which patients are at highest risk for emergency room (ER) visits or readmissions within 90 days of surgery and the reasons for return are crucial to formulate ways to decrease these visits and improve patient outcomes. METHODS: This is a retrospective review of a consecutive series of 7466 unilateral primary TJA performed from July 2013 to June 2017; any patients who had an ER visit or readmission in the first 90 days after surgery were identified, and a detailed chart review was performed. Patients discharged home or to rehab were analyzed separately. RESULTS: Three hundred thirty-six (4.5%) patients had 380 ER visits and 250 (3.3%) patients had 291 readmissions in the first 90 days after TJA. Patients returning to the ER were equivalent to those who did not. Patients who went to a rehab facility on discharge were significantly more likely to be readmitted (P = .000). Patients who were readmitted had a higher American Society of Anesthesiologists score (P = .000). Length of stay decreased over the study period from 2.66 days to 1.63 days, while the number of unplanned interventions remained steady. Pain and swelling was the most common reason for return for ER visits (33.2%) and readmissions (14.1%). CONCLUSION: The overall number of unplanned interventions after TJA in this population was low and remained consistent over time despite decreasing length of stay. Patients who went to rehab were more likely to experience readmission. The majority of unplanned interventions occurred in the first 4 weeks after surgery.

Styron, J. F., Koroukian, S. M., Klika, A. K., et al. (2011). "Patient vs provider characteristics impacting hospital lengths of stay after total knee or hip arthroplasty." J Arthroplasty 26(8) : 1418-1426.e1411-1412.

This study aims to identify whether patient-level or provider-level characteristics are most influential on a patient's length of stay in the acute care hospital. A data set containing a nationally representative sample of inpatient discharge abstracts was used. Multilevel linear regression models were used to evaluate the associations between patient-level and provider-level characteristics on patients' lengths of stay. The target population included 322,894 discharges with a primary procedure code for primary total knee arthroplasty and 193,553 discharges for total hip arthroplasty. The variables associated with the greatest increases in length of stay were a higher comorbidity level among patient level attributes (+17.4%) and low surgeon volume among provider-level characteristics (+18.8%). Provider-level characteristics, particularly provider volume, had a greater impact on length of stay.

Suhm, N., Kaelin, R., Studer, P., et al. (2014). "Orthogeriatric care pathway : a prospective survey of impact on length of stay, mortality and institutionalisation." Arch Orthop Trauma Surg 134(9) : 1261-1269.

INTRODUCTION: Care pathways for elderly hip fracture patients are increasingly implemented but there has been only limited evaluation of their use. Our objective was to investigate the impact of such a care pathway on the use of healthcare resources and on patients' outcomes. MATERIALS AND METHODS: The prospective survey covered 493 hip fracture patients 65 years of age or older that were treated either before "Usual Care = (UC)" or after "Co-Managed-Care = (CMC)" implementation of the care pathway. Primary outcome

was length of stay (LoS). Secondary outcomes were 1-year mortality and change in residential status from prefracture baseline to 1-year after surgery. Data were analysed by descriptive and interferential statistics and adjustment for baseline differences amongst the two patient groups was done. RESULTS: Patients in the CMC sample had more preexisting comorbidities (CCI 2.5 versus 2.1). Prior to the fracture, a larger proportion amongst them needed help in ADL (49 versus 26%), and they were more likely to reside in a nursing home (36 versus 29%). Prefracture mobility status was equal in both samples. In the CMC sample LoS was significantly shorter (LoS 8.6 versus 11.3 days, p < 0.01) and patients were less likely to experience a complication (59 vs 73%, p < 0.01) while being in the hospital. There was no significant difference in 1-year mortality or in change of residential status. CONCLUSIONS: A care pathway for elderly hip fracture patients allowed decreased LoS without affecting mortality or change of residential status 1 year after fracture compared to prefracture baseline.

Sutton, J. C., 3rd, Antoniou, J., Epure, L. M., et al. (2016). "Hospital Discharge within 2 Days Following Total Hip or Knee Arthroplasty Does Not Increase Major-Complication and Readmission Rates." J Bone Joint Surg Am 98(17) : 1419-1428.

BACKGROUND: The rising costs of total knee arthroplasty (TKA) and total hip arthroplasty (THA) have resulted in a substantial economic burden on the U.S. health-care system. Recent efforts to contain these costs have targeted hospital length of stay. However, shorter hospital admissions have raised concerns over possible increases in complications and readmission rates. The purpose of this study was to assess whether early discharge, from 0 to 2 days postoperatively, was associated with increased 30-day major complications and readmissions compared with standard discharge, 3 to 4 days following THA or TKA. METHODS: The National Surgical Quality Improvement Program (NSQIP) database was queried to identify all patients who underwent an elective, primary unilateral THA or TKA between 2011 and 2012. For each procedure, 2 groups were created consisting of patients discharged from 0 to 2 days (early discharge) and those discharged from 3 to 4 days (standard discharge). Patient demographics and perioperative variables were compared between both discharge groups. Multivariable logistic-regression models were used to assess the independent effect of length of stay on 30-day major-complication and readmission rates. RESULTS: A total of 31,044 patients who underwent TKA and 19,909 patients who underwent THA were included. Overall, patients who were discharged early were younger and had fewer medical comorbidities and a lower American Society of Anesthesiologists (ASA) score. The multivariable logistic-regression model revealed that early discharge was not associated with increased odds of major complications following TKA (odds ratio [OR] = 0.95; 95% confidence interval [CI] = 0.75 to 1.20; p = 0.64). Furthermore, early discharge following THA was found to be an independent predictor against major complications (OR = 0.75; 95% CI = 0.58 to 0.95; p = 0.02). Lastly, early discharge was not an independent risk factor for hospital readmission following THA or TKA. CONCLUSIONS: Early discharge was not an independent risk factor for 30-day major complications or readmissions following THA or TKA. Rather, increased major complications and readmissions were attributed to patient comorbidities and perioperative variables. Early discharge within the first 2 days postoperatively for risk-stratified patients appears feasible without compromising patient care. LEVEL OF EVIDENCE: Prognostic Level III. See Instructions for Authors for a complete description of levels of evidence.

Tal-Akabi, A., Schmid, S. et Taeymans, J. (2013). "Determinants of inpatient rehabilitation length of stay and discharge modality after hip and knee replacement surgery in Switzerland - a retrospective observational study." Swiss Med Wkly 143 : w13832.

QUESTIONS UNDER STUDY / PRINCIPLES: The aims of this study were to identify the determinants influencing the inpatient rehabilitation length of stay (LoS) and discharge modality (DisMod) after hip or knee replacement surgery. METHODS: Data were retrieved for 306 patients (185 females, 121 males) who were admitted to a Swiss orthopaedic rehabilitation facility between 2007 and 2008 after hip or knee replacement surgery. LoS and DisMod were extracted from the medical files along with an additional seven binary and six continuous variables (including scores of timed-get-up-and-go [TUG], walking distance [WDT] and stair climbing tests [FIM_St]). Nonparametric procedures were used to detect differences between the gender groups. For the analysis of the LoS determinants, a linear regression model was used. The nonmotor performance test determinants of DisMod were analysed using a logistic regression model, whereas the motor performance test determinants were examined using binary classification. For both regression models, a backward procedure was used. RESULTS: Unlike DisMod, LoS calculations were conducted after stratification for gender. The simplified regression models explained 22% (females) and 31% (males) of the LoS variance and 20% (both genders) of the DisMod variance. TUG, WDT and FIM_St were all important predictors for LoS, whereas DisMod could be best predicted by WDT. CONCLUSIONS: Patients with good motor ability at admission were discharged earlier and more frequently to home. These findings might be of importance for preoperative physiotherapeutic care and might help to improve care planning as well as more accurately predict the access to inpatients beds and the allocation of resources.

Tayrose, G., Newman, D., Slover, J., et al. (2013). "Rapid mobilization decreases length-of-stay in joint replacement patients." Bull Hosp Jt Dis (2013) 71(3) : 222-226.

BACKGROUND: Physiotherapy after total joint replacement enhances postoperative recovery. Implementing a pathway to include earlier postoperative mobilization can reduce the hospital length-of-stay as well as cost. QUESTIONS: Does a rapid rehabilitation program con- sisting of physical therapy on the day of surgery affect the hospital length-of-stay on patients undergoing either total hip or total knee replacements? Is there a difference in the effectiveness of rapid rehabilitation between patients under- going Total Hip and Total Knee Replacements? Can these patients tolerate day of surgery physical therapy sessions? PATIENTS AND METHODS: Nine-hundred hip and knee arthro- plasty patients were divided into two groups for analysis. Group 1 participated in a rapid rehabilitation physical therapy program that began with physical therapists in the recovery room. Group 2 received a standard physical therapy protocol starting the day after surgery. Progression with rehabilitation was followed, and length of hospital stay between the two groups was compared. RESULTS: Total length-of-stay was 3.9 days for the rapid rehabilitation group and was 4.4 days ($p < 0.001$) for the standard therapy group. We found the rapid rehabilitation group had a significantly shorter length-of-stay than patients who began therapy on postoperative day one. In addition to decreased length-of-stay, rapid rehabilitation also resulted in direct savings considering fewer hospital resources were utilized over the decreased time in-house. CONCLUSIONS: Rapid mobilization of total joint replacement patients in the recovery room can be accomplished safely and reduces the overall length of hospital stay for over 70 % of patients.

Tessier, J. E., Rupp, G., Gera, J. T., et al. (2016). "Physicians With Defined Clear Care Pathways Have Better Discharge Disposition and Lower Cost." J Arthroplasty 31(9 Suppl) : 54-58.
https://www.arthroplastyjournal.org/article/S0883-5403(16)30135-8/fulltext

BACKGROUND: There is a pronounced need for a sustainable care model for total joint arthroplasty in the United States. Total hip and knee arthroplasty is expected to increase 673% by 2030, and Medicare is the payor for a majority of these episodes. Our objective was to compare orthopedic cohort groups with and without defined postacute care pathways and the effects of the care pathways on service utilization and cost for Medicare patients in the Bundled Payments for Care Improvement program. METHODS: Claims data for elective hip and knee arthroplasty episodes from a national bundled payments for care improvement database were the source of our study data. Independent reviewers were used to determine which groups had defined clinical pathways. The 2 cohort groups were then compared between those with defined clinical pathways and those without. Outcomes measures included postacute care costs, utilization rates (both frequency and length of time) for inpatient rehabilitation facilities, skilled nursing facilities, home health, and readmissions. RESULTS: Orthopedic physicians with defined postacute care pathways showed consistent decreases in cost and utilization as compared to physicians without defined postacute care pathways. Elective hip arthroplasty per episode cost differential was $3189 per episode between physicians with care pathways ($19,005) and those without ($22,195; P < .001). Elective knee arthroplasty per episode cost difference was $2466 per episode between physicians with care pathways ($18,866) and those without ($21,332; P < .001). Incident rates of utilization for postacute care services displayed significant differences between physicians with and without postacute care pathways. Physicians with defined postacute pathways demonstrated utilization reductions ranging from 7% to 79% with incident rate reductions ranging from 44% to 79%. CONCLUSION: The results suggest that orthopedic physicians with defined postacute care pathways affect discharge disposition. The findings show significant cost and utilization reductions for physicians with defined postacute care pathways.

Thygesen, L. C., Baixauli-Perez, C., Librero-Lopez, J., et al. (2015). "Comparing variation across European countries: building geographical areas to provide sounder estimates." Eur J Public Health 25 Suppl 1 : 8-14.
https://academic.oup.com/eurpub/article/25/suppl_1/8/476660

BACKGROUND: In geographical studies, population distribution is a key issue. An unequal distribution across units of analysis might entail extra-variation and produce misleading conclusions on healthcare performance variations. This article aims at assessing the impact of building more homogeneous units of analysis in the estimation of systematic variation in three countries. METHODS: Hospital discharges for six conditions (congestive heart failure, short-term complications of diabetes, hip fracture, knee replacement, prostatectomy in prostate cancer and percutaneous coronary intervention) produced in Denmark, England and Portugal in 2008 and 2009 were allocated to both original geographical units and new ad hoc areas. New areas were built using Ward's minimum variance methods. The impact of the new areas on variability was assessed using Kernel distribution curves and different statistic of variation such as Extremal Quotient, Interquartile Interval ratio, Systematic Component of Variation and Empirical Bayes statistic. RESULTS: Ward's method reduced the number of areas, allowing a more homogeneous population distribution, yet 20% of the areas in Portugal exhibited less than 100 000 inhabitants vs. 7% in Denmark and 5% in England. Point estimates for Extremal Quotient and Interquartile Interval Ratio were lower in the three countries, particularly in less prevalent conditions. In turn, the Systematic Component of Variation and Empirical Bayes statistic were slightly lower in more prevalent conditions. CONCLUSIONS: Building new geographical areas produced a reduction of the variation in hospitalization rates in several prevalent conditions mitigating random noise, particularly in the smallest areas and allowing a sounder interpretation of the variation across countries.

Tian, W., DeJong, G., Munin, M. C., et al. (2010). "Patterns of rehabilitation after hip arthroplasty and the association with outcomes: an episode of care view." Am J Phys Med Rehabil 89(11) : 905-918.

OBJECTIVES: To examine the patterns of rehabilitation after elective and nonelective hip arthroplasty and its association with outcomes over an episode of postacute care. DESIGN: Data were obtained from a multisite prospective observational cohort study and its companion follow-up study. Patterns of care were measured by the combination of settings of care where hip arthroplasty patients received rehabilitation therapy. Main outcome measure was motor portion of the functional independence measure. RESULTS: Approximately 90% of hip arthroplasty patients received rehabilitation care from more than one setting. Eight patterns of care were identified in the follow-up period. Patterns of subsequent care were driven more by initial setting than by etiology. Nonelective hip arthroplasty patients had lower motor functional independence measure scores and used more rehabilitation services than did elective hip arthroplasty patients. Patterns of care were modest factors (accounted for only 7% of variance) in predicting patient motor functional independence measure over an episode of postacute care. CONCLUSIONS: Etiology of hip arthroplasty is associated with amounts of rehabilitation care used and outcomes. After the initial postacute rehabilitation setting, patients continued to receive considerable amounts of therapy in various settings. It is important to look beyond a single setting of care to an entire episode of care when examining clinical outcomes.

Tomek, I. M., Sabel, A. L., Froimson, M. I., et al. (2012). "HA collaborative of leading health systems finds wide variations in total knee replacement delivery and takes steps to improve value." Health Aff. (Millwood.) 31(6) : 1329-1338.

Members of a consortium of leading US health care systems, known as the High Value Healthcare Collaborative, used administrative data to examine differences in their delivery of primary total knee replacement. The goal was to identify opportunities to improve health care value by increasing the quality and reducing the cost of that procedure. The study showed substantial variations across the participating health care organizations in surgery times, hospital lengths-of-stay, discharge dispositions, and in-hospital complication rates. The study also revealed that higher surgeon caseloads were associated with shorter lengths-of-stay and operating time, as well as fewer in-hospital complications. These findings led the consortium to test more coordinated management for medically complex patients, more use of dedicated teams, and a process to improve the management of patients' expectations. These innovations are now being tried by the consortium's members to evaluate whether they increase health care value

Trimba, R., Laughlin, R. T., Krishnamurthy, A., et al. (2016). "Hospital-Based Acute Care After Total Hip and Knee Arthroplasty: Implications for Quality Measurement." J Arthroplasty 31(3) : 573-578.e572.

BACKGROUND: Although hospital readmissions are being adopted as a quality measure after total hip or knee arthroplasty, they may fail accurately capture the patient's postdischarge experience. METHODS: We studied 272,853 discharges from 517 hospitals to determine hospital emergency department (ED) visit and readmission rates. RESULTS: The hospital-level, 30-day, risk-standardized ED visit (median = 5.6% [2.4%-13.7%]) and hospital readmission (5.0% [2.6%-9.2%]) rates were similar and varied widely. A hospital's risk-standardized ED visit rate did not correlate with its readmission rate (r = -0.03, P = .50). If ED visits were included in a broader "readmission" measure, 246 (47.6%) hospitals would change perceived performance groups. CONCLUSION: Including ED visits in a broader,

hospital-based, acute care measure may be warranted to better describe postdischarge health care utilization.

Tseng, M. Y., Shyu, Y. I. et Liang, J. (2012). "Functional recovery of older hip-fracture patients after interdisciplinary intervention follows three distinct trajectories." Gerontologist 52(6) : 833-842.

PURPOSE: To assess the effects of an interdisciplinary intervention on the trajectories of functional recovery among older patients with hip fracture during 2 years after hospitalization. DESIGN AND METHODS: In a randomized controlled trial with 24-month follow-up, 162 patients >60 years were enrolled after hip-fracture surgery at a 3,000-bed medical center in northern Taiwan. Patients received an interdisciplinary program of geriatric consultation, in-hospital and at-home rehabilitation, and discharge planning (n = 80) or usual care (n = 82). Patients' functional status was assessed by the Chinese Barthel Index before discharge and at 1, 3, 6, 12, 18, and 24 months after discharge. Covariates included demographic attributes, depressive symptoms, and cognitive functioning. Latent class growth modeling was used to examine distinctive groups of individual trajectories within the sample. RESULTS: Functional recovery followed 3 distinct paths, approximated by either a quadratic or cubic function over time. These paths were (a) poor recovery (6.8%), (b) moderate recovery (47.5%), and (c) excellent recovery (45.7%). The interdisciplinary intervention significantly reduced the likelihood of poor recovery (relative risk ratio [RRR] = 0.05, $p < .01$) and moderate recovery (RRR = 0.17, $p < .01$), relative to excellent recovery. In addition, the major risk factors for poor or moderate recovery were older age, lower prefracture physical functioning, as well as higher depression scores and lower cognitive functioning before discharge. IMPLICATIONS: Distinct trajectories of functional recovery can serve as useful outcome measures in clinical research and practice.

Unwin, O., Hassaballa, M., Murray, J., et al. (2017). "Minimally invasive surgery (MIS) for total knee replacement; medium term results with minimum five year follow-up." The Knee 24(2) : 454-459. http://www.sciencedirect.com/science/article/pii/S0968016017300315

AbstractBackground MIS TKA has been shown to offer a reduced in-patient stay, but no clinical difference at two years. Whilst there may be a benefit from earlier discharge, we need to ensure that there are no detrimental effects in the medium and long-term following MIS-TKA. To report the mid-term result from a prospective randomised controlled trial (RCT) comparing MIS-TKA with standard approach for TKA. Methods Using knee score questionnaires, we collected patient reported outcome measures (PROMs) regarding pain and function. Sixty-six patients (from an eligible cohort of 83 patients) completed the mid-term postal follow-up. Results There was no significant difference between groups for change in score from pre-operative to final follow-up in all three PROMs. Mean MIS and standard group improvement was: AKSS 53 and 51 ($p = 0.7644$), OKS 15 and 16 ($p = 0.2341$) or WOMAC 15 and 15 ($p = 0.9900$) respectively. Both groups showed improvement in pain and function with no significant difference between groups. There was no difference between groups for revision due to malalignment at a mean six year follow-up. Conclusions In addition to the early benefits regarding hospital stay and complications, we have found that at a mean of six years there was no increase in malalignment, pain or function with MIS techniques.

van den Belt, L., van Essen, P., Heesterbeek, P. J., et al. (2015). "Predictive factors of length of hospital stay after primary total knee arthroplasty." Knee Surg Sports Traumatol Arthrosc 23(6) : 1856-1862.

PURPOSE: To reduce post-operative length of hospital stay (PLOS) after primary total knee arthroplasty (TKA), the fast-track method was introduced which focusses on mobilising the patient within 2 h after surgery. The aim of this prospective study was to identify the factors that predict PLOS using the fast-track method. METHODS: In a consecutive series from July 2012 to November 2012, all patients who were admitted for a primary TKA (Genesis II prosthesis, Smith and Nephew, Memphis, TN) were included in a prospective study. Demographic and relevant preoperative, perioperative and post-operative parameters for PLOS were collected. Multivariate linear regression analysis was performed to identify predictive factors. RESULTS: In total, 240 patients were included (59.6% female) with a median age of 64.1 years (range 38-90). Median PLOS was 5 days (range 3-19). The predictive model suggested that ASA score (American Society of Anesthesiologists' physical status classification) wound exudate and range of motion (ROM) at the day of surgery (day 0) were significant predictive factors for PLOS using the fast-track procedure after TKA (adjusted R(2) = 0.43). CONCLUSIONS: Predictive factors for PLOS after TKA were ASA score, wound exudate and ROM at day 0. Adjustments in patient counselling, nursing ward, mode of physiotherapist training and discharge criteria regarding wound exudate may result in a further reduction of post-operative length of hospital stay. LEVEL OF EVIDENCE: Prognostic studies: high-quality prospective cohort study, Level I.

Van Den Eeden, Y. N., De Turck, B. J. et Van Den Eeden, F. M. (2017). "24 hours stay after hip replacement." Acta Orthop 88(1) : 24-28.

Background and purpose - The length of stay after total hip arthroplasty has been reduced to 2-4 days after implementing fast-track surgery. We investigated whether a new time-based patient-centered primary direct anterior approach (DAA) total hip arthroplasty (THA) treatment protocol in a specialized clinic, with a planned length of stay of about 24 hours, could be achieved in all patients or only in a selected group of patients. Patients and methods - We analyzed prospectively collected data in a cohort of 378 consecutive patients who underwent a primary direct anterior THA as a patient-centered time-based procedure between March 1, 2012 and December 31, 2015. Patients with complicated medical comorbidity and those over the age of 85 were excluded from the study. The average length of stay was recorded and all complications, re-admissions, and reoperations were registered and analyzed. The primary outcome measures were length of stay and complication rate, at discharge and 90 days postoperatively. Results - The average length of stay for all patients was 26 hours. All patients were discharged from the clinic on the day after the operation and were able to continue their recovery at home or in a rehabilitation facility. The overall complication rate within 3 months of surgery was 6%. The 3-month re-admission rate and the 3-month reoperation rate were both 2%. Interpretation - Performing a time-based, patient-centered fast-track program for DAA total hip arthroplasty can result in a standardized length of stay of about 24 hours and a high level of patient satisfaction with few complications, re-admissions, and reoperations.

van der Sluis, G., Goldbohm, R. A., Elings, J. E., et al. (2017). "Pre-operative functional mobility as an independent determinant of inpatient functional recovery after total knee arthroplasty during three periods that coincided with changes in clinical pathways." Bone Joint J 99-B(2) : 211-217. https://online.boneandjoint.org.uk/doi/abs/10.1302/0301-620X.99B2.BJJ-2016-0508.R1?journalCode=bjj

AIMS: To investigate whether pre-operative functional mobility is a determinant of delayed inpatient recovery of activities (IRoA) after total knee arthroplasty (TKA) in three periods that

coincided with changes in the clinical pathway. PATIENTS AND METHODS: All patients (n = 682, 73% women, mean age 70 years, standard deviation 9) scheduled for TKA between 2009 and 2015 were pre-operatively screened for functional mobility by the Timed-up-and-Go test (TUG) and De Morton mobility index (DEMMI). The cut-off point for delayed IRoA was set on the day that 70% of the patients were recovered, according to the Modified Iowa Levels of Assistance Scale (mILAS) (a 5-item activity scale). In a multivariable logistic regression analysis, we added either the TUG or the DEMMI to a reference model including established determinants. RESULTS: Both the TUG (Odds Ratio (OR) 1.10 per second, 95% confidence intervals (CI) 1.06 to 1.15) and the DEMMI (OR 0.96 per point on the 100-point scale, 95% CI 0.95 to 0.98) were statistically significant determinants of delayed IRoA in a model that also included age, BMI, ASA score and ISAR score. These associations did not depend on the time period during which the TKA took place, as assessed by tests for interaction. CONCLUSION: Functional mobility, as assessed pre-operatively by the TUG and DEMMI, is an independent and stable determinant of delayed inpatient recovery of activities after TKA. Future research, focusing on improvement of pre-operative functional mobility through tailored physiotherapy intervention, should indicate whether such intervention enhances post-operative recovery among high-risk patients. Cite this article: Bone Joint J 2017;99-B:211-17.

Vanhaecht, K., Bellemans, J., De Witte, K., et al. (2010). "Does the organization of care processes affect outcomes in patients undergoing total joint replacement?" J Eval Clin Pract 16(1) : 121-128. https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2753.2009.01130.x
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BACKGROUND: Surgeons realize that safe and efficient care processes for total joint replacement requires more than just well-performed operations. Orthopaedic teams are reorganizing care process to improve efficacy and shorten length of stay. Little is known on the impact of organizational changes on patient outcome. This paper studies the relation between the organization of care processes and patient outcomes in hip and knee. Clinical pathways are used as one of the methods to structure the care process. Although evidence is available on the effect of pathways in total joint replacement, their impact with the organization of the care process has not been studied previously. METHODS: A cross-sectional multicentre study was performed on 39 care processes and 737 consecutive patients. Regression models were used to analyse the relation between the organization of the care process and risk-adjusted patient outcomes. The use of pathways and the organization of the care process, measured by the Care Process Self Evaluation Tool (CPSET), were measured at organizational level. Length of stay, pain, mobility and elapsed time to discharge were measured at patient level. RESULTS: The use of pathways had a positive effect on four out of five subscales and the overall CPSET score. Using pathways decreased length of stay (P = 0.014), pain (P = 0.052) and elapsed time to discharge (P = 0.003). The CPSET subscale communication was related with three risk adjusted outcomes. Multivariate analysis demonstrated a significant effect by three different variables on the length of stay; (1) use of pathways; (2) coordination of care processes; and (3) communication with patients and family. Both the use of pathways and coordination of the care process were determinants for the elapsed time to discharge. A significant interaction effect was found between use of pathways and coordination of the care process. CONCLUSION: This large multicentre study revealed the relation between the use of pathways, organization of the care process and patient outcomes. This information is important for both clinicians and managers to understand and further improve the organization of orthopaedic care. LEVEL OF EVIDENCE: Level I prognostic study.

Villanueva-Martinez, M., Hernandez-Barrera, V., Chana-Rodriguez, F., et al. (2012). "Trends in incidence and outcomes of revision total hip arthroplasty in Spain: a population based study." BMC Musculoskelet Disord 13 : 37.

BACKGROUND: To analyze changes in incidence and outcomes of patients undergoing revision total hip arthroplasty (RTHA) over an 8-year study period in Spain. METHODS: We selected all surgical admissions in individuals aged >/= 40 years who underwent RTHA (ICD-9-CM procedure code 81.53) between 2001 and 2008 from the Spanish National Hospital Discharge Database. Age- and sex-specific incidence rates, Charlson co-morbidity index, length of stay (LOS), costs and in-hospital mortality (IHM) were estimated for each year. Multivariate analyses were conducted to asses time trends. RESULTS: 32,280 discharges of patients (13, 391 men/18, 889 women) having undergone RTHA were identified. Overall crude incidence showed a small but significant increase from 20.2 to 21.8 RTHA per 100, 000 inhabitants from 2001 to 2008 ($p < 0.01$). The incidence increased for men (17.7 to 19.8 in 2008) but did not vary for women (22.3 in 2001 and 22.2 in 2008). Greater increments were observed in patients older than 84 years and in the age group 75-84. In 2001, 19% of RTHA patients had a Charlson Index >/= 1 and this proportion rose to 24.6% in 2008 ($p < 0.001$). The ratio RTHA/THA remained stable and around 20% in Spain along the entire period. The crude overall in-hospital mortality (IHM) increased from 1.16% in 2001 to 1.77% ($p = 0.025$) in 2008. For both sexes the risk of death was higher with age, with the highest mortality rates found among those aged 85 or over. After multivariate analysis no change was observed in IHM over time. The mean inflation adjusted cost per patient increased by 78.3%, from 9, 375 to 16, 715 Euros from 2001 to 2008.After controlling for possible confounders using Poisson regression models, we observed that the incidence of RTHA hospitalizations significantly increased for men and women over the period 2001 to 2008 (IRR 1.10, 95% CI 1.03-1.18 and 1.08, 95% CI 1.02-1.14 respectively). CONCLUSIONS: The crude incidence of RTHA in Spain showed a small but significant increase from 2001 to 2008 with concomitant reductions in LOS, significant increase in co-morbidities and cost per patient.

Waugh, E. J., Badley, E. M., Borkhoff, C. M., et al. (2016). "Primary care physicians' perceptions about and confidence in deciding which patients to refer for total joint arthroplasty of the hip and knee." Osteoarthritis Cartilage 24(3) : 451-457.

OBJECTIVE: The purpose of this study is to examine the perceptions of primary care physicians (PCPs) regarding indications, contraindications, risks and benefits of total joint arthroplasty (TJA) and their confidence in selecting patients for referral for TJA. DESIGN: PCPs recruited from among those providing care to participants in an established community cohort with hip or knee osteoarthritis (OA). Self-completed questionnaires were used to collect demographic and practice characteristics and perceptions about TJA. Confidence in referring appropriate patients for TJA was measured on a scale from 1 to 10; respondents scoring in the lowest tertile were considered to have 'low confidence'. Descriptive analyses were conducted and multiple logistic regression was used to determine key predictors of low confidence. RESULTS: 212 PCPs participated (58% response rate) (65% aged 50+ years, 45% female, 77% >15 years of practice). Perceptions about TJA were highly variable but on average, PCPs perceived that a typical surgical candidate would have moderate pain and disability, identified few absolute contraindications to TJA, and overestimated both the effectiveness and risks of TJA. On average, PCPs indicated moderate confidence in deciding who to refer. Independent predictors of low confidence were female physicians (OR = 2.18, 95% confidence interval (CI): 1.06-4.46) and reporting a 'lack of clarity about surgical indications' (OR = 3.54, 95% CI: 1.87-6.66). CONCLUSIONS: Variability in perceptions and lack

of clarity about surgical indications underscore the need for decision support tools to inform PCP - patient decision making regarding referral for TJA.

Webster, F., Perruccio, A. V., Jenkinson, R., et al. (2013). "Where is the patient in models of patient-centred care: a grounded theory study of total joint replacement patients." BMC Health Serv Res 13 : 531.

BACKGROUND: Patient-centered care ideally considers patient preferences, values and needs. However, it is unclear if policies such as wait time strategies for hip and knee replacement surgery (TJR) are patient-centred as they focus on an isolated episode of care. This paper describes the accounts of people scheduled to undergo TJR, focusing on their experience of (OA) as a chronic disease that has considerable impact on their everyday lives. METHODS: Semi-structured qualitative interviews were conducted with participants scheduled to undergo TJR who were recruited from the practices of two orthopaedic surgeons. We first used maximum variation and then theoretical sampling based on age, sex and joint replaced. 33 participants (age 38-79 years; 17 female) were included in the analysis. 20 were scheduled for hip replacement and 13 for knee replacement. A constructivist approach to grounded theory guided sampling, data collection and analysis. RESULTS: While a specific hip or knee was the target for surgery, individuals experienced multiple-joint symptoms and comorbidities. Management of their health and daily lives was impacted by these combined experiences. Over time, they struggled to manage symptoms with varying degrees of access to and acceptance of pain medication, which was a source of constant concern. This was a multi-faceted issue with physicians reluctant to prescribe and many patients reluctant to take prescription pain medications due to their side effects. CONCLUSIONS: For patients, TJR surgery is an acute intervention in the experience of chronic disease, OA and other comorbidities. While policy has focused on wait time as patient/surgeon decision for surgery to surgery date, the patient's experience does not begin or end with surgery as they struggle to manage their pain. Our findings suggest that further work is needed to align the medical treatment of OA with the current policy emphasis on patient-centeredness. Patient-centred care may require a paradigm shift that is not always evident in current policy and strategies.

Weeks, W. B., Jardin, M., Dufour, J. C., et al. (2014). "Geographic Variation in Admissions for Knee Replacement, Hip Replacement, and Hip Fracture in France: Evidence of Supplier-induced Demand in For-Profit and Not-for-Profit Hospitals." Med Care 52(10) : 909-917.

INTRODUCTION: We sought to determine whether there was evidence of supplier-induced demand in mainland France, where health care is mainly financed by a public and compulsory health insurance and provided by both for-profit and not-for-profit hospitals. METHODS: Using a dataset of all admissions to French hospitals for 2009 and 2010, we calculated department-level age-adjusted and sex-adjusted per capita admission rates for hip replacement, knee replacement, and hip fracture for 2 age groups (45-64 and 65-99 y old), for-profit and not-for-profit hospitals. We used spatial regression analysis to examine the relationship between ecological variables, procedure rates, and supply of surgeons or sector-specific surgical beds. RESULTS: The large majority of hip and knee replacement surgeries were performed in for-profit hospitals, whereas the large majority of hip fracture admissions were in not-for-profit hospitals; nonetheless, we found approximately 2-fold variation in per capita rates of hip and knee replacement surgery in both age groups and settings. Spatial regression results showed that among younger patients, higher incomes were associated with lower admission rates; among older patients, higher levels of reliance on social benefits were associated with lower rates of elective surgery in for-profit hospitals. Although overall

surgical bed supply was not associated with admission rates, for-profit-specific and not-for-profit-specific bed supply were associated with higher rates of elective procedures within a respective hospital type. DISCUSSION: We found evidence of supplier-induced demand within the French for-profit and not-for-profit hospital systems; however, these systems appear to complement one another so that there is no overall national supplier-induced effect

Williams, J., Kester, B. S., Bosco, J. A., et al. (2017). "The Association Between Hospital Length of Stay and 90-Day Readmission Risk Within a Total Joint Arthroplasty Bundled Payment Initiative." J Arthroplasty 32(3) : 714-718.
https://pubmed.ncbi.nlm.nih.gov/27776899

BACKGROUND: To curb the unsustainable rise in health care expenses, health care payers are developing programs to incentivize hospitals and physicians to improve the value of care delivered to patients. Payers are utilizing various metrics, such as length of stay (LOS) and unplanned readmissions, to track progression of quality metrics. Relevant to orthopedic surgeons, the Centers for Medicare and Medicaid Services announced in 2015 the Comprehensive Care for Joint Replacement Payment Model-a program aimed at improving the quality of health care delivered to patients by shifting more of the financial risk of patient care onto providers. METHODS: We analyzed the medical records of 1329 consecutive lower extremity total joint patients enrolled in Centers for Medicare and Medicaid Services' Bundled Program for Care Improvement treated over a 21-month period. The goal of this study was to ascertain if hospital LOS is associated with unplanned readmissions within 90 days of admission for a total hip or knee arthroplasty. RESULTS: After controlling for multiple demographic variables including sex, age, comorbidities and discharge location, we found that hospital LOS greater than 4 days is a significant risk factor for unplanned readmission within 90 days (odd ratio = 1.928, P = .010). Total knee arthroplasty (TKA) and discharge to a location other than home are also independent risk factors for 90-day readmission. CONCLUSION: Our results demonstrate that increased LOS is a significant risk factor for readmission within 90 days of admission for a hip or knee arthroplasty in the Medicare population.

Williams, S. N., Wolford, M. L. et Bercovitz, A. (2015). "Hospitalization for Total Knee Replacement Among Inpatients Aged 45 and Over: United States, 2000-2010." NCHS Data Brief (210) : 1-8.

In 2010, total knee replacement was the most frequently performed inpatient procedure on adults aged 45 and over. In the 11-year period from 2000 through 2010, an estimated 5.2 million total knee replacements were performed. Adults aged 45 and over comprised 98.1% of those surgeries. This report uses data from the National Hospital Discharge Survey (NHDS) to present trends in the rate of hospitalizations for total knee replacement, mean age at hospitalization, and discharge status for inpatients aged 45 and over from 2000 through 2010.

Xie, F., Lo, N.-N., Tarride, J.-E., et al. (2010). "Total or Partial Knee Replacement? Cost-Utility Analysis in Patients with Knee Osteoarthritis Based on a 2-Year Observational Study." European Journal of Health Economics 11(1) : 27-34.
http://dx.doi.org/10.1007/s10198-009-0154-5

The objective of this study was to evaluate incremental cost-utility of total knee replacement (TKR) versus unicompartmental knee arthroplasty (UKA) in patients with knee osteoarthritis (OA) of the medial compartment. A 2-year non-randomised prospective observational cohort

study was conducted in unicompartmental knee osteoarthritis patients scheduled for TKR (n = 431) or UKA (n = 102). Costs were identified using administrative databases and health outcomes were measured using the SF-36 and the Oxford knee score (OKS) 1 week before, 6 months after, and 2 years after surgery. The incremental cost-utility ratio (ICUR) for TKR versus UKA was calculated and its 95% confidence interval estimated using a nonparametric bootstrapping technique. Cost-effectiveness acceptability curves were constructed from different perspectives. On average, from the societal perspective, the ICUR was US $65,245 per quality-adjusted life-year (QALY). In the scenario with costs calculated from the perspective of patients, the ICUR was $60,382/QALY. This value decreased to $4,860/QALY in the scenario with costs calculated from the governmental perspective. However, the 95% confidence interval of ICURs cannot be defined because more than 5% bootstrapped samples fell into the upper left quadrant of the cost-effectiveness plane from all three perspectives. Based on the 2-year data, TKR gained more QALYs at higher costs compared to UKA. A long-term prospective study is necessary to determine cost-effectiveness of TKR and UKA.

Yao, D.-H., Keswani, A., Shah, C. K., et al. (2017). "Home Discharge After Primary Elective Total Joint Arthroplasty: Postdischarge Complication Timing and Risk Factor Analysis." J Arthroplasty 32(2) : 375-380.
https://www.arthroplastyjournal.org/article/S0883-5403(16)30478-8/fulltext

BACKGROUND: Bundled payment programs for primary total joint arthroplasty (TJA) have identified reducing nonhome discharge as a major area of cost savings. Health care providers must therefore identify, risk stratify, and appropriately care for home-discharged TJA patients. This study aimed to analyze risk factors and timing of postdischarge complications among home-discharged primary total hip arthroplasty (THA) and total knee arthroplasty (TKA) patients and risk stratify them to identify those who would benefit from higher level care. METHODS: Patients discharged home after elective primary THA/TKA from 2011 to 2014 were identified in the National Surgical Quality Improvement Program database. Bivariate and multivariate analyses were performed using perioperative variables. RESULTS: A total of 50,376 and 71,293 home-discharged THA and TKA patients were included for analysis, of which, 1575 THA (3.1%) and 2490 TKA (3.5%) patients suffered postdischarge severe complications or unplanned readmissions. These patients were older, smokers, obese, and functionally dependent (P < .001 for all). In multivariate analysis, severe adverse event predischarge, age, male gender, functional status, and 10 other variables were all associated with ≥1.22 odds of postdischarge severe adverse event or readmission (P < .05). THA and TKA patients with 2, 3, or ≥4 risk factors had 1.43-5.06 times odds of complications within 14 days post discharge and 1.41-3.68 times odds of complications beyond 14 days compared to those with 0 risk factors (P < .001 for all). CONCLUSION: Risk factors can be used to predict which home-discharged TJA patients are at greatest risk of postdischarge complications. Given that this is a growing population, we recommend the development of formal risk-stratification protocols for home-discharged TJA patients.

Modèles de protocoles de soins

ÉTUDES FRANÇAISES

Cnam (2013). Améliorer la qualité du système de santé et maîtriser les dépenses : propositions de l'Assurance maladie pour 2014. Rapport au ministre chargé de la Sécurité sociale et au Parlement sur l'évolution des charges et produits de l'assurance maladie. Paris Cnamts **:** 186, tabl.

http://www.ameli.fr/fileadmin/user_upload/documents/cnamts_rapport_charges_produits_2014.pdf

Cnam (2014). Améliorer la qualité du système de santé et maîtriser les dépenses : propositions de l'Assurance maladie pour 2015. Rapport au ministre chargé de la Sécurité sociale et au Parlement sur l'évolution des charges et produits de l'assurance maladie. Paris Cnamts **:** 186, tabl.
http://www.ameli.fr/fileadmin/user_upload/documents/cnamts_rapport_charges_produits_2015.pdf

HAS (2008). Critères de suivi en rééducation et d'orientation en ambulatoire ou en soins de suite ou de réadaptation après ligamentoplastie du croisé antérieur du genou. Recommandations. Recommandations professionnelles. Saint-Denis HAS **:** 85.
http://www.has-sante.fr/portail/upload/docs/application/pdf/reeducation_genou_ptg_-_argumentaire.pdf

[BDSP. Notice produite par HAS R0x8G7s7. Diffusion soumise à autorisation]. Ces recommandations complètent celles publiées par la HAS en mars 2006 (cf. "en savoir plus" : Recommandations portant sur les actes chirurgicaux et orthopédiques ...). L'objectif de ces différents travaux de la HAS est d'éviter les hospitalisations inappropriées en soins de suite ou de réadaptation (SSR) après certains traitements orthopédiques ou chirurgicaux. Les objectifs des présentes recommandations sont de : * proposer une aide à la décision au médecin qui prescrit des soins de masso-kinésithérapie après ligamentoplastie du croisé antérieur du genou, afin de lui permettre d'apprécier l'opportunité de recourir ou non, pour son patient, à une hospitalisation en SSR en vue de la réalisation de ces soins * définir les éléments de transmission entre chirurgien et masseur-kinésithérapeute nécessaires à la mise en ouvre de la prise en charge de rééducation et de suivi du patient, quel que soit le lieu où s'effectue la rééducation.

HAS (2016). Programmes de récupération améliorée après chirurgie (RAAC), Saint-Denis : HAS **:** 73p.

La récupération améliorée après chirurgie (RAAC) initialement développée dans les années 1990 par l'équipe danoise du Pr. Henrik Kehlet est une approche de prise en charge globale du patient favorisant le rétablissement précoce de ses capacités après la chirurgie. Face à l'emergence croissante de données de la littérature sur la récupération améliorée après chirurgie, le développement d'expériences pilotes au sein d'établissements français et l'intérêt croissant des différents acteurs de santé, la HAS a décidé d'élaborer un rapport d'orientation sur cette thématique afin d'aider les professionnels dans la mise en place de programmes de récupération améliorée et leur évaluation. Le rapport reprend les concepts et définitions de la RAAC, les différentes modalités d'organisation en considérant les modèles, expérimentations et outils déjà mis en oeuvre. Il apporte des informations sur les points suivants : principes généraux et définition de la RAAC données de la littérature disponibles expériences nationales et internationales mise en place et aspects organisationnels freins et leviers à la mise en place d'un programme RAAC impacts économiques et enjeux Le rapport a été complété par un document court, la fiche de synthèse, qui reprend les messages clés et permet aux professionnels de santé, médecins généralistes ou spécialistes, de disposer rapidement d'une vision globale de la démarche.

Lemerrer, A. et Blery, E. (2019). Réhabilitation améliorée après chirurgie (RAAC) : Dispositif d'accompagnement francilien - Retours d'expériences. Paris ARSIF **:** 36, tab., graph., fig.
https://www.iledefrance.ars.sante.fr/rehabilitation-amelioree-apres-chirurgie-raac-dispositif-daccompagnement-francilien-retours

De février 2017 à septembre 2018, 20 services « candidats » ont été appuyés par 10 services « référents » sur les chirurgies programmées orthopédiques (PTH/PTG), colorectales (bénigne ou maligne), thoraciques et gynécologiques (hystérectomie). Ce projet a été l'occasion pour 21 établissements – tous statuts, toutes « situations géographiques » – de mener des actions articulées autour des axes de travail suivant : l'organisation des parcours patients RAAC (réhabilitation améliorée après chirurgie), en amont et en aval des interventions chirurgicales ; la mise en place d'un socle/cadre commun de bonnes pratiques professionnelles ; des démarches institutionnelles et des comités RAAC pluridisciplinaires. Ce rapport est un retour d'expérience de ces travaux, qui prend la forme non pas d'un témoignage des projets menés, mais d'un guide le plus opérationnel possible.

Smith, T. O., McCabe, C., Lister, S., et al. (2012). "Conséquences de la mise en place du programme Norwich de récupération accélérée après prothèse totale de hanche ou de genou." Revue de Chirurgie Orthopédique et Traumatologique 98(5) : 442-443.
http://www.sciencedirect.com/science/article/pii/S1877051712001815

Summary Background/Hypothesis To report the analysis of the initial rehabilitation results of the Norwich Enhanced Recovery Programme (NERP), regime with increased postoperative physiotherapy input following total hip arthroplasty (THA) and total knee arthroplasty (TKA) performed under spinal anaesthetic with wound catheter infiltration. Materials and methods A secondary analysis of a service improvement programme was undertaken from an acute national health service hospital in the United Kingdom. Ninety-five patients listed for THA (n=67) or TKA (n=28) were reviewed during the first six postoperative weeks. All received an enhanced postoperative programme including commencement of mobilisation 4hours postoperatively and physiotherapy interventions a minimum of twice daily during hospital admission. The primary outcome measure was the Iowa Level of Assistance Score at discharge. Secondary outcomes included length of hospital stay (LOS), visual analogue scale pain at discharge and complications during the initial six postoperative weeks. Results The NERP is a successful rehabilitation regime for patients following THA and TKA, facilitating early safe discharge (mean LOS=3.5 days) with minimal complications. Patients who commenced mobilisation on the day of the operation reported significantly reduced pain score (p=0.02) and length of stay (p<0.01) compared to those who did not. Thirty-four percent of patients were discharged with rollator frames. Conclusions Whilst the early results of the NERP allow patients who have undergone THA or TKA surgery a short hospital length of stay, its demand on outreach physiotherapy suggests that the availability of such community services is imperative to ensure the appropriate progression of rehabilitation. Level of Evidence Level IV – retrospective series.

Vendittoli, P.-A., Pelleï, K., Desmeules, F., et al. (2019). "Un programme de récupération optimisée en chirurgie d'un jour permet de réduire les complications et les coûts du remplacement articulaire de la hanche et du genou." Revue de Chirurgie Orthopédique et Traumatologique 105(7) : 813-820.
http://www.sciencedirect.com/science/article/pii/S1877051719304198

Résumé Introduction Appliquer les principes de récupération optimisée après une chirurgie (Enhanced Recovery After Surgery: ERAS) est une option intéressante pouvant réduire la durée de séjour après un remplacement articulaire de la hanche ou du genou (PTH, PTG). Cette méthode permettrait d'améliorer l'expérience clinique du patient, afin qu'il soit disposé à retourner plus tôt à la maison. Hypothèse Nous prévoyons que notre groupe ERAS, PTH et PTG en court séjour présentera un taux de complication inférieur et une durée de séjour hospitalier réduite, se traduisant par des coûts directs inférieurs en comparaison à la procédure standard. Matériel et méthode Nous avons comparé le taux de complication selon

la classification de Clavien-Dindo, la durée de séjour et les coûts d'une hospitalisation entre une cohorte prospective de 120 PTH et PTG ERAS en court séjour et un groupe contrôle historique de 150 PTH et PTG hospitalisées plus de 24h. Résultats Le groupe ERAS court séjour a présenté un taux significativement inférieur de complications de grade 1 ou 2 par patient en comparaison au groupe contrôle (moy. 0,8 vs 3,0, p<0,001). Aucune différence significative n'a été trouvée entre les deux groupes pour les complications de grades supérieurs 3, 4 ou 5. La durée de séjour moyenne a été significativement réduite pour le groupe ERAS court séjour de 2,8jours pour les PTH (0,1 vs 2,9jours, p<0,001) et de 3,9jours pour les PTG (1,0 vs 4,9jours, p<0,001). La réduction moyenne estimée des coûts directs engendrés par le protocole ERAS court-séjour était de 1489 CAD par patient pour la PTH et de 4158 CAD pour la PTG. Discussion Plusieurs programmes de chirurgie ambulatoire mettent l'accent sur le retour à domicile comme principal facteur de succès, repoussant au second plan a qualité de la récupération et la réduction des complications post-opératoires. L'instauration d'un protocole ERAS court-séjour PTH et PTG dans notre établissement a non seulement permis une diminution de la durée de séjour mais aussi d'améliorer le bien-être du patient et diminuer les coûts directs engendrés par ces procédures. Niveau de preuve Niveau II.

Weickmans, H., Rouanet, S., Rosenthal, D., et al. (2014). "Récupération rapide après prothèse totale de hanche et de genou : lever précoce et facteurs déterminant le jour de sortie." Ann Fr Anesth Reanim 33 : A149-A150.
http://www.sciencedirect.com/science/article/pii/S0750765814004900

Introduction Les patients opérés en France de prothèse totale de hanche (PTH) ou de genou sont hospitalisés actuellement en moyenne 7 et 8 nuits. Un protocole multidisciplinaire « récupération rapide » a été mis en place depuis fin 2012 dans l'établissement. Le but de cette analyse était d'évaluer les conditions de déroulement du lever le jour de l'intervention (j0) et les déterminants du jour de sortie, en utilisant les critères d'autonomie de Husted et al. [1]. Matériel et méthodes Une étude prospective observationnelle a été mise en place de décembre 2012 à février 2014 pour les patients opérés de PTH ou PTG et pour qui le lever à j0 était autorisé par le chirurgien. Seuls les patients non francophones étaient exclus. Le mode d'anesthésie était anesthésie générale ou rachianesthésie. Les patients opérés de PTG bénéficiaient d'une infiltration du site opératoire à la ropivacaïne [2] et d'un cathéter du canal adducteur. Lorsqu'il est possible de faire au patient au moins le tour du lit avec déambulateur, le lever j0 est dit « sans limitation ». Les incidents étaient notés. Les conditions de sortie ont été évaluées par : le délai entre admission (la veille de l'intervention) et les événements suivants : douleur contrôlée (EVA repos<40 et EVA mobilisation<60), autonomie pour se coucher et sortir du lit, s'asseoir sur une chaise et en sortir, marcher 50 mètres avec des béquilles, ablation du dernier Redon et du cathéter du canal adducteur, information donnée. Le moment de disponibilité du lieu de sortie (soins de suite et de réadaptation (SSR), hospitalisation à domicile (HAD) ou à domicile) était noté. Résultats 221 interventions (100 PTH et 221 PTG) ont été étudiés. 24 % étaient âgés de 80ans ou plus. Le score ASA était de 1, 2 ou 3 chez respectivement 8 %, 81 % et 11 % des patients. Le type d'anesthésie était rachianesthésie pour 63 %. Le Tableau 1 résume les conditions des levers à j0 au cours desquels une chute, sans conséquence, et un vomissement chez 2 patients sont survenus. En moyenne (écart type), tous les critères de sortie étaient atteints pour les PTH et PTG après 6,9 (1,9) et 8,5 (2,4) ½ journées. Les 2 critères de sortie attendus le plus longtemps étaient l'ablation du Redon et la marche 50 mètres, 6,8 (1,6) et 5,5 (2,4) ½ journées après l'admission. Le délai entre l'atteinte des critères de sortie et la sortie effective était, lorsque la sortie était programmée en SSR ou HAD vs à domicile, de 5,1 (2,5) vs 4,5 (1,8). Aucun événement indésirable grave n'a été signalé au cours de l'étude. Discussion Le lever précoce

des patients non sélectionnés opérés de PTH ou de PTG est possible et sûr à condition de gérer l'éventuelle intolérance orthostatique [3], ce qui nécessite la présence de personnel formé et en nombre. Une meilleure organisation de la sortie est un moyen d'abréger le séjour.

ÉTUDES ETRANGERES

(2018). "The Association Between Readmission and Patient Experience in a Total Hip Arthroplasty Population." J Arthroplasty 33(6) : 1668-1674.

> BACKGROUND: Our goal was to determine whether readmissions within 30 or 90 days following discharge are associated with Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores for total hip arthroplasty (THA) patients. METHODS: HCAHPS surveys from all patients who underwent THA between January 2016 and September 2016 in our institution were analyzed. Readmissions, demographics, baseline joint pain, joint function, and Veterans RAND-12 scores were collected. Statistical analyses involved Pearson's chi-squared tests for categorical variables and Student's t-tests for continuous variables. Multivariable logistic regression models were used to determine whether 30-day or 90-day readmissions were independently associated with HCAHPS scores. RESULTS: A total of 1868 patients were identified, the survey was sent to 969 patients and 578 completed the survey (59.6%). Eight patients (1.4%) were readmitted within 30 days, and 28 patients (4.8%) within 90 days. These patients were more likely to undergo revision THA (P < .001). For the 30-day readmission cohort, 4 of 8 patients (50.0%) rated the hospital a 9 or 10 out of 10 compared to 466 of 567 patients (82.2%) of the non-readmitted cohort (P = .019). Thirty-day readmissions were associated with significantly lower likelihood of rating the hospital a 9 or 10 out of 10 (odds ratio 0.18). CONCLUSIONS: Our results demonstrate a significant negative association between readmission and HCAHPS scores under several dimensions of the survey including nurse communication, doctor communication, pain management, and global satisfaction with the hospital experience.

Auyong, D. B., Allen, C. J., Pahang, J. A., et al. (2015). "Reduced Length of Hospitalization in Primary Total Knee Arthroplasty Patients Using an Updated Enhanced Recovery After Orthopedic Surgery (ERAS) Pathway." J Arthroplasty 30(10) : 1705-1709.

> Decreasing hospital length of stay may attenuate costs associated with total knee arthroplasty. The purpose of this study was to determine if updates to an existing orthopedic enhanced recovery after surgery (ERAS) pathway would improve length of hospitalization. Clinical and demographic data were collected on 252 primary total knee arthroplasties between January 2012 and July 2013. Pre-updated and post-updated ERAS pathway cohorts were analyzed for length of stay, clinical outcomes, and re-admissions. The mean length of stay decreased from 76.6 hours to 56.1 hours after implementation of the evidence-based orthopedic enhanced recovery after surgery pathway (P<0.001). This improvement was possible without a concomitant increase in readmission rates.

Barber, C., Fraser, J. F., Mendez, G. G., et al. (2017). "The Halo Effect: An Unintended Benefit of Care Pathways." J Knee Surg 30(3) : 264-268.

> The objective of this study was to determine if implementation of a simplified care pathway for total knee arthroplasty (TKA) would affect outcomes of total hip arthroplasty (THA)

patients in the same health care system. Data were collected from a total of 5,095 consecutive THA patients in the year before and 2 years after implementation of the care pathway for TKA patients. Postimplementation increases were observed in both early activity ($p < 0.0001$) and continuous urinary catheter avoidance ($p < 0.0001$) among THA patients. These improvements in protocol adherence were associated with decreased complications ($p < 0.0001$), fewer 30-day readmissions ($p < 0.0019$), and decreased hospital length of stay ($p < 0.0001$). Based on these results, the implementation of a simplified care pathway for TKA patients can also improve outcomes for THA patients in the same health care system.

Barbieri, A., Vanhaecht, K., Van Herck, P., et al. (2009). "Effects of clinical pathways in the joint replacement: a meta-analysis." BMC medicine 7 : 32-32.
https://pubmed.ncbi.nlm.nih.gov/19570193

BACKGROUND: A meta-analysis was performed to evaluate the use of clinical pathways for hip and knee joint replacements when compared with standard medical care. The impact of clinical pathways was evaluated assessing the major outcomes of in-hospital hip and knee joint replacement processes: postoperative complications, number of patients discharged at home, length of in-hospital stay and direct costs. METHODS: Medline, Cinahl, Embase and the Cochrane Central Register of Controlled Trials were searched. The search was performed from 1975 to 2007. Each study was assessed independently by two reviewers. The assessment of methodological quality of the included studies was based on the Jadad methodological approach and on the New Castle Ottawa Scale. Data analysis abided by the guidelines set out by The Cochrane Collaboration regarding statistical methods. Meta-analyses were performed using RevMan software, version 4.2. RESULTS: Twenty-two studies met the study inclusion criteria and were included in the meta-analysis for a total sample of 6,316 patients. The aggregate overall results showed significantly fewer patients suffering postoperative complications in the clinical pathways group when compared with the standard care group. A shorter length of stay in the clinical pathway group was also observed and lower costs during hospital stay were associated with the use of the clinical pathways. No significant differences were found in the rates of discharge to home. CONCLUSION: The results of this meta-analysis show that clinical pathways can significantly improve the quality of care even if it is not possible to conclude that the implementation of clinical pathways is a cost-effective process, because none of the included studies analysed the cost of the development and implementation of the pathways. Based on the results we assume that pathways have impact on the organisation of care if the care process is structured in a standardised way, teams critically analyse the actual organisation of the process and the multidisciplinary team is highly involved in the re-organisation. Further studies should focus on the evaluation of pathways as complex interventions to help to understand which mechanisms within the clinical pathways can really improve the quality of care. With the need for knee and hip joint replacement on the rise, the use of clinical pathways might contribute to better quality of care and cost-effectiveness.

Berg, U., Berg, M., Rolfson, O., et al. (2019). "Fast-track program of elective joint replacement in hip and knee-patients' experiences of the clinical pathway and care process." J Orthop Surg Res 14(1) : 186.

BACKGROUND: The clinical pathway and care program in elective total hip and knee replacement (THR/TKR) has, during the last decade, undergone considerable changes in many countries influenced by the concept of fast-track surgery, resulting in a very short hospital stay. Studies into patients' experiences of the entire fast-track program, from decision-making regarding surgery until recovery 3 months after surgery, are lacking. The aim

of the study was to increase the knowledge about patients' experiences of the clinical pathway and care in a fast-track program of elective THR/TKR in order to identify factors that may influence recovery and clinical outcome. METHODS: A qualitative research design was chosen with data collected from interviews 3 months after surgery and analyzed using an inductive content analysis method. In total, 24 patients from three hospitals with a fast-track care program were included in the study: 14 women and 10 men, 13 with THR and 11 with TKR. The mean age was 65 years (range 44-85). RESULTS: The analysis identified three chronological phases in the clinical pathway: preparation, hospital stay for surgery, and recovery. In the preparation phase, patients' experiences and involvement in the planning of the operation were highlighted. The need to know the risks and expectations of recovery and outcome were also central, although there was great diversity in needs for information and involvement. In the hospital stay for the surgery phase, there were mainly positive experiences regarding admission, early mobilization, and early discharge. Experiences about the recovery phase focused on management of daily life, rehabilitation program, and recovery. Rehabilitation involved uncertainty as to whether or not the progress was normal. The recovery phase was also filled with questions about unfulfilled expectations. Regardless of the different phases, we found the importance of a person-centered care to be a pervasive theme. CONCLUSION: Our study supports the view that a person-centered approach, from surgery decision until recovery, is an important element in optimizing care in a THR and TKR fast-track care program. More focus on the period after hospital discharge may improve recovery, patient satisfaction, and functional outcome.

Berg, U., BüLow, E., Sundberg, M., et al. (2018). "No increase in readmissions or adverse events after implementation of fast-track program in total hip and knee replacement at 8 Swedish hospitals: An observational before-and-after study of 14,148 total joint replacements 2011-2015." Acta Orthop 89(5) : 522-527.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6202734/

Background and purpose - Fast-track care programs in elective total hip and knee replacement (THR/TKR) have been introduced in several countries during the last decade resulting in a significant reduction of hospital stay without any rise in readmissions or early adverse events (AE). We evaluated the risk of readmissions and AE within 30 and 90 days after surgery when a fast-track program was introduced in routine care of joint replacement at 8 Swedish hospitals. Patients and methods - Fast-track care programs were introduced at 8 public hospitals in Västra Götaland region from 2012 to 2014. We obtained data from the Swedish Hip and Knee Arthroplasty Registers for patients operated with THR and TKR in 2011-2015. All readmissions and new contacts with the health care system within 3 months with a possible connection to the surgical intervention were requested from the regional patient register. We compared patients operated before and after the introduction of the fast-track program. Results - Implementation of the fast-track program resulted in a decrease in median hospital length of stay (LOS) from 5 to 3 days in both THR and TKR. The total readmission rate <90 days for THR was 7.2% with fast-track compared with 6.7% in the previous program, and for TKR 8.4% in both groups. Almost half of the readmissions occurred without any AE identified. There was no statistically significant difference concerning readmissions or AE when comparing the programs. Interpretation - Implementation of a fast-track care program in routine care of elective hip and knee replacement is effective in reducing hospital stay without increasing the risk of readmissions or adverse events within 90 days after surgery.

Berger, R. A., Cross, M. B. et Sanders, S. (2016). "Outpatient Hip and Knee Replacement: The Experience From the First 15 Years." Instr Course Lect 65 : 547-551.

Rapid recovery and early discharge after total joint arthroplasty are becoming more common. To develop a successful, safe, outpatient arthroplasty practice, surgeons must have the support of a multidisciplinary team, which includes an orthopaedic surgeon, an anesthesiologist, nurses, physical therapists, and a discharge planner. The authors of this chapter recommend surgeons start with healthier, motivated patients and focus on total hip replacements and unicompartmental knee replacements in the learning curve phase of the transition to outpatient total joint arthroplasty. It is important for orthopaedic surgeons to establish an outpatient joint arthroplasty protocol as well as ways to avoid complications and delays in discharge.

Berthelsen, C. B. et Frederiksen, K. (2017). "Orchestrating care through the fast-track perspective: A qualitative content analysis of the provision of individualised nursing care in orthopaedic fast-track programmes." Int J Orthop Trauma Nurs 24 : 40-49.

The lack of individualised care in orthopaedic regimes is often explained by the extended use of patient pathways and clinical guidelines. The aim of this study was to illuminate orthopaedic nurses' perceptions and experiences of providing individual nursing care for older patients in standardised fast-track programmes after total hip or knee replacement. Ten semi-structured interviews were conducted with orthopaedic nurses in orthopaedic wards at three Danish hospitals between April and June of 2015. Data were analysed using manifest and latent content analysis according to Graneheim and Lundman. The main theme of the overall interpretation was Orchestrating care through the fast-track perspective, accompanied by three sub-themes: Identifying and legitimising relevant individual care in the fast-track programme, Struggling to fit all patients in the fast-track programme and Justifying individualised care-related actions in the fast-track programme. The study concluded that, even though the nurses struggled to comply with the programme, they still found themselves compromising their nursing care and ethics to follow the standardised regime. There is a need to establish more specific inclusion criteria to maintain the effective elements in the programme and to facilitate nurses' opportunities to offer individual care, thereby ensuring that fragile patients have access to other possibilities.

Briggs, A., Page, C. J., Sham, B. R., et al. (2018). "A Model of Care for Osteoarthritis of the Hip and Knee: Development of a System-Wide Plan for the Health Sector in Victoria, Australia." Healthcare Policy 14(2) : 47-58.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7008674/

Osteoarthritis (OA) imposes a significant burden to the person, the health system and the community. Models of Care (MoCs) drive translation of evidence into policy and practice and provide a platform for health system reform. The Victorian MoC for OA of the hip and knee was developed following a best-practice framework, informed by best-evidence and iterative cross-sector consultation, including direct consumer consultation. Governance and external expert advisory committees consisting of local OA care champions facilitated the development and consultation processes. The MoC outlines key components of care, care that is not recommended, and suggests phased implementation strategies. This paper describes the MoC development process and lessons learned.

Christelis, N., Wallace, S., Sage, C. E., et al. (2015). "An enhanced recovery after surgery program for hip and knee arthroplasty." Med J Aust 202(7) : 363-368.

OBJECTIVE: To institute and evaluate the benefits of an enhanced recovery after surgery (ERAS) program across three hospitals in Victoria. DESIGN, SETTING AND PARTICIPANTS: We used a before-and-after quality improvement study design consisting of three phases: pre-ERAS program data collection from March to September 2012; ERAS training and implementation during September 2012; and change performance measurement following ERAS implementation from October 2012 to May 2013. MAIN OUTCOME MEASURES: The primary end point was duration of hospital stay after knee or hip arthroplasty. Secondary end points were adherence to the ERAS bundle, and process and patient recovery characteristics. RESULTS: We enrolled 412 patients to the pre-ERAS (existing-practice) phase and compared them with 297 patients in the ERAS phase. For ERAS patients, compared with existing-practice patients, hospital stay was reduced (geometric mean, 5.3 [SD, 1.6] v 4.9 [SD, 1.6] days; P < 0.001) and there was a significant improvement in the proportion of patients ready for discharge on Day 3 after surgery (41% v 59%; P < 0.001). The most common reason for delayed discharge was patients waiting for review or access to rehabilitation services. There were markedly improved indicators of processes and outcomes of care, including improved patient education, reduced fasting times, less blood loss, better analgesia, earlier ambulation and improved overall quality of recovery. CONCLUSION: We found that an ERAS program could be successfully implemented in elective joint arthroplasty, leading to a shorter duration of hospital stay. We recommend this orthopaedic ERAS pathway.

Churchill, L., Malian, S. J., Chesworth, B. M., et al. (2016). "The development and validation of a multivariable model to predict whether patients referred for total knee replacement are suitable surgical candidates at the time of initial consultation." Can J Surg 59(6) : 407-414.

BACKGROUND: In previous studies, 50%-70% of patients referred to orthopedic surgeons for total knee replacement (TKR) were not surgical candidates at the time of initial assessment. The purpose of our study was to identify and cross-validate patient self-reported predictors of suitability for TKR and to determine the clinical utility of a predictive model to guide the timing and appropriateness of referral to a surgeon. METHODS: We assessed pre-consultation patient data as well as the surgeon's findings and post-consultation recommendations. We used multivariate logistic regression to detect self-reported items that could identify suitable surgical candidates. RESULTS: Patients' willingness to undergo surgery, higher rating of pain, greater physical function, previous intra-articular injections and patient age were the factors predictive of patients being offered and electing to undergo TKR. CONCLUSION: The application of the model developed in our study would effectively reduce the proportion of nonsurgical referrals by 25%, while identifying the vast majority of surgical candidates (> 90%). Using patient-reported information, we can correctly predict the outcome of specialist consultation for TKR in 70% of cases. To reduce long waits for first consultation with a surgeon, it may be possible to use these items to educate and guide referring clinicians and patients to understand when specialist consultation is the next step in managing the patient with severe osteoarthritis of the knee.

Coenders, M. J., Mathijssen, N. M. C. et Vehmeijer, S. B. W. (2020). "Three and a half years' experience with outpatient total hip arthroplasty." Bone Joint J 102-b(1) : 82-89.

AIMS: The aim of this study was to report our experience at 3.5 years with outpatient total hip arthroplasty (THA). METHODS: In this prospective cohort study, we included all patients who were planned to receive primary THA through the anterior approach between 1 April 2014 and 1 October 2017. Patient-related data and surgical information were recorded. Patient reported outcome measures (PROMs) related to the hip and an anchor question were taken preoperatively, at six weeks, three months, and one year after surgery. All

complications, readmissions, and reoperations were registered. RESULTS: Of the 647 THA patients who had surgery in this period through the anterior approach, 257 patients (39.7%) met the inclusion criteria and were scheduled for THA in an outpatient setting. Of these, 40 patients (15.6%) were admitted to the hospital, mainly because of postoperative nausea and/or dizziness. All other 217 patients were able to go home on the day of surgery. All hip-related PROMs improved significantly up to 12 months after surgery, compared with the scores before surgery. There were three readmissions and two reoperations in the outpatient cohort. There were no complications related to the outpatient THA protocol. CONCLUSION: These study results confirm that outpatient THA can be performed safe and successfully in a selected group of patients, with satisfying results up to one year postoperatively, and without outpatient-related complications, readmissions, and reoperations. Cite this article: Bone Joint J 2020;102-B(1):82-89.

den Hartog, Y. M., Mathijssen, N. M. C. et Vehmeijer, S. B. W. (2013). "Reduced length of hospital stay after the introduction of a rapid recovery protocol for primary THA procedures." Acta Orthop 84(5) : 444-447.
https://pubmed.ncbi.nlm.nih.gov/24032524

BACKGROUND AND PURPOSE: Rapid recovery protocols after total hip arthroplasty (THA) have been introduced worldwide in the last few years and they have reduced the length of hospital stay. We show the results of the introduction of a rapid recovery protocol for primary THA for unselected patients in our large teaching hospital. PATIENTS AND METHODS: In a retrospective cohort study, we included all 1,180 patients who underwent a primary THA between July 1, 2008 and June 30, 2012. These patients were divided into 3 groups: patients operated before, during, and after the introduction of the rapid recovery protocol. There were no exclusion criteria. All complications, re-admissions, and reoperations were registered and analyzed. RESULTS: The mean length of hospital stay decreased from 4.6 to 2.9 nights after the introduction of the rapid recovery protocol. There were no statistically significant differences in the rate of complications, re-admissions, or reoperations between the 3 groups. INTERPRETATION: In a large teaching hospital, the length of hospital stay decreased after introduction of our protocol for rapid recovery after THA in unselected patients, without any increase in complications, re-admissions, or reoperation rate.

den Hertog, A., Gliesche, K., Timm, J., et al. (2012). "Pathway-controlled fast-track rehabilitation after total knee arthroplasty: a randomized prospective clinical study evaluating the recovery pattern, drug consumption, and length of stay." Arch Orthop Trauma Surg 132(8) : 1153-1163.

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((R)))--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.

Didden, A. G. M., Punt, I. M., Feczko, P. Z., et al. (2019). "Enhanced recovery in usual health care improves functional recovery after total knee arthroplasty." Int J Orthop Trauma Nurs 34 : 9-15. https://pubmed.ncbi.nlm.nih.gov/31272919

BACKGROUND: The success of total knee arthroplasty (TKA) is determined by an effective surgical procedure as well as a well-organized clinical care pathway. Research has shown that day-of-surgery mobilization decreases length of stay (LOS) and complication rates. We developed, implemented, and evaluated a new clinical care pathway for patients undergoing TKA, that included early mobilization, using 'Lean Six Sigma (LSS)', with the aim of accelerating functional recovery and reducing LOS. METHODS: Data derived from physical therapy reports and LOS were compared between the old (n = 85) and the new (n = 85) clinical care pathways for time to functional recovery (using the modified Iowa Level of Assistance Scale), LOS and joint-related readmission. Group differences were evaluated using Mann-Whitney and Chi-Square tests. The clinical care pathway was redesigned using LSS-methods. RESULTS: After implementation of the new pathway, median time to functional recovery improved from 4 (2-5) to 2 days (1-8)(P < 0.001) and LOS from 7 (5-11) to 4 days (3-12)(P < 0.001), joint-related readmission declined (3.5-2.4%)(P = 0.65). CONCLUSION: Implementation of the new clinical care pathway accelerated functional recovery and reduced LOS for patients undergoing TKA. Future research should focus on having multiple discharge moments per day which might encourage patients to achieve functional recovery as soon as possible.

Duncan, C. M., Moeschler, S. M., Horlocker, T. T., et al. (2013). "A self-paired comparison of perioperative outcomes before and after implementation of a clinical pathway in patients undergoing total knee arthroplasty." Reg Anesth Pain Med 38(6) : 533-538.

BACKGROUND AND OBJECTIVES: Clinical pathways commonly modify multiple variables and deviate from long-established clinical practices. Therefore, it is difficult to perform prospective, randomized clinical trials comparing "standard care" to the "new clinical pathway." The goal of this investigation was to examine the impact of clinical pathways implementation on perioperative outcomes and institutional costs in patients undergoing total knee arthroplasty (TKA). METHODS: This before-and-after study evaluated patient clinical outcomes and economic costs after the implementation of institutional clinical pathway. The primary outcome was hospital length of stay (LOS). Clinical and economic outcomes were analyzed as continuous variables using paired t test. RESULTS: Fifty-four patients were identified for study inclusion. Patients undergoing their TKA after implementation of the clinical pathway had a significantly shorter hospital LOS (3.4 vs 4.4 days; P < 0.001). Patients reported significantly less postoperative pain, less postoperative confusion, and an easier time participating in physical therapy sessions after their second (after the clinical pathway implementation) TKA. Patients undergoing their TKA after the clinical pathway implementation had reduced total direct hospital costs ($956; 95% confidence interval, $233-$1785; P = 0.02). CONCLUSIONS: Our findings demonstrated that the use of a standardized clinical pathway reduced hospital LOS, improved clinical outcomes and patient satisfaction while reducing costs for identical surgical procedures.

Edwards, P. K., Kee, J. R., Mears, S. C., et al. (2018). "Is Rapid Recovery Hip and Knee Replacement Possible and Safe in the Octogenarian Patient?" J Arthroplasty 33(2) : 316-319. https://www.arthroplastyjournal.org/article/S0883-5403(17)30868-9/fulltext

BACKGROUND: Rapid recovery programs are now aimed to reduce costs of hip and knee arthroplasties by discharging patients directly home, shortening hospital length of stay (LOS), and reducing readmission rates. Although patients aged 80 years and older are included in the Medicare bundle, little work has been performed to determine if older patients can safely participate in rapid recovery programs. METHODS: We retrospectively reviewed 2482 patients undergoing primary and revision total hip and knee arthroplasties (THA and TKA) who all participated in a multifaceted rapid recovery program. The goals of this program were next day discharge to home without the use of home services or post-acute care admission. We examined the hospital LOS and the percentage of patients discharged home as well as 90-day readmission rates to determine efficacy and safety of this program in the patients aged 80 years and older. RESULTS: Octogenarians receiving primary THA and TKA were discharged home >90% of the time with LOSs <2 days and low readmission rates. Revision THA and TKA patients aged 80 years and older were discharged home about 70% of the time with significantly longer LOSs than patients aged more than 80 years. The revision THA patients aged more than 80 years had the highest readmission rates. CONCLUSION: Patients aged more than 80 years can successfully and safely participate in rapid recovery programs.

Fancott, C., Jaglal, S., Quan, V., et al. (2010). "Rehabilitation services following total joint replacement: a qualitative analysis of key processes and structures to decrease length of stay and increase surgical volumes in Ontario, Canada." J Eval Clin Pract 16(4) : 724-730.

OBJECTIVES: The purpose of this study was: (1) to identify key total joint replacement (TJR) care processes and structures from acute care and rehabilitation hospitals; (2) to determine the perceived implications of practice patterns and processes on wait times, discharge planning, transitions in care, utilization of rehabilitation services, and outcomes; and (3) to understand how acute care hospitals funded for additional cases were addressing current and future rehabilitation needs. METHODS: A qualitative descriptive approach using key informant interviews was used to provide further insights and depth of understanding to current practice patterns, structures and processes of care for TJR patients. RESULTS: Twenty-three key informants from a total of 15 hospitals across Ontario participated in this project. Themes that emerged related to processes of care (e.g. patient education, preoperative services, clinical pathways), and structures that supported these processes of care (e.g. organizational supports, increased funding and resources). The results point to a number of key practices that can facilitate smooth, integrated care for TJR patients, particularly in relation to best practices to decrease length of stay and increase surgical volumes. Increased funding related to strategic priorities placed on TJRs by the provincial government was viewed as an important impetus to implement a number of these key practices. CONCLUSION: From a rehabilitation perspective, there is need for consistent funding to secure more rehabilitation services for both preoperative and post-operative management of care that allows for shorter lengths of stay and to ensure optimal outcomes.

Fransen, B. L., Hoozemans, M. J. M., Argelo, K. D. S., et al. (2018). "Fast-track total knee arthroplasty improved clinical and functional outcome in the first 7 days after surgery: a randomized controlled pilot study with 5-year follow-up." Arch Orthop Trauma Surg 138(9) : 1305-1316. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6096572/

INTRODUCTION: Fast-track protocols (FP) are used more and more to optimize results after total knee arthroplasty (TKA). Many studies evaluating FP in TKA concentrate on clinical outcome and medium to long-term results. Since discharge from hospital after TKA is achieved increasingly quicker worldwide using FP in an increasingly younger and active patient population, the effects of FP on functional outcome in the first days after TKA become more important. The purpose of the current study was to compare FP with a regular joint care protocol (RP), with an emphasis on the first 7 days after surgery. MATERIALS AND METHODS: A non-blinded randomized controlled clinical pilot study was performed with 25 patients assigned to a FP group and 25 patients assigned to a RP group. Primary outcome was functional outcome, clinical outcome, pain, and complications for each day in the first week after surgery. Patients were followed up to 5 years after surgery. RESULTS: Significantly lower VAS scores for knee pain, faster Timed-Up and Go test times and more mobility on functional tests were seen on several days in the first week in the FP group compared to the RP group. Few other significant differences were found at 2, 6 weeks, and no significant differences were found at 12 weeks and 1, 2 and 5 years after surgery. CONCLUSIONS: Fast-track protocol for primary TKA showed significantly lower knee pain scores and improved functional outcome in the first 7 days after TKA compared to a regular protocol.

Gakhar, H., McConnell, B., Apostolopoulos, A. P., et al. (2013). "A pilot study investigating the use of at-home, web-based questionnaires compiling patient-reported outcome measures following total hip and knee replacement surgeries." J Long Term Eff Med Implants 23(1) : 39-43.

Patient-reported outcome measures (PROMs) are used routinely in NHS. Traditional pen-and-paper questionnaire collection can be time-consuming for both patients and clinic staff. The purpose of the current study was to determine whether a web-based PROMs system has the potential to provide satisfactory patient compliance and whether compiled data are equivalent to pen-and-paper PROMs data. A series of 82 patients who had joint replacement surgery was identified. Each patient was contacted by letter to register on the myClinicalOutcomes.co.uk website and to follow the instructions to render an Oxford score. A second request was sent to those failing to initially register. Telephone contact was then made with non-responders to identify the reason for failed registration. Successfully collated online Oxford scores were compared with previously recorded pen-and-paper scores for each patient from a prospectively updated database. Of the 82 patients identified, 61 (74%) received a letter or were otherwise contacted by telephone. Of these, 27 (44%) patients confirmed that they had access to the Internet. A total of 21 complete sets of data were collected. On review, the available secure online Oxford outcome scores demonstrated a mean of 30.1 (SD 11.4, range: 9-47). This mean score was comparable to the pen-and-paper database mean score of 29.1 (SD 11.8, range: 9-48) for the respective patients. Of the 27 respondents with Internet access, 21 (78%) produced complete scores that were available for real-time review. Available online scores were comparable to those collected via traditional means. With increased Internet availability and improved communication, remote web-based collection of patient reported outcomes may facilitate enhanced and efficient follow-up of patients.

Galbraith, A. S., McGloughlin, E. et Cashman, J. (2018). "Enhanced recovery protocols in total joint arthroplasty: a review of the literature and their implementation." Irish journal of medical science 187(1) : 97-109.
https://link.springer.com/article/10.1007/s11845-017-1641-9

BACKGROUND: During recent years, there has been an exponential demand for joint arthroplasty, which has coincided with the global economic recession. In response, the management of patients following arthroplasty is continuously evolving, with the average inpatient length of stay decreasing from weeks to days, and more recently, we have witnessed the development of "outpatient arthroplasty" as a novel concept which aims to address the high volume of patients. The reduction in length of stay has been made possible via implementation of "enhanced recovery programmes" encompassing each stage of the patient journey. Such programmes have aimed to maximise efficiency, whilst maintaining patient satisfaction and achieving exceptional functional outcomes. OBJECTIVE: We have undertaken a thorough review the literature in relation to enhanced recovery programmes (ERPs) and the research that has underpinned individual elements of enhanced recovery. A literature search of enhanced recovery protocols was carried out using PubMed, Cochrane, Embase and OVID. No language restrictions were imposed on the search. REVIEW: ERPs represent a multifactorial framework which may be subdivided into several phases. Pre-operative education programmes, outpatient consultation, pre-anaesthetic assessment, pre-procedural physiotherapy, day-of-surgery admission, pre-operative medications, type of anaesthesia, blood loss reduction protocols, multimodal analgesia delivery, day-of-surgery mobilisation, thromboembolic prophylaxis and ongoing rehabilitation are essential in enhanced recovery. CONCLUSION: These successful strategies have streamlined the patient pathway of arthroplasty surgery in a cost-effective manner, whilst reducing length of hospital stay and maintaining patient outcomes. Further studies are required to appropriately quantify the impact of individual variables and development of an internationally agreed ERP.

Galea, V. P., Rojanasopondist, P., Ingelsrud, L. H., et al. (2019). "Longitudinal changes in patient-reported outcome measures following total hip arthroplasty and predictors of deterioration during follow-up: a seven-year prospective international multicentre study." Bone Joint J 101-b(7) : 768-778.

AIMS: The primary aim of this study was to quantify the improvement in patient-reported outcome measures (PROMs) following total hip arthroplasty (THA), as well as the extent of any deterioration through the seven-year follow-up. The secondary aim was to identify predictors of PROM improvement and deterioration. PATIENTS AND METHODS: A total of 976 patients were enrolled into a prospective, international, multicentre study. Patients completed a battery of PROMs prior to THA, at three months post-THA, and at one, three, five, and seven-years post-THA. The Harris Hip Score (HHS), the 36-Item Short-Form Health Survey (SF-36) Physical Component Summary (PCS), the SF-36 Mental Component Summary (MCS), and the EuroQol five-dimension three-level (EQ-5D) index were the primary outcomes. Longitudinal changes in each PROM were investigated by piece-wise linear mixed effects models. Clinically significant deterioration was defined for each patient as a decrease of one half of a standard deviation (group baseline). RESULTS: Improvements were noted in each PROM between the preoperative and one-year visits, with one-year values exceeding age-matched population norms. Patients with difficulty in self-care experienced less improvement in HHS (odds ratio (OR) 2.2; p = 0.003). Those with anxiety/depression experienced less improvement in PCS (OR -3.3; p = 0.002) and EQ-5D (OR -0.07; p = 0.005). Between one and seven years, obesity was associated with deterioration in HHS (1.5 points/year; p = 0.006), PCS (0.8 points/year; p < 0.001), and EQ-5D (0.02 points/year; p < 0.001). Preoperative difficulty in self-care was associated with deterioration in HHS (2.2 points/year; p < 0.001). Preoperative pain from other joints was associated with deterioration in MCS (0.8 points/year; p < 0.001). All aforementioned factors were associated with clinically significant deterioration in PROMs (p < 0.035), except anxiety/depression with regard to PCS (p = 0.060). CONCLUSION: The present study finds that patient factors affect

the improvement and deterioration in PROMs over the medium term following THA. Special attention should be given to patients with risk factors for decreased PROMs, both preoperatively and during follow-up. Cite this article: Bone Joint J 2019;101-B:768-778.

Gayed, B., Black, S., Daggy, J., et al. (2013). "Redesigning a joint replacement program using Lean Six Sigma in a Veterans Affairs hospital." JAMA Surg 148(11) : 1050-1056.

IMPORTANCE: In April 2009, an analysis of joint replacement surgical procedures at the Richard L. Roudebush Veterans Affairs Medical Center, Indianapolis, Indiana, revealed that total hip and knee replacements incurred $1.4 million in non-Veterans Affairs (VA) care costs with an average length of stay of 6.1 days during fiscal year 2008. The Joint Replacement Program system redesign project was initiated following the Vision-Analysis-Team-Aim-Map-Measure-Change-Sustain (VA-TAMMCS) model to increase efficiency, decrease length of stay, and reduce non-VA care costs. OBJECTIVE: To determine the effectiveness of Lean Six Sigma process improvement methods applied in a VA hospital. DESIGN, SETTING, AND PARTICIPANTS: Perioperative processes for patients undergoing total joint replacement were redesigned following the VA-TAMMCS model--the VA's official, branded method of Lean Six Sigma process improvement. A multidisciplinary team including the orthopedic surgeons, frontline staff, and executive management identified waste in the current processes and initiated changes to reduce waste and increase efficiency. Data collection included a 1-year baseline period and a 20-month sustainment period. MAIN OUTCOMES AND MEASURES: The primary endpoint was length of stay; a secondary analysis considered non-VA care cost reductions. RESULTS: Length of stay decreased 36% overall, decreasing from 5.3 days during the preproject period to 3.4 days during the 20-month sustainment period (P < .001). Non-VA care was completely eliminated for patients undergoing total hip and knee replacement at the Richard L. Roudebush Veterans Affairs Medical Center, producing an estimated return on investment of $1 million annually when compared with baseline cost and volumes. In addition, the volume of total joint replacements at this center increased during the data collection period. CONCLUSIONS AND RELEVANCE: The success of the Joint Replacement Program demonstrates that VA-TAMMCS is an effective tool for Lean and Six Sigma process improvement initiatives in a surgical practice, producing a 36% sustained reduction in length of stay and completely eliminating non-VA care for total hip and knee replacements while increasing total joint replacement volume at this medical center.

Gondusky, J. S., Choi, L., Khalaf, N., et al. (2014). "Day of surgery discharge after unicompartmental knee arthroplasty: an effective perioperative pathway." J Arthroplasty 29(3) : 516-519.

Day of surgery (DOS) discharge after unicompartmental knee arthroplasty (UKA) allows for safe, efficient care of the appropriately selected patient. Refinement of our perioperative pathway over the last decade has allowed for successful DOS discharge of 160 consecutive patients. The cohort averaged 65 years and American Society of Anesthesiology class was 1-3 (mean, 1.8). Perioperative pain control included a preoperative single shot femoral nerve block. Mean recovery room time was 121 (SD = 37) minutes. No patient required overnight admission for uncontrolled pain or nausea. Significant improvements in Knee Society Clinical Rating System (KSCRS) scores and high patient satisfaction were observed. This study details critical components of our simple perioperative pathway that can be utilized to safely perform UKA with discharge on the DOS.

Gooch, K., Marshall, D. A., Faris, P. D., et al. (2012). "Comparative effectiveness of alternative clinical pathways for primary hip and knee joint replacement patients: a pragmatic randomized, controlled trial." Osteoarthritis Cartilage 20(10) : 1086-1094.

OBJECTIVE: Total hip replacement (THR) and total knee replacement (TKR) (arthroplasty) surgery for end-stage osteoarthritis (OA) are ideal candidates for optimization through an algorithmic care pathway. Using a comparative effectiveness study design, we compared the effectiveness of a new clinical pathway (NCP) featuring central intake clinics, dedicated inpatient resources, care guidelines and efficiency benchmarks vs. the standard of care (SOC) for THR or TKR. METHODS: We compared patients undergoing primary THR and TKR who received surgery in NCP vs. SOC in a randomised controlled trial within the trial timeframe. 1,570 patients (1,066 SOC and 504 NCP patients) that underwent surgery within the study timeframe from urban and rural practice settings were included. The primary endpoint was improvement in Western Ontario and McMaster University osteoarthritis index (WOMAC) overall score over 12 months post-surgery. Secondary endpoints were improvements in the physical function (PF) and bodily pain (BP) domains of the Short Form 36 (SF-36). RESULTS: NCP patients had significantly greater improvements from baseline WOMAC scores compared to SOC patients after adjusting for covariates (treatment effect=2.56; 95% confidence interval (CI) [1.10-4.01]). SF-36 BP scores were significantly improved for both hip and knee patients in the NCP (treatment effect=3.01, 95% CI [0.70-5.32]), but SF-36 PF scores were not. Effects of the NCP were more pronounced in knee patients. CONCLUSION: While effect sizes were small compared with major effects of the surgery itself, an evidence-informed clinical pathway can improve health related quality of life (HRQoL) of hip and knee arthroplasty patients with degenerative joint disorder in routine clinical practice for up to 12 months post-operatively. CLINICALTRIALS.GOV IDENTIFIER: NCT00277186.

Gooch, K. L., Smith, D., Wasylak, T., et al. (2009). "The Alberta Hip and Knee Replacement Project: a model for health technology assessment based on comparative effectiveness of clinical pathways." Int J Technol Assess Health Care 25(2) : 113-123.

BACKGROUND: The Alberta Hip and Knee Replacement Project developed a new evidence-based clinical pathway (NCP) for total hip (THR) and knee (TKR) replacement. The aim was to facilitate the delivery of services in a timely and cost-effective manner while achieving the highest quality of care for the patient across the full continuum of care from patient referral to an orthopedic surgeon through surgery, recovery, and rehabilitation. The purpose of this article is to provide an overview of the study design, rationale, and execution of this project as a model for health technology assessment based on comparative effectiveness of alternative clinical pathways. METHODS: A pragmatic randomized controlled trial study design was used to evaluate the NCP compared with the standard of care (SOC) for these procedures. The pragmatic study design was selected as a rigorous approach to produce high quality evidence suitable for informing decisions between relevant interventions in real clinical practice. The NCP was evaluated in three of the nine regional health authorities (RHAs) in Alberta with dedicated central intake clinics offering multidisciplinary care teams, constituting 80 percent of THR and TKR surgeries performed annually in Alberta. Patients were identified in the offices of twenty orthopedic surgeons who routinely performed THR or TKR surgeries. Evaluation outcome measures were based on the six dimensions of the Alberta Quality Matrix for Health (AQMH): acceptability, accessibility, appropriateness, effectiveness, efficiency and safety. Data were collected prospectively through patient self-completed questionnaires at baseline and 3 and 12 months after surgery, ambulatory and inpatient chart reviews, and electronic administrative data. RESULTS: The trial design was successful in establishing similar groups for rigorous evaluation. Of the 4,985 patients invited to participate, 69 percent of patients consented. A total of 3,434 patients were randomized: 1,712 to SOC and 1,722 to the NCP. The baseline characteristics of patients in the two study arms, including demographics, comorbidity as measured by CDS and exposure to pain

medications, and health-related quality of life, as measured by Western Ontario and McMaster Universities Osteoarthritis Index and Short Form-36, were similar. CONCLUSIONS: The Alberta Hip and Knee Replacement Project demonstrates the feasibility and advantages of applying a pragmatic randomized controlled trial to ascertain comparative effectiveness. This is a model for health technology assessment that incorporates how clinical pathways can be effectively evaluated.

Grassi, A. et Golinelli, D. (2019). "Patient-reported outcome measures (PROMs) after elective hip, knee and shoulder arthroplasty: protocol for a prospective cohort study." 20(1) : 374.

BACKGROUND: The number of hip, knee and shoulder arthroplasties continues to rise worldwide. The Organization for Economic Cooperation and Development has launched an initiative (called PaRIS Initiative) for the systematic collection of Patient Reported Outcome Measures (PROMs) in patients undergoing elective hip and knee arthroplasty. The Rizzoli Orthopedic Institute (IOR) was selected as a pilot center for the launch of the Initiative in Italy given that IOR hosts the Registry of Orthopedic Prosthetic Implants (RIPO), a region-wide registry which collects joint implant data from all the hospitals in the Emilia-Romagna Region. In this specific geographic area information related to PROMs after joint replacement is unknown. This paper describes the protocol of a study (PaRIS-IOR) that aims to implement the collection of a set of PROMs within an existing implant registry in Italy. The study will also investigate the temporal trend of PROMs in relation to the type of prosthesis and the type of surgical intervention. METHODS: The PaRIS-IOR study is a prospective, single site, cohort study that consists of the administration of PROMs questionnaires to patients on the list for elective arthroplasty. The questionnaires will be administered to the study population within 30 days before surgery, and then at 6 and 12 months following surgery. The study population will consist of consecutive adult patients undergoing either hip, knee or shoulder arthroplasty. The collected data will be linked with those routinely collected by the RIPO in order to assess the temporal trend of PROMs in relation to the type of prosthesis and the type of surgical intervention. DISCUSSION: The PaRIS-IOR study could have important implications in targeting the factors influencing functional outcomes and quality of life reported by patients after hip, knee and shoulder arthroplasty, and will also represent the first systematic collection of PROMs related to arthroplasty in Italy. TRIAL REGISTRATION: Protocol version (1.0) and trial registration data are available on the platform www.clinicaltrial.gov with the identifier NCT03790267 , first posted on December 31, 2018.

Gromov, K., Kristensen, B. B., Jørgensen, C. C., et al. (2017). "Fast-track total knee arthroplasty." Ugeskrift for laeger 179(38) : V04170300.
https://ugeskriftet.dk/videnskab/fast-track-totalknaealloplastik

Fast-track total knee arthroplasty (TKA) is a well-established concept including optimized logistics and evidence-based treatment, focusing on minimizing surgical stress and improved post-operative recovery, thus leading to lower mortality and morbidity as well as high patient satisfaction. All patients are eligible for fast-track TKA, and hence the fast-track concept should be standard at all joint replacement facilities. Future challenges of fast-track TKA include safe introduction of outpatient protocols, acute and chronic pain after surgery and optimal utilization of post-operative physiotherapy.

Grosso, M. J., Neuwirth, A. L., Boddapati, V., et al. (2019). "Decreasing Length of Hospital Stay and Postoperative Complications After Primary Total Hip Arthroplasty: A Decade Analysis From 2006 to 2016." J Arthroplasty 34(3) : 422-425.

BACKGROUND: In an attempt to decrease costs without increasing complication burden, the development of rapid recovery protocols has led to an increased push for decreased length of hospital stay (LOS) following total hip arthroplasty (THA). The purpose of this study was to analyze trends in LOS and complications following THA over a 10-year period. METHODS: Using the National Surgical Quality Improvement Program registry from 2006 to 2016, we identified all patients who underwent primary THA. Patients were placed into 3 cohorts based on the year of surgery (2006-2009 [N = 3873], 2010-2013 [N = 45,992], 2014-2016 [N = 86,099]). Differences in LOS, operative time, readmission rates, and 30-day postoperative medical complications were compared using bivariate and multivariate analyses. RESULTS: Multivariate regression analysis identified a significant decrease in LOS in days for the 2010-2013 cohort (3.2 +/- 4.8, P < .001) and 2014-2016 cohort (2.7 +/- 2.5, P < .001) compared to the 2006-2009 cohort (3.8 +/- 2.5). Despite decreasing LOS, there were significantly lower complications in the later cohorts, with significantly lower rates of all complications (5.27% [2006-2009], 3.77% [2009-2013], 3.14% [2013-2016]), sepsis (0.70%, 0.31%, 0.16%), and urinary tract infection (1.94%, 1.23%, 0.83%) using both bivariate and multivariate analyses (P < .001). In addition, there was no significant difference in unplanned 30-day readmissions (3.66% [2010-2013] vs 3.5% [2014-2016], P = .142). CONCLUSION: Over the last decade, there has been a decrease in LOS and an improved short-term complication profile for THA. With continually increasing rates of utilization of THA along broader patient demographics, these changes are important to help mitigate the costs of higher volume.

Gwynne-Jones, D. P., Martin, G. et Crane, C. (2017). "Enhanced Recovery After Surgery for Hip and Knee Replacements." Orthop Nurs 36(3) : 203-210.

BACKGROUND: Enhanced recovery after surgery (ERAS) programs or hip and knee replacements have had a significant effect on streamlining patient care with shorter stays, no increase in complications, and improved outcomes including reduced mortality. PURPOSE: To compare outcomes following the introduction of an ERAS program for hip and knee replacements developed at our institution with a historical cohort of patients. METHODS: ERAS protocols were developed at our institution for patients undergoing hip and knee joint replacements. Key aspects were changes in preadmission, a new education session, improved management of perioperative anemia, standardized anesthetic guidelines, day of surgery mobilization, and improved discharge planning. The results of the first 18 months (528 consecutive patients) were compared with those of a historical cohort of 507 patients from the 18 months prior to their introduction. RESULTS: In the ERAS group, the mean age was 68.3 years for patients who underwent hip replacement and 70.4 years for patients who underwent knee replacement. Thirty-two percent of patients were ASA (American Society of Anesthesiologists) Grades III and IV. The average preoperative Oxford score was 11. The average length of stay (ALOS) fell from 5.6 to 4.3 days for patients who underwent hip replacement and from 5.7 to 4.8 days for patients who underwent knee replacement (p < .001). Ninety-six percent of patients were discharged home. The 30-day readmission rate increased from 3.2% to 5.5% (p = .065). Six-month Oxford knee scores were higher in the ERAS group (39.8 vs. 36.3, p = .03). There was no increase in mortality or early revision rate. CONCLUSIONS: Substantial reductions in ALOS can be gained with the introduction of ERAS protocols, with high patient satisfaction and no increase in complications in a consecutive unselected group of public hospital patients. This requires a multidisciplinary approach and a strong clinical input.

Hass, S., Jaekel, C. et Nesbitt, B. (2015). "Nursing strategies to reduce length of stay for persons undergoing total knee replacement: integrative review of key variables." J Nurs Care Qual 30(3) : 283-288.

Decreasing the length of stay for persons undergoing total knee replacement surgery can improve patient and organizational outcomes while reducing health care costs. This integrative review examined selected nurse-driven variables that assist the interdisciplinary team to reduce length of stay. Findings suggest that a targeted clinical pathway including comprehensive preoperative patient education, physical therapy on the day of surgery, multimodal pain control, and proactive discharge planning may provide the best practice with this patient population.

Haynes, J. A., Stambough, J. B., Sassoon, A. A., et al. (2016). "Contemporary Surgical Indications and Referral Trends in Revision Total Hip Arthroplasty: A 10-Year Review." J Arthroplasty 31(3) : 622-625.

BACKGROUND: Revision total hip arthroplasty (THA) represents nearly 15% of all hip arthroplasty procedures in the United States and is projected to increase. The purpose of our study was to summarize the contemporary indications for revision THA surgery at a tertiary referral medical center. We also sought to identify the indications for early and late revision surgery and define the prevalence of outside institution referral for revision THA. METHODS: Using our institution's arthroplasty registry, we identified a retrospective cohort of 870 consecutive patients who underwent revision THA at our hospital from 2004 to 2014. Records were reviewed to collect data on patient's primary and revision THA procedures, and the interval between primary THA and revision surgery was determined. RESULTS: Aseptic loosening (31.3%), osteolysis (21.8%), and instability (21.4%) were the overall most common indications for revision THA and the most common indications for revision surgery within 5 years of primary THA. Aseptic loosening and osteolysis were the most common indications for revision greater than 5 years from primary THA. Only 16.4% of revised hips had their index arthroplasty performed at our hospital, whereas 83.6% were referred to our institution. CONCLUSIONS: Aseptic loosening, osteolysis, and instability remain the most common contemporary indications for revision THA in an era of alternative bearings and modular components. Most of our revisions were referred from outside institutions, which highlights the transfer of a large portion of the revision THA burden to tertiary referral centers, a pattern that could be exacerbated under future bundled payment models.

Hoogland, J. et Wijnen, A. (2019). "Feasibility and Patient Experience of a Home-Based Rehabilitation Program Driven by a Tablet App and Mobility Monitoring for Patients After a Total Hip Arthroplasty." 7(1) : e10342.

BACKGROUND: Recent developments in technology are promising for providing home-based exercise programs. OBJECTIVE: The objective of this study was to evaluate the feasibility and patient experience of a home-based rehabilitation program after total hip arthroplasty (THA) delivered using videos on a tablet personal computer (PC) and a necklace-worn motion sensor to continuously monitor mobility-related activities. METHODS: We enrolled 30 independently living patients aged 18-75 years who had undergone THA as a treatment for primary or secondary osteoarthritis (OA) between December 2015 and February 2017. Patients followed a 12-week exercise program with video instructions on a tablet PC and daily physical activity registration through a motion sensor. Patients were asked to do strengthening and walking exercises at least 5 days a week. There was weekly phone contact with a physiotherapist. Adherence and technical problems were recorded during the intervention. User evaluation was done in week 4 (T1) and at the end of the program (T2). RESULTS: Overall, 26 patients completed the program. Average adherence for exercising 5 times a week was 92%. Reasons mentioned most often for nonadherence were vacation or a day or weekend off 25% (33/134) and work 15% (20/134). The total number of technical

issues was 8. The average score on the user evaluation questionnaire (range 0-5) was 4.6 at T1 and 4.5 at T2. The highest score was for the subscale "coaching" and the lowest for the subscale "sensor." CONCLUSIONS: A home-based rehabilitation program driven by a tablet app and mobility monitoring seems feasible for THA patients. Adherence was good and patient experience was positive. The novel technology was well accepted. When the home-based rehabilitation program proves to be effective, it could be used as an alternative to formal physiotherapy. However, further research on its effectiveness is needed.

Høvik, L. H., Aglen, B. et Husby, V. S. (2018). "Patient experience with early discharge after total knee arthroplasty: a focus group study." Scandinavian journal of caring sciences 32(2) : 833-842. https://onlinelibrary.wiley.com/doi/abs/10.1111/scs.12514

BACKGROUND: Total knee arthroplasty is experienced as a painful procedure, and pain after surgery seems to be the most limiting factor for early mobilisation. Physical exercise is of utter importance for avoiding complications such as persistent pain and functional limitations. A fast-track pathway aims at improving patient outcome, and patients are now discharged 2-3 days after surgery. Little is known about how the patients cope with pain, exercise or daily activities at home. AIM: To explore the experience of patients undergoing total knee arthroplasty in a fast-track pathway during the first 2 weeks after surgery. DESIGN: Qualitative design. METHODS: Three focus group interviews, including 13 patients from two different units of an orthopaedic department in central Norway, were conducted from May to June 2015. The interviews were analysed using Malteruds` method of systematic text condensation. FINDINGS: The main finding was the patients' determination and ability to cope at home. The fast-track pathway seemed to enable patients to take an active role in own self-care. The patient's coping capacity was strengthened by education, knowledge and predictability. Four main areas related to coping emerged after discharge. First, the majority of patients expressed that it was good to come home and take responsibility for their own rehabilitation. Second, prerequisites for feeling secure after returning home were highlighted. Third, the patients seemed empowered by sharing experiences with others. Fourth, postoperative pain was prevalent in many patients after discharge, but the patients seemed prepared by information provided in the fast-track pathway. CONCLUSION: The fast-track pathway released coping skills and resources among the patients. The expectation of, and preparation for early discharge made the patients feel confident when discharged few days after surgery. The patients expected to take great responsibility for their own rehabilitation process.

Husni, M. E., Losina, E., Fossel, A. H., et al. (2010). "Decreasing medical complications for total knee arthroplasty: effect of critical pathways on outcomes." BMC Musculoskelet Disord 11 : 160.

BACKGROUND: Studies on critical pathway use have demonstrated decreased length of stay and cost without compromise in quality of care. However, pathway effectiveness is difficult to determine given methodological flaws, such as small or single center cohorts. We studied the effect of critical pathways on total knee replacement outcomes in a large population-based study. METHODS: We identified hospitals in four US states that performed total knee replacements. We sent a questionnaire to surgical administrators in these hospitals including items about critical pathway use and hospital characteristics potentially related to outcomes. Patient data were obtained from Medicare claims, including demographics, comorbidities, 90-day postoperative complications and length of hospital stay. The principal outcome measure was the risk of having one or more postoperative complications. RESULTS: Two hundred ninety five hospitals (73%) responded to the questionnaire, with 201 reporting the use of critical pathways. 9,157 Medicare beneficiaries underwent TKR in these hospitals with

a mean age of 74 years (+/- 5.8). After adjusting for both patient and hospital related variables, patients in hospitals with pathways were 32% less likely to have a postoperative complication compared to patients in hospitals without pathways (OR 0.68, 95% CI 0.50-0.92). Patients managed on a critical pathway had an average length of stay 0.5 days (95% CI 0.3-0.6) shorter than patients not managed on a pathway. CONCLUSION: Medicare patients undergoing total knee replacement surgery in hospitals that used critical pathways had fewer postoperative complications than patients in hospitals without pathways, even after adjusting for patient and hospital related factors. This study has helped to establish that critical pathway use is associated with lower rates of postoperative mortality and complications following total knee replacement after adjusting for measured variables.

Husted, H., Hansen, H. C., Holm, G., et al. (2010). "What determines length of stay after total hip and knee arthroplasty? A nationwide study in Denmark." Arch Orthop Trauma Surg 130(2) : 263-268.

INTRODUCTION: The goal of this study was (1) to identify logistical and clinical areas of importance for length of stay (LOS) by identifying departments with short and long LOS and to evaluate their set-up; and (2) to evaluate patient satisfaction in relation to LOS. MATERIALS AND METHODS: Based on the National Register on Patients in 2004 on LOS following total hip and knee arthroplasty (THA and TKA), departments with short and long LOS were identified. The three departments with the shortest and the three departments with the longest postoperative hospital stay were chosen for evaluation. The logistic setup and the clinical treatment/pathway were examined with on-location focus interviews to identify logistic and clinical factors acting as improvement or barriers for early rehabilitation and subsequent discharge. Also, the patients from these departments answered a questionnaire regarding satisfaction with components of their stay, co-morbidity, sex and age. RESULTS: Mean LOS was 7.4 and 8.0 days after THA and TKA, respectively staying from 4.5 to 12 days. Departments with short hospital stay were characterised by both logistical (homogenous entities, regular staff, high continuity, using more time on and up to date information including expectations on a short stay, functional discharge criteria) and clinical features (multimodal opioid-sparing analgesia, early mobilisation and discharge when criteria were met) facilitating quick rehabilitation and discharge. Patient demographics from departments with the shortest stay were similar co-morbidities than patients from departments with longer stays, but were either as satisfied-or more satisfied-with all parts of their stay. There was no difference in staffing (nurses/physiotherapists) between the two types of departments. CONCLUSION: Nationwide implementation of fast-track THA and TKA would result in a significant decrease in the needed number of hospital beds with similar or better outcome for the patients. Implementation of updated logistical and clinical features is expected to increase rehabilitation and reduce LOS with similar or improved patient satisfaction. These results support the implementation of fast-track total hip- and knee arthroplasty.

Jacobs, C. A., Christensen, C. P. et Karthikeyan, T. (2015). "Assessing the utility of routine first annual follow-up visits after primary total knee arthroplasty." J Arthroplasty 30(4) : 552-554.

The combination of increased TKA utilization and a decreased number of arthroplasty specialists has resulted in a growing need to maximize efficiency without sacrificing the level of care being provided. The purpose of this study was to evaluate the utility of routine first annual follow-up visits for patients that have undergone primary TKA. Of 339 TKAs performed by a single surgeon in 2012, 23% failed to attend scheduled first annual visits. Furthermore, none of the revisions performed at our facility since 2003 were the direct result

of information gained at a patient's routine first annual visit. As such, we question the clinical utility of the first annual visit.

Jansson, M. M. et Harjumaa, M. (2019). "Healthcare professionals' proposed eHealth needs in elective primary fast-track hip and knee arthroplasty journey: A qualitative interview study." 28(23-24) : 4434-4446.

AIMS AND OBJECTIVES: To examine the lived experience of healthcare professionals providing care for patients with total hip and knee arthroplasty and to understand healthcare professionals' proposed eHealth needs in elective primary fast-track hip and knee arthroplasty journey. BACKGROUND: There is little evidence in nursing literature to indicate how to develop new eHealth services to support surgical care journeys. Evidence is particularly lacking regarding the development of eHealth solutions. DESIGN: This was a qualitative interview study. METHODS: Semi-structured interviews were conducted with four surgeons, two anaesthesiologists, ten nurses and four physiotherapists in a single joint replacement centre during autumn 2018. The data were analysed using an inductive content analysis method. NVivo qualitative data analysis software was used. The COREQ checklist for qualitative studies was followed. RESULTS: Our research addressed the gap in evidence by focusing on the four main parts of the patient journey in the selected context. Analysis of the data revealed nine main categories for the proposed eHealth needs: eligibility criteria, referrals, meeting the Health Care Guarantee, patient flow, postdischarge care, patient counselling, communication, transparency of the journey and receiving feedback. In addition, the requirements and further development needs for eHealth solutions were generally identified. CONCLUSIONS: From the point of view of healthcare professionals, eHealth solutions have huge potential in supporting the elective primary fast-track hip and knee arthroplasty journey. However, it is important to acknowledge that these needs may be very different depending on the technological and organisational environment in question. RELEVANCE TO CLINICAL PRACTICE: More effective use of information and communication technologies is needed for organisational optimisation resulting in a streamlined pathway, better access to healthcare services, improved outcomes and an improved patient experience. These results can be used in the development of new eHealth solutions to support surgical care journeys and patient education.

Jung, K.-D., Husted, H. et Kristensen, B. B. (2020). "Total knee and hip arthroplasty within 2 days : The Danish Fast-Track Model." Orthopade 49(3) : 218-225.
https://link.springer.com/article/10.1007%2Fs00132-019-03796-5

BACKGROUND: Patients in Denmark undergoing total knee or hip replacement are routinely discharged within 2 days of surgery. A critical examination of traditional treatment methods, combined with focused research, has during the last 20 years increasingly optimized the treatment course in such a way that it has become possible to radically reduce the length of stay (LOS). BASICS OF THE FAST-TRACK MODEL: The most important elements of this Fast-Track model are described. The patient motivation and transfer of partial responsibility to the patient through intensive information, optimized operation techniques, as well as modern multi-modal pain therapy with early mobilization are key issues. The relatively small and homogenous health care system of Denmark offers good research conditions and the possibility of a fast implementation of the latest results, as well as a lump-sum based re-imbursement system without minimum stay-both factors have been favorable for the development of the Fast-Track model.

Kauppila, A. M., Kyllonen, E., Ohtonen, P., et al. (2010). "Multidisciplinary rehabilitation after primary total knee arthroplasty: a randomized controlled study of its effects on functional capacity and quality of life." Clin Rehabil 24(5) : 398-411.

OBJECTIVE: To examine whether a multidisciplinary rehabilitation programme can improve functional recovery and quality of life and reduce the use of rehabilitation services compared with conventional care one year after total knee arthroplasty. DESIGN: Prospective, randomized, non-blinded, controlled trial. SETTING: An outpatient centre-based setting. SUBJECTS: Eighty-six patients who were scheduled for primary total knee arthroplasty due to osteoarthritis of the knee. INTERVENTIONS: A ten-day multidisciplinary rehabilitation programme, which was focused on enhancing functional capacity, was organized 2-4 months after surgery. In both groups, a standard amount of physiotherapy was included in conventional care. MAIN MEASURES: The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), the 15D, 15-m walk test, stair test, isometric strength measurement of the knee. Use of rehabilitation services was asked about with a questionnaire. Outcomes were assessed preoperatively and at 2-, 6- and 12-month follow-ups. RESULTS: In both groups, functional capacity and quality of life improved significantly. The mean absolute change in the WOMAC function score was -32.4 mm (SD 26.4) in the rehabilitation group and -32.8 mm (SD 20.1) in the control group (P-time*group = 0.40). No difference was found between groups in any outcome measure or in the use of rehabilitation services during the study period. CONCLUSIONS: This study indicates that for knee osteoarthritis patients treated with primary total knee arthroplasty, a 10-day multidisciplinary outpatient rehabilitation programme 2-4 months after surgery does not yield faster attainment of functional recovery or improvement in quality of life than can be achieved with conventional care.

Kehlet, H. (2013). "Fast-track hip and knee arthroplasty." Lancet (London, England) 381(9878) : 1600-1602.
https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)61003-X/fulltext

Kelly, E., Campbell, J. et Murray, P. (2013). "Total hip replacement: patient satisfaction and early outcomes." Int J Health Care Qual Assur 26(3) : 262-268.

PURPOSE: The purpose of this paper is to assess patient satisfaction with their healthcare experience, total hip replacement outcome, compliance with post operative rehabilitation and consenting process effectiveness. DESIGN/METHODOLOGY/APPROACH: A consecutive sample of patients between January 2007 and September 2008 was identified. A novel questionnaire was designed to assess outcomes and applied via phone interview by an independent assessor. FINDINGS: All patients recalled the consenting/education process with a high proportion recalling surgical risks/benefits. Overall satisfaction was good or better in 76 per cent of the cohort. Post-operative compliance with the rehabilitation programme in 70 per cent of the cohort was achieved. Walking, as the surrogate functional marker, was deemed good or better in 76 per cent. PRACTICAL IMPLICATIONS: The education process and a purposefully designed booklet helped educate patients. Those dissatisfied with physiotherapy generally underwent surgery late in the week and were assessed/treated by the emergency physiotherapy service. Consequently, full-time weekend physiotherapy for arthroplasty patients was implemented. ORIGINALITY/VALUE: Results revealed a high-volume treatment centre with outcomes comparable to international standards. A potential problem with physiotherapy cover was identified and the loop closed.

Kelly, M. P., Calkins, T. E., Culvern, C., et al. (2018). "Inpatient Versus Outpatient Hip and Knee Arthroplasty: Which Has Higher Patient Satisfaction?" J Arthroplasty 33(11) : 3402-3406.

BACKGROUND: More surgeons are offering patients the option of having adult reconstructive procedures performed as an outpatient at an ambulatory surgery center. However, it is unknown if these patients have higher or lower satisfaction with their care than patients having a traditional inpatient stay. The purpose of this study is to compare satisfaction between inpatients and outpatients undergoing hip or knee arthroplasty. METHODS: Portions of the Health Consumer Assessment of Healthcare Providers and Systems survey, the Friends and Family Test, and 8 additional questions were administered to 174 consecutive patients. There were 8 non-responders (95.4% response rate) leaving 102 who underwent inpatient and 64 who had outpatient surgery. Responses were stratified using the "boxes" scoring approach as recommended by Health Consumer Assessment of Healthcare Providers and Systems and analyzed with a chi-squared or Fischer's exact test where appropriate. Power analysis determined that 38 patients per group were needed to detect a 1-point difference in overall satisfaction between groups with 80% power and alpha of 0.05 considered significant. RESULTS: Outpatients responded with more top responses when asked about the staff's explanation of any medicines received (91.4% vs 77.5%, P = .026), the staff's assistance with their pain management (98.3% vs 88.0%, P = .022), the written health information they were given upon discharge (98.3% vs 90.1%, P = .05), and the courtesy and respect from the nurses (100.0% vs 92.2%, P = .022). Inpatients responded with more bottom responses when asked how prepared they felt for discharge home (8.9% vs 0.0%, P = .014). Top responses in overall satisfaction with the facility (87.1% vs 93.4%, P = .204) and overall experience (89.2% vs 95.2%, P = .177) were similar between inpatients and outpatients, respectively. Not surprisingly, inpatients were older (64.1 vs 59.2 years, P = .001), heavier (body mass index 32.7 vs 30.4, P = .035), and had higher Charlson comorbidity scores (2.6 vs 1.9, P = .002). CONCLUSION: Although satisfaction was high in both groups, when differences were present they favored outpatient surgery in the ambulatory surgery center.

Kim, K., Pham, D. et Schwarzkopf, R. (2016). "Mobile Application Use in Monitoring Patient Adherence to Perioperative Total Knee Arthroplasty Protocols." Surg Technol Int 28 : 253-260.

The potential for using mobile applications (apps) as an effective tool to monitor patients in an outpatient setting is promising. Past studies have investigated the use of applications in preoperative and postoperative settings as well as in monitoring and treating chronic illnesses such as diabetes, congestive heart failure (CHF), and multiple sclerosis. However, there is limited data on its specific use in the context of total knee arthroplasty. Given the complicated nature and crucial role of patient adherence to protocols during the preparatory and recovery phases of the procedure, the use of an app can serve as a helpful tool in aiding patients throughout this process. We present a pilot study to assess the efficacy of using such an app in order to monitor patient adherence to total knee arthroplasty-specific preoperative and postoperative protocols. Preoperative protocols used in this study included a 5-item medication protocol and multiple activity instructions. Postoperative patient protocols included following instructions on topics such as recording responses to quality-of-life questions, when and how to contact the clinical team if patients had non-emergent concerns or questions, and carrying out daily physical therapy (PT) exercises. Patients received and recorded responses to these preoperative and postoperative instructions using the iGetBetter program application installed on an iPad Mini, provided to the participants. Patient adherence was based on the data gathered from the patient responses inputted on this app. Adherence rates were comparable to those reported in various past studies that

also investigated rates of adherence to health management-related instructions communicated through mobile apps.

Kim, K. Y., Anoushiravani, A. A., Elbuluk, A., et al. (2018). "Primary Total Hip Arthroplasty With Same-Day Discharge: Who Failed and Why." Orthopedics 41(1) : 35-42.

As the emphasis on value-based care within total joint arthroplasty increases, this procedure is becoming more prevalent in the outpatient setting. The goals of this study were to report on the authors' early experiences with same-day discharge and to identify patient characteristics that are associated with failure to discharge after total hip arthroplasty within this program. All patients who were enrolled in the same-day discharge total hip arthroplasty program at the study institution between January 2015 and July 2016 were included. Demographics, baseline characteristics, and clinical and quality outcomes were compared between patients who successfully completed this program and those who did not. Of the 163 study subjects, 143 (87.7%) were discharged successfully on the same day as surgery. Women, patients younger than 40 years, and patients older than 60 years all had an increased risk of failing the program. Body mass index of 26 kg/m(2) or less was associated with a 40% greater risk of failure. Patients with an American Society of Anesthesiologists score of 3 had a 3-fold risk of failure compared with patients with an American Society of Anesthesiologists score of 2 or less. The screening protocol for same-day discharge at the study institution had an 87.7% rate of successful same-day discharge. Further investigation is needed to identify patients who are at risk of failing the same-day discharge initiative. [Orthopedics. 2018; 41(1):35-42.].

Kiran, M., Lacey, A., Awad, M., et al. (2018). "Enhanced recovery protocol in total hip replacement does not increase general practitioner visits." Br J Anaesth 121(3) : 682-683.

Kirschner, S., Lutzner, J., Gunther, K. P., et al. (2010). "[Clinical pathway for total knee arthroplasty. I: Pathway conception and effect on functional quality of results]." Orthopade 39(9) : 853-859.

PURPOSE: The aim of the current study was to evaluate patient-centred and economic outcomes after introduction of a clinical pathway for total knee arthroplasty. METHODS: In a prospective trial two sequential cohorts of patients undergoing total knee arthroplasty were recruited. Baseline treatment was surveyed in cohort I and the clinical pathway was developed and evaluated in cohort II. Data from WOMAC, EQ-5D as well as partial cost data were collected. The study design was ratified by the local Independent Ethics Committee. RESULTS: There was an increase in WOMAC score of 39% for cohort I and 35% for cohort II in 3 months follow-up. Similar results were found for ED-5D with an increase of 30% for cohort I and 25% for cohort II. Partial cost rates could be lowered from 4303 EUR to 419 EUR. Despite this significant cost saving we were not able to improve the ratio of improvement in quality of life to costs. CONCLUSION: With the aid of a clinical pathway the process for implementation of a total knee arthroplasty was improved and treatment quality assured.

Kirschner, S., Lutzner, J., Meier, V., et al. (2010). "[Clinical pathway for total knee arthroplasty (EGON). II. The impact of enhanced patient information]." Orthopade 39(9) : 860-865.

PURPOSE: The effects of the introduction of a clinical pathway and enhanced patient information on patients' satisfaction were investigated in the current study. MATERIAL AND METHODS: In a prospective cohort study patients were systematically interviewed about the preparation and the clinical course during implantation of a total knee arthroplasty. The study included 132 patients before (cohort I) and 128 after (cohort II) introduction of a

clinical pathway. All patients of cohort II were offered the opportunity to attend an enhanced patient information lecture. The collected data were analysed in a descriptive manner. Items with more than 10% negative answers constituted the need for improvement. RESULTS: Regarding preparation of the operation there was a need for improvement of 11 items in cohort I and 4 in cohort II. With respect to the clinical course there was a slight increase from 6 to 7 items that required improvement. The enhanced information about the treatment and the clinical course were assessed positively. Patients were unsatisfied with the individual explanation of the X-rays. Of 128 patients from cohort II, 58 decided to participate in the information session for patients. The patients who had attended were more interested in receiving additional information. The success of the operation (gain in WOMAC score of at least 20%) showed a substantial effect on patient satisfaction. CONCLUSION: With increased patient information the knowledge and patient satisfaction within clinical pathways can be improved.

Klapwijk, L. C., Mathijssen, N. M., Van Egmond, J. C., et al. (2017). "The first 6 weeks of recovery after primary total hip arthroplasty with fast track." Acta Orthop 88(2) : 140-144.

Background and purpose - Fast-track protocols have been introduced worldwide to improve the recovery after total hip arthroplasty (THA). These protocols have reduced the length of hospital stay (LOS), and THA in an outpatient setting is also feasible. However, less is known regarding the first weeks after THA with fast track. We examined patients' experiences of the first 6 weeks after hospital discharge following inpatient and outpatient THA with fast track. Patients and methods - In a prospective cohort study, 100 consecutive patients who underwent THA surgery in a fast-track setting between February 2015 and October 2015 received a diary for 6 weeks. This diary contained various internationally validated questionnaires including HOOS-PS, OHS, EQ-5D, SF-12, and ICOAP. In addition, there were general questions regarding pain, the wound, physiotherapy, and thrombosis prophylaxis injections. Results - 94 patients completed the diary, 42 of whom were operated in an outpatient setting. Pain and use of pain medication had gradually decreased during the 6 weeks. Function and quality of life gradually improved. After 6 weeks, 91% of all patients reported better functioning and less pain than preoperatively. Interpretation - Fast track improves early functional outcome, and the PROMs reported during the first 6 weeks in this study showed continued improvement. They can be used as a baseline for future studies. The PROMs reported could also serve as a guide for staff and patients alike to modify expectations and therefore possibly improve patient satisfaction.

Krummenauer, F., Guenther, K. P. et Kirschner, S. (2011). "Cost effectiveness of total knee arthroplasty from a health care providers' perspective before and after introduction of an interdisciplinary clinical pathway--is investment always improvement?" BMC Health Serv Res 11 : 338.

BACKGROUND: Total knee arthroplasty (TKA) is an effective, but also cost-intensive health care intervention for end stage osteoarthritis. This investigation was designed to evaluate the cost-effectiveness of TKA before versus after introduction of an interdisciplinary clinical pathway from a University Orthopedic Surgery Department's cost perspective as an interdisciplinary full service health care provider. METHODS: A prospective trial recruited two sequential cohorts of 132 and 128 consecutive patients, who were interviewed by means of the WOMAC questionnaire. Direct process costs from the health care providers' perspective were estimated according to the German DRG calculation framework. The health economic evaluation was based on margiual cost-effectveness ratios (MCERs); an individual marginal cost effectiveness relation</=100 euro per % WOMAC index increase was considered as

primary endpoint of the confirmatory cohort comparison. The interdisciplinary clinical pathway under consideration primarily consisted of a voluntary preoperative personal briefing of patients concerning postoperatively expectable progess in health status and optimum use of walking aids after surgery. All patients were supplied with written information on these topics, attendance of the personal briefing also included preoperative training for postoperative mobilisation by the Department's physiotherapeutic staff. RESULTS: An individual marginal cost effectiveness relation</=100 euro/% WOMAC index increase was found in 38% of the patients in the pre pathway implementation cohort versus in 30% of the post pathway implementation cohort (Fisher p=0.278). Both cohorts showed substantial improvement in WOMAC scores (39 versus 35% in median), whereas the cohort did not differ significantly in the median WOMAC score before surgery (41% for the pre pathway cohort versus 44% for the post pathway cohort). Despite a locally significant decrease in costs (4303 versus 4194 euro in median), the individual cost/benefit relation became worse after introduction of the pathway: for the first cohort the MCER was estimated 108 euro per gained % WOMAC index increase (86-150 euro/%) versus 118 euro/% WOMAC gain (93-173 euro/%) in the second cohort after pathway implementation. In summary, the proposed critical pathway for TKA could be shown to be significantly cost efficient, but not cost effective concerning functional outcome, when the above individual marginal cost effectiveness criterion was concentrated on. CONCLUSIONS: The introduction of an interdisciplinary clinical pathway does not necessarily improve patient related outcomes. On the contrary, cost effectiveness from the health care providers' perspective may even turn out remarkably reduced in the setting considered here (functional outcome assessment after treatment by a full service health care provider).

Loftus, T., Agee, C., Jaffe, R., et al. (2014). "A simplified pathway for total knee arthroplasty improves outcomes." J Knee Surg 27(3) : 221-228.

Care pathways for total knee arthroplasty (TKA) demonstrate improved quality and utilization outcomes. Standardizing these processes over large systems is difficult due to the variability of practice patterns and the complexity of multistep pathways. A simplified approach to this process focusing on early activity and avoidance of continuous urinary catheters was performed to overcome these perceived barriers for implementing a system-wide care pathway. Data were collected from a total of 6,154 consecutive patients during the time period of 1 year before and 1 year after implementation of a pathway focusing on two key drivers: early activity and continuous urinary catheter avoidance. Patients included were adults admitted for elective primary TKA. A composite score was calculated based on the successful completion of the two key drivers. Outcome measures were tracked before and after implementation. Following implementation of a simplified TKA care pathway, there was a significant increase in the composite score with increases attributable to both increased early activity ($p < 0.0001$) and continuous urinary catheter avoidance ($p < 0.0001$). This improvement in composite score was associated with a significant decrease in hospital length of stay (HLOS) ($p < 0.0001$), costs ($p < 0.0001$), complications ($p < 0.0001$), and 30-day readmissions ($p < 0.0106$). A fixed-effect model analysis demonstrated early activity was associated with improvements in HLOS ($p < 0.0001$), complications ($p = 0.0240$), and 30-day readmissions ($p = 0.0046$). Avoidance of a continuous urinary catheter was associated with improvements in HLOS ($p = 0.0001$), costs ($p < 0.0001$), complications ($p = 0.0006$), and 30-day readmissions ($p = 0.0008$). A simplified care pathway for TKA focusing on early activity and continuous urinary catheter avoidance is associated with improved complications, costs, HLOS, and 30-day readmissions.

Malek, I. A., Royce, G., Bhatti, S. U., et al. (2016). "A comparison between the direct anterior and posterior approaches for total hip arthroplasty: the role of an 'Enhanced Recovery' pathway." Bone Joint J 98-b(6): 754-760.

AIMS: We assessed the difference in hospital based and early clinical outcomes between the direct anterior approach and the posterior approach in patients who undergo total hip arthroplasty (THA). PATIENTS AND METHODS: The outcome was assessed in 448 (203 males, 245 females) consecutive patients undergoing unilateral primary THA after the implementation of an 'Enhanced Recovery' pathway. In all, 265 patients (mean age: 71 years (49 to 89); 117 males and 148 females) had surgery using the direct anterior approach (DAA) and 183 patients (mean age: 70 years (26 to 100); 86 males and 97 females) using a posterior approach. The groups were compared for age, gender, American Society of Anesthesiologists grade, body mass index, the side of the operation, pre-operative Oxford Hip Score (OHS) and attendance at 'Joint school'. Mean follow-up was 18.1 months (one to 50). RESULTS: There was no significant difference in mean length of stay (p = 0.07), pain scores on the day of surgery, the first, second and third post-operative days (p = 0.36, 0.23, 0.25 and 0.59, respectively), the day of mobilisation (p = 0.12), the mean OHS at six and 24 months (p = 0.08, and 0.29, respectively), the incidence of infection (p = 1.0), dislocation (p = 1.0), re-operation (p = 0.21) or 28 days' re-admission (p = 0.06). Significantly more patients in the DAA group achieved a planned discharge target of three days post-operatively (68% vs 56%, p = 0.007). The rate of periprosthetic femoral fractures was significantly higher in the DAA group (p = 0.04). CONCLUSION: We conclude that there is no difference in clinical outcomes between the DAA and the posterior approach in patients undergoing THA when an 'Enhanced Recovery' pathway is used. However, a significantly higher rate of periprosthetic femoral fractures remains a concern with the DAA, even in experienced hands. TAKE HOME MESSAGE: Our results show that the DAA for THA is not superior to posterior approach when 'Enhanced Recovery' pathway is used. Cite this article: Bone Joint J 2016;98-B:754-60.

Malviya, A., Martin, K., Harper, I., et al. (2011). "Enhanced recovery program for hip and knee replacement reduces death rate." Acta Orthop 82(5) : 577-581.

BACKGROUND AND PURPOSE: Multimodal techniques can aid early rehabilitation and discharge of patients following primary joint replacement. We hypothesized that this not only reduces the economic burden of joint replacement by reducing length of stay, but also helps in reduction of early complications. PATIENTS AND METHODS: We evaluated 4,500 consecutive unselected total hip replacements and total knee replacements regarding length of hospital stay, mortality, and perioperative complications. The first 3,000 underwent a traditional protocol while the other 1,500 underwent an enhanced recovery protocol involving behavioral, pharmacological, and procedural modifications. RESULTS: There was a reduction in 30-day death rate (0.5% to 0.1%, p = 0.02) and 90-day death rate (0.8% to 0.2%, p = 0.01). The median length of stay decreased from 6 days to 3 days (p < 0.001), resulting in a saving of 5,418 bed days. Requirement for blood transfusion was reduced (23% to 9.8%, p < 0.001). There was a trend of a reduced rate of 30-day myocardial infarction (0.8% to 0.5%. p = 0 .2) and stroke (0.5% to 0.2%, p = 0.2). The 60-day deep vein thrombosis figures (0.8% to 0.6%, p = 0.5) and pulmonary embolism figures (1.2% to 1.1%, p = 0.9) were similar. Re-admission rate remained unchanged during the period of the study (4.7% to 4.8%, p = 0.8). INTERPRETATION: This large observational study of unselected consecutive hip and knee arthroplasty patients shows a substantial reduction in death rate, reduced length of stay, and reduced transfusion requirements after the introduction of a multimodal enhanced recovery protocol.

Marshall, D. A., Christiansen, T., Smith, C., et al. (2015). "Continuous quality improvement program for hip and knee replacement." Am J Med Qual 30(5) : 425-431.

Improving quality of care and maximizing efficiency are priorities in hip and knee replacement, where surgical demand and costs increase as the population ages. The authors describe the integrated structure and processes from the Continuous Quality Improvement (CQI) Program for Hip and Knee Replacement Surgical Care and summarize lessons learned from implementation. The Triple Aim framework and 6 dimensions of quality care are overarching constructs of the CQI program. A validated, evidence-based clinical pathway that measures quality across the continuum of care was adopted. Working collaboratively, multidisciplinary experts embedded the CQI program into everyday practices in clinics across Alberta. Currently, 83% of surgeons participate in the CQI program, representing 95% of the total volume of hip and knee surgeries. Biannual reports provide feedback to improve care processes, infrastructure planning, and patient outcomes. CQI programs evaluating health care services inform choices to optimize care and improve efficiencies through continuous knowledge translation.

Mears, S. C., Edwards, P. K. et Barnes, C. L. (2016). "How to Decrease Length of Hospital Stay After Total Knee Replacement." J Surg Orthop Adv 25(1) : 2-7.

Hospital stays have been decreasing for hip and knee arthroplasty procedures. Short stay or outpatient procedures were first pioneered in hip replacement; however, short-stay knee replacement is now being routinely performed by some surgeons. Changes in pain control and mobilization have allowed for quicker discharge for knee replacement patients. Combined with specific pathways of care as well as changes in patient expectations and early mobilization, patients can now routinely go home the day after knee replacement. This review seeks to give the reader practical ways to facilitate rapid discharge after knee arthroplasty.

Mitchell, J. M., Reschovsky, J. D. et Reicherter, E. A. (2016). "Use of Physical Therapy Following Total Knee Replacement Surgery: Implications of Orthopedic Surgeons' Ownership of Physical Therapy Services." Health Serv Res 51(5) : 1838-1857.

OBJECTIVE: To examine whether the course of physical therapy treatments received by patients who undergo total knee replacement (TKR) surgery differs depending on whether the orthopedic surgeon has a financial stake in physical therapy services. DATA: Sample of Medicare beneficiaries who underwent TKR surgery during the years 2007-2009. STUDY DESIGN: We used regression analysis to evaluate the effect of physician self-referral on the following outcomes: (1) time from discharge to first physical therapy visit; (2) episode length; (3) number of physical therapy visits per episode; (4) number of physical therapy service units per episode; and (5) number of physical therapy services per episode expressed in relative value units. PRINCIPAL FINDINGS: TKR patients who underwent physical therapy treatment at a physician-owned clinic received on average twice as many physical therapy visits (8.3 more) than patients whose TKR surgery was performed by a orthopedic surgeon who did not self-refer physical therapy services ($p < .001$). Regression-adjusted results show that TKR patients treated at physician-owned clinics received almost nine fewer physical therapy service units during an episode compared with patients treated by nonself-referring providers ($p < .001$). In relative value units, this difference was 4 ($p < .001$). In contrast, episodes where the orthopedic surgeon owner does not profit from physical therapy services rendered to the patient look virtually identical to episodes where the TKR surgery was performed by a surgeon nonowner. CONCLUSIONS: Physical therapists not involved with

physician-owned clinics saw patients for fewer visits, but the composition of physical therapy services rendered during each visit included more individualized therapeutic exercises.

Molko, S. et Combalia, A. (2017). "Rapid recovery programmes for hip and knee arthroplasty. An update." Rev Esp Cir Ortop Traumatol 61(2) : 130-138.

Fast-track surgery, or enhanced recovery, has appeared in the last 20 years or so as a combination of the optimisation of clinical protocols and organisational processes, pursuing the reduction in surgical stress with the aim of reducing peri-operative comorbidities, convalescence time, and functional recovery, resulting in a reduction in admission time. After a review of the European literature available on this subject, this article attempts to present an update. It highlights its interest and origins, basically being set out as a response to the question: 'Why is this patient in Hospital today?' It also attempts to summarise the essence of such programmes: the search for immediate post-surgical mobilisation, being supported in a multidisciplinary approach. This includes a multimodal intervention and analgesia, a limitation in the use of opiates, and the active participation by the patients in their own recovery. Furthermore, mention is made of the initiatives by European State organisation as a boost to enhanced recovery programmes in their respective countries, as is the case in Denmark, France, and the United Kingdom. The clinical outcomes published up to September 2015 have been reviewed. A subsequent decrease in mean hospital stay is observed in 11 studies, achieving patient satisfaction, low complication rates, a reduction in the transfusion rates, and with no apparent increase in re-admissions. Mention is also made of the financial consequences, and how to implement these protocols. As a conclusion, an analysis is made of the future challenges fast-track surgery, such as the possibility of moving towards outpatient surgery, or the obtaining of a surgery 'with no risk or pain' in general, for which there are other still open lines of work.

Negus, J. J., Cawthorne, D. P., Chen, J. S., et al. (2015). "Patient outcomes using Wii-enhanced rehabilitation after total knee replacement - the TKR-POWER study." Contemp Clin Trials 40 : 47-53.

BACKGROUND: Home-based rehabilitation following total knee replacement surgery can be as effective as clinic-based or in-patient rehabilitation. The use of the Nintendo Wii has been postulated as a novel rehabilitation tool that adds an additional focus on balance and proprioception into the recovery protocol. The aim of the proposed clinical trial is to investigate the effectiveness of this novel rehabilitation tool, used at home for three months after total knee replacement surgery and to assess any lasting improvements in functional outcome at one year. METHODS/DESIGN: This will be a randomised controlled trial of 128 patients undergoing primary total knee replacement. The participants will be recruited preoperatively from three surgeons at a single centre. There will be no change to the usual care provided until 6 weeks after the operation. Then participants will be randomised to either the Wii-Fit group or usual rehabilitative care group. Outcomes will be assessed preoperatively, a 6-week post surgery baseline and then at 18 weeks, 6 months and 1 year. The primary outcome is the change in self-reported WOMAC total score from week 6 to 18 weeks. Secondary outcomes include objective measures of strength, function and satisfaction scores. DISCUSSION: The results of this clinical trial will be directly relevant for implementation into clinical practice. If beneficial, this affordable technology could be used by many patients to rehabilitate at home. Not only could it optimize the outcomes from their total knee replacement surgery but decrease the need for clinic-based or outpatient therapy for the majority. TRIAL REGISTRATION: (ACTRN12611000291987).

Noth, U., Geiser, T., Kranich, T., et al. (2019). "[Fast track strategies in hip arthroplasty]." Orthopade 48(4): 330-336.

> BACKGROUND: Fast track arthroplasty is becoming increasingly accepted in German-speaking countries. By optimizing treatment processes fast track programs promise faster recovery, increased patient satisfaction, quality improvement and reduction in the length of hospital stay. OBJECTIVES: The philosophy and treatment principles of fast track hip arthroplasty during the pre, intra and postoperative phase are described in the light of the current body of evidence. The challenges concerning fast track arthroplasty within the German health system are discussed. MATERIAL AND METHODS: Besides presenting our own data concerning a patient seminar and an opiate saving pain treatment, the most relevant literature related to fast track hip arthroplasty from a pubmed search is discussed. RESULTS: Fast track concepts can only be successfully implemented through close interdisciplinary team work. Preoperatively, a patient seminar can help to prepare patients better for surgery. Postoperatively, early mobilisation and pain treatment play a central role, whereat a clear reduction in opiate application can be achieved. CONCLUSION: Fast track hip arthroplasty makes rethinking with respect to traditional treatment principles necessary and demands a high degree of interdisciplinary team work. Particularly, as result of the specifics of the health system (DRG system and stationary rehabilitation), a nationwide establishment in Germany has not taken place so far.

Oldsberg, L., Garellick, G., Osika Friberg, I., et al. (2019). "Geographical variations in patient-reported outcomes after total hip arthroplasty between 2008 - 2012." BMC Health Serv Res 19(1) : 343.

> BACKGROUND: Health care on equal terms is a cornerstone of the Swedish health care system. Total hip arthroplasty (THA) is considered a success story in Sweden with low frequency of reoperations and restored health-related quality of life (HRQoL). Administratively, health care in Sweden is locally self-governed by 21 counties. In this longitudinal nation-wide observational study we assessed the possible geographical variations in 1-year follow-up patient-reported outcomes (PROs): EQ-5D index, EQ VAS, Pain VAS and Satisfaction VAS. METHODS: Study population consisted of 36,235 Swedish THA patients, operated during 2008 to 2012 due to hip osteoarthritis. Individual data came from Swedish Hip Arthroplasty Register, Statistics Sweden and National Board of Health and Welfare. We used descriptive statistics together with multivariable regression analysis to analyse the data. RESULTS: We observed county level differences in both preoperative and postoperative PROs. The results showed that the differences observed in preoperative PROs could not fully explain the differences observed in postoperative PROs, even after adjustment for patient demographics (age, sex, BMI, Elixhauser comorbidity index, marital status, educational level and disposable income). This indicates that other factors might influence the outcome after THA. CONCLUSION: Likely, structural and process differences such as indication for surgery have an influence on PROs after surgery. Standardization of care at hospital levels may decrease geographical variations in postoperative HRQoL. Remaining differences will then possibly be associated to patient demographics.

Olsson, L. E., Karlsson, J., Berg, U., et al. (2014). "Person-centred care compared with standardized care for patients undergoing total hip arthroplasty--a quasi-experimental study." J Orthop Surg Res 9 : 95.

> BACKGROUND: A common approach to decrease length of stay has been to standardize patient care, for example, by implementing clinical care pathways or creating fast-track organizations. In a recent national report, it was found that Sweden's healthcare system

often fails to anticipate and respond to patients as individuals with particular needs, values and preferences. We compared a standardized care approach to one of person-centred care for patients undergoing total hip replacement surgery. METHODS: A control group (n =138) was consecutively recruited between 20th September 2010 and 1st March 2011 and an intervention group (n =128) between 12th December 2011 and 12th November 2012, both scheduled for total hip replacement. The primary outcome measures were length of stay and physical function at both discharge and 3 months later. RESULTS: The mean length of stay in the control group was 7 days (SD 5.0) compared to 5.3 days in the intervention group (SD 2.2). Physical functional performance, as assessed using activities of daily living, was similar at baseline for both groups. At discharge, 84% in the control group had regained activities of daily living level A vs. 72% in the intervention group. At 3 months after surgery, 88% in the control group had regained their independence vs. 92.5% in the person-centred care group. CONCLUSIONS: Focusing attention on patients as people and including them as partners in healthcare decision-making can result in shorter length of stay. The present study shows that the patients should be the focus and they should be involved as partners.

Oosting, E., Jans, M. P., Dronkers, J. J., et al. (2012). "Preoperative home-based physical therapy versus usual care to improve functional health of frail older adults scheduled for elective total hip arthroplasty: a pilot randomized controlled trial." Arch Phys Med Rehabil 93(4) : 610-616.

OBJECTIVE: To investigate the feasibility and preliminary effectiveness of a home-based intensive exercise program to improve physical health of frail elderly patients scheduled for elective total hip arthroplasty (THA). DESIGN: Single-blind pilot randomized controlled trial. SETTING: Patients' homes and a general hospital in The Netherlands. PARTICIPANTS: Frail patients (N=30) older than 65 years. INTERVENTION: A preoperative, home-based program supervised by an experienced physical therapist to train functional activities and walking capacity. The control group received usual care consisting of 1 session of instructions. MAIN OUTCOME MEASURES: Feasibility was determined on the basis of adherence to treatment, patient satisfaction, adverse events, walking distance (measured with a pedometer), and intensity of exercise (evaluated with the Borg scale). Preliminary pre- and postoperative effectiveness was determined by the Timed Up & Go (TUG) test, 6-minute walk test (6MWT), Chair Rise Time, and self-reported measures of functions, activities, and participation. RESULTS: Patient satisfaction and adherence to the training were good (median=5 on a 5-point Likert scale) and no serious adverse events occurred. The Borg score during training was 14 (range, 13-16). Preoperative clinical relevant differences on the TUG test (2.9 s; 95% confidence interval [CI], -0.9 to 6.6) and significant differences on the 6MWT (41 m; 95% CI, 8 to 74) were found between groups. CONCLUSIONS: Intensive preoperative training at home is feasible for frail elderly patients waiting for THA and produces relevant changes in functional health. A larger multicenter randomized controlled trial is in progress to investigate the (cost-)effectiveness of preoperative training.

Pamilo, K. J., Torkki, P., Peltola, M., et al. (2018). "Reduced length of uninterrupted institutional stay after implementing a fast-track protocol for primary total hip replacement." Acta Orthop 89(1) : 10-16.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5810815/

Background and purpose - Fast-track protocols have been successfully implemented in many hospitals as they have been shown to result in shorter length of stay (LOS) without compromising results. We evaluated the effect of fast-track implementation on the use of institutional care and results after total hip replacement (THR). Patients and methods - 3,193 THRs performed in 4 hospitals between 2009-2010 and 2012-2013 were identified from the

Finnish Hospital Discharge Register and the Finnish Arthroplasty Register. Hospitals were classified as fast-track (Hospital A) and non-fast-track (Hospitals B, C, and D). We analyzed LOS, length of uninterrupted institutional care (LUIC, including LOS), discharge destination, readmission, revision rate, and mortality in each hospital. We compared these outcomes for THRs performed in Hospital A before and after fast-track implementation and we also compared outcomes, excluding readmission rates, with the corresponding outcomes for the other hospitals. Results - After fast-track implementation, median LOS in Hospital A diminished from 5 to 2 days ($p < 0.001$) and (median) LUIC from 6 to 3 ($p = 0.001$) days. No statistically significant changes occurred in discharge destination. However, the reduction in LOS was combined with an increase in the 42-day readmission rate (3.1% to 8.3%) ($p < 0.001$). A higher proportion of patients were at home 1 week after THR ($p < 0.001$) in Hospital A after fast-tracking than before. Interpretation - The fast-track protocol reduces LUIC but needs careful implementation to maintain good quality of care throughout the treatment process.

Pearsall, E. A., Meghji, Z., Pitzul, K. B., et al. (2015). "A qualitative study to understand the barriers and enablers in implementing an enhanced recovery after surgery program." Ann Surg 261(1) : 92-96. https://insights.ovid.com/pubmed?pmid=24646564

OBJECTIVE: Explore the barriers and enablers to adoption of an Enhanced Recovery after Surgery (ERAS) program by the multidisciplinary perioperative team responsible for the care of elective colorectal surgical patients. BACKGROUND: ERAS programs include perioperative interventions that when used together have led to decreased length of stay while increasing patient recovery and satisfaction. Despite the known benefits of ERAS programs, uptake remains slow. METHODS: Semistructured interviews were conducted with general surgeons, anesthesiologists, and ward nurses at 7 University of Toronto-affiliated hospitals to identify potential barriers and enablers to adoption of 18 ERAS interventions. Grounded theory was used to thematically analyze the transcribed interviews. RESULTS: Nineteen general surgeons, 18 anesthesiologists, and 18 nurses participated. The mean time of each interview was 18 minutes. Lack of manpower, poor communication and collaboration, resistance to change, and patient factors were cited by most as barriers. Discipline-specific issues were identified although most related to resistance to change. Overall, interviewees were supportive of implementation of a standardized ERAS program and agreed that a standardized guideline based on best evidence; standardized order sets; and education of the staff, patients, and families are essential. CONCLUSIONS: Multidisciplinary perioperative staff supported the implementation of an ERAS program at the University of Toronto-affiliated hospitals. However, major barriers were identified, including the need for patient education, increased communication and collaboration, and better evidence for ERAS interventions. Identifying these barriers and enablers is the first step toward successfully implementing an ERAS program.

Molko, S. et Combalia, A. (2017). "Rapid recovery programmes for hip and knee arthroplasty. An update." Rev Esp Cir Ortop Traumatol 61(2) : 130-138. https://www.sciencedirect.com/science/article/abs/pii/S1888441517300073?via%3Dihub

Fast-track surgery, or enhanced recovery, has appeared in the last 20 years or so as a combination of the optimisation of clinical protocols and organisational processes, pursuing the reduction in surgical stress with the aim of reducing peri-operative comorbidities, convalescence time, and functional recovery, resulting in a reduction in admission time. After a review of the European literature available on this subject, this article attempts to present an update. It highlights its interest and origins, basically being set out as a response to the

question: 'Why is this patient in Hospital today?' It also attempts to summarise the essence of such programmes: the search for immediate post-surgical mobilisation, being supported in a multidisciplinary approach. This includes a multimodal intervention and analgesia, a limitation in the use of opiates, and the active participation by the patients in their own recovery. Furthermore, mention is made of the initiatives by European State organisation as a boost to enhanced recovery programmes in their respective countries, as is the case in Denmark, France, and the United Kingdom. The clinical outcomes published up to September 2015 have been reviewed. A subsequent decrease in mean hospital stay is observed in 11 studies, achieving patient satisfaction, low complication rates, a reduction in the transfusion rates, and with no apparent increase in re-admissions. Mention is also made of the financial consequences, and how to implement these protocols. As a conclusion, an analysis is made of the future challenges fast-track surgery, such as the possibility of moving towards outpatient surgery, or the obtaining of a surgery 'with no risk or pain' in general, for which there are other still open lines of work.

Porsius, J. T., Mathijssen, N. M. C., Klapwijk-Van Heijningen, L. C. M., et al. (2018). "Early recovery trajectories after fast-track primary total hip arthroplasty: the role of patient characteristics." JMIR Mhealth Uhealth 89(6) : 597-602.

Background and purpose - Little is known about heterogeneity in early recovery after primary total hip arthroplasty (THA). Therefore, we characterized subgroups of patients according to their hip function trajectory during the first 6 weeks after THA in a fast-track setting. Patients and methods - 94 patients (median age 65 years [41-82], 56 women) from a single hospital participated in a diary study. Patients recorded their severity of hip problems (Oxford Hip Score, OHS) weekly for 6 weeks after THA. Latent class growth modelling (LCGM) was used to identify patients with the same hip function trajectory and to compare these subgroups on patient characteristics. Results - LCGM revealed a fast (n = 17), an average (n = 53), and a slow (n = 24) recovery subgroup. Subgroups differed on the estimated weekly growth rate during the first 2 weeks (fast: 9.5; average: 5.3; slow: 2.7), with fewer differences between groups in the last 4 weeks (fast: 0.90; average: 2.0; slow: 1.7). Patients in the slow recovery group could be characterized as women of older age (mean age =69) who rated their health as lower preoperatively, needed more assistance during recovery, and were less satisfied with the outcomes of the surgery. Interpretation - We identified distinct recovery trajectories in the first 6 weeks after fast-track primary THA which were associated with patient characteristics.

Pritchard, M. G., Murphy, J., Cheng, L., et al. (2020). "Enhanced recovery following hip and knee arthroplasty: a systematic review of cost-effectiveness evidence." BMJ Open 10(1) : e032204. https://bmjopen.bmj.com/content/bmjopen/10/1/e032204.full.pdf

Objectives To assess cost-effectiveness of enhanced recovery pathways following total hip and knee arthroplasties. Secondary objectives were to report on quality of studies and identify research gaps for future work.Design Systematic review of cost–utility analyses.Data sources Ovid MEDLINE, Embase, the National Health Service Economic Evaluations Database and EconLit, January 2000 to August 2019.Eligibility criteria English-language peer-reviewed cost–utility analyses of enhanced recovery pathways, or components of one, compared with usual care, in patients having total hip or knee arthroplasties for osteoarthritis.Data extraction and synthesis Data extracted by three reviewers with disagreements resolved by a fourth. Study quality assessed using the Consensus on Health Economic Criteria list, the International Society for Pharmacoeconomics and Outcomes Research and Assessment of the Validation Status of Health-Economic decision models tools; for trial-based studies the

Cochrane Collaboration's tool to assess risk of bias. No quantitative synthesis was undertaken.Results We identified 17 studies: five trial-based and 12 model-based studies. Two analyses evaluated entire enhanced recovery pathways and reported them to be cost-effective compared with usual care. Ten pathway components were more effective and cost-saving compared with usual care, three were cost-effective, and two were not cost-effective. We had concerns around risk of bias for all included studies, particularly regarding the short time horizon of the trials and lack of reporting of model validation.Conclusions Consistent results supported enhanced recovery pathways as a whole, prophylactic systemic antibiotics, antibiotic-impregnated cement and conventional ventilation for infection prevention. No other interventions were subject of more than one study. We found ample scope for future cost-effectiveness studies, particularly analyses of entire recovery pathways and comparison of incremental changes within pathways. A key limitation is that standard practices have changed over the period covered by the included studies.PROSPERO registration number CRD42017059473.

Quack, V., Ippendorf, A. V., Betsch, M., et al. (2015). "[Multidisciplinary Rehabilitation and Fast-track Rehabilitation after Knee Replacement: Faster, Better, Cheaper? A Survey and Systematic Review of Literature]." Rehabilitation (Stuttg) 54(4) : 245-251.

INTRODUCTION: The aim of multidisciplinary rehabilitation after total knee replacement (TKA) is to reduce postoperative complications and costs and enable faster convalescence. The goals of fast-track rehabilitation, as a multidisciplinary concept, are to reduce the length of hospital stay and achieve early functional improvements by optimizing the perioperative setting. METHOD: A literature review was carried out for the years 1960-2013. The search terms were: "rehabilitation", "training", "physiotherapy", "physical therapy", "recovery", "exercise program", "knee surgery", "TKA", "total knee replacement", "arthroplasty", "intensive", "multidisciplinary", "accelerated", "rapid" or "fast track". Only randomized controlled trials and metaanalyses were included. A survey was also performed to assess care as actually offered in orthopaedic rehabilitation clinics in North Rhine-Westphalia. RESULTS: A total of 729 articles were identified of which 11 studies were included. Fast-track rehabilitation can significantly reduce both the duration of hospital stay and costs after TKA. Current studies showed that a better short-/middle-term clinical outcome might be achieved with multidisciplinary rehabilitation. However, a difference in the long-term outcome could not be observed. Our survey shows that most patients are admitted to a rehabilitation clinic in a state of poor general condition as well as decreased mobility and knee range of motion. CONCLUSIONS: Fast-track rehabilitation facilitates a shortened hospital stay as well as cost saving. It probably can be used to optimize the condition of the patient before admission to a rehabilitation facility.

Qiu, C., Cannesson, M., Morkos, A., et al. (2016). "Practice and Outcomes of the Perioperative Surgical Home in a California Integrated Delivery System." Anesth Analg 123(3) : 597-606.

BACKGROUND: In this article, we report on the implementation and impact of a Perioperative Surgical Home (PSH) model for the total knee arthroplasty at an integrated delivery system (Kaiser Permanente). METHODS: A multidisciplinary committee developed and implemented a series of PSH protocols that included the entire continuum of care from the decision for surgery until 30 days after surgery. Five hundred forty-six subjects were included in the preimplementation phase (Fast Track [T-fast]), and 518 patients were included in the postimplementation phase (PSH). The primary end points of this report are hospital length of stay (LOS), postoperative skilled nursing facility (SNF) bypass rate, and 30-day readmission rate. We used a generalized linear model to assess the effect on LOS while

adjusting for potential confounding variables. RESULTS: We found that patients assigned to the PSH pathway had a significantly shorter mean LOS compared with patients in the T-fast group (2.4 +/- 2.1 days [confidence interval {CI}, 2.2-2.8] vs 3.4 +/- 2.9 days [CI, 2.9-3.9]). The SNF bypass rate was significantly higher in the PSH group compared with the T-fast group (94% vs 80%, P = 0.00002, CI, -0.102 to -0.036). There was no difference in the 30 readmission rates between patients managed in the PSH track and the T-fast track (1.2% vs 0.98%). CONCLUSIONS: Introduction of the PSH into an integrated delivery system resulted in a simultaneous reduction of LOS and SNF admission for total knee arthroplasty patients.

Renkawitz, T., Rieder, T., Handel, M., et al. (2010). "Comparison of two accelerated clinical pathways--after total knee replacement how fast can we really go?" Clin Rehabil 24(3) : 230-239.

OBJECTIVE: To evaluate whether a further optimization of an existing accelerated clinical pathway protocol after total knee replacement is feasible and improves postoperative outcome. DESIGN: Prospective, parallel group design. SETTING: Orthopaedic University Medical Centre. PATIENTS: A total of 143 patients, scheduled for unilateral primary total knee replacement under perioperative regional analgesia. INTERVENTION: Sixty-seven patients received an optimized accelerated clinical pathway including patient-controlled regional analgesia pumps, ultra-early/doubled physiotherapy and motor-driven continuous passive motion machine units. Seventy-six patients received a standard accelerated clinical pathway. MAIN MEASURES: Feasibility was defined as the proportion of patients successfully completing the assigned pathway. Early postoperative pain on a visual analogue scale, consumption of regional anaesthetics, knee range of motion, time out of bed, non-stop walking distance/stair climbing, circumference measurement and Knee Society Score on the operated leg. Possible discharge according to an own discharge checklist. RESULTS: All patients assigned to both groups successfully completed this pathway. Patients in the optimized pathway showed significant benefits regarding stair climbing/walking distance/time out of bed/circumference measurements of the thigh/Knee Society function score on the fifth postoperative day and stair climbing/ circumference measurements of the thigh on the eighth postoperative day, and reduction of the consumption of regional anaesthetics. No significant reduction in length of stay was observed. CONCLUSIONS: Early postoperative functional process indicators tended to be higher within the optimized pathway group, but the main effects flattened over the course of the first eight postoperative days.

Ribinik, P., Le Moine, F., de Korvin, G., et al. (2012). "Physical and rehabilitation medicine (PRM) care pathways: "patients after total hip arthroplasty"." Ann Phys Rehabil Med 55(8) : 540-545.

This document is part of a series of documents designed by the French Physical and Rehabilitation Medicine Society (SOFMER) and the French Federation of PRM (FEDMER). These documents describe the needs for or a specific type of patients; PRM care objectives, human and material resources to be implemented, chronology as well as expected outcomes. "Care pathways in PRM" is a short document designed to enable the reader (physicians, decision-maker, administrator, lawyer or finance manager) to quickly apprehend the needs of these patients and the available therapeutic care structures for proper organization and pricing of these activities. Patients after total hip arthroplasty are classified into three care sequences and two clinical categories, each one being treated with the same six parameters according to the International Classification of Functioning, Disability and Health (WHO), while taking into account personal and environmental factors that could influence the needs of these patients.

Ribinik, P., Le Moine, F., de Korvin, G., et al. (2012). "Physical and rehabilitation medicine (PRM) care pathways: "patients after total knee arthroplasty"." Ann Phys Rehabil Med 55(8) : 533-539.

> This document is part of a series of documents designed by the French Physical and Rehabilitation Medicine Society (SOFMER) and the French Federation of PRM (FEDMER). These documents describe the needs for or a specific type of patients; PRM care objectives, human and material resources to be implemented, chronology as well as expected outcomes. "Care pathways in PRM" is a short document designed to enable the reader (physicians, decision-maker, administrator, lawyer or finance manager) to quickly apprehend the needs of these patients and the available therapeutic care structures for proper organization and pricing of these activities. Patients after total knee arthroplasty are classified into three care sequences and two clinical categories, each one being treated with the same six parameters according to the International Classification of Functioning, Disability and Health (WHO), while taking into account personal and environmental factors that could influence the needs of these patients.

Scharli, M., Hantikainen, V. et Bischofberger, I. (2013). "[Hospital discharge preparation: enhancing self-care competence of patients after minimally invasive hip arthroplasty]." Pflege 26(5) : 303-310.

> Increasing numbers of hip replacement implant surgeries in Switzerland today are minimally invasive. Patients undergoing such procedures become mobile faster and are discharged from hospital to home within an average of four days. Using a qualitative descriptive design, this study examined how post-operative self-care is taught to patients in the orthopaedic department of a rehabilitation hospital after a minimally invasive hip arthroplasty and explored ways to optimise such teaching methods. Data were collected by conducting three focus groups with nine nursing professionals and expert interviews with the chief surgeon and the assigned physiotherapist. Data were analysed by using qualitative content analysis procedures. Results showed that teaching to enhance self-care competence of patients was not carried out systematically. Instead, the primary focus was to inform and prescribe rather than empower patients. Empowerment, however, would be necessary to assure adherence to the treatment regime. Hospital discharge often takes place surprisingly early and prevents assessment-based counselling of patients. The researchers concluded that the introduction of the minimally invasive surgical technique requires that the multidisciplinary rehabilitation team adapts its teaching methods. Self-care confidence in patients should be enhanced by following participatory clinical pathways. This demands modification in discharge and rehabilitation teaching plans to make them patient-oriented, and the plans should be supported by the entire team and the management.

Segal, O., Bellemans, J., Van Gerven, E., et al. (2013). "Important variations in the content of care pathway documents for total knee arthroplasty may lead to quality and patient safety problems." J Eval Clin Pract 19(1) : 11-15.

> AIM: Reducing variations by standardizing the key interventions in clinical processes is an effective tool to minimize the probability of medical errors. Thus, we determined whether variations exist in the key interventions included in care pathway documents (CPDs) of different organizations and in the timing of these interventions during the care process. METHODS: We invited members of the Belgian Dutch Clinical Pathway Network to send their CPDs for external review. We analysed 19 CPDs for total knee arthroplasty. International guidelines were consulted for definition of key interventions. Documentation of these interventions in the pathway documents was checked. RESULTS: From the 19 CPDs analysed, we retrieved 18 key interventions. Nine of these key interventions appeared in at least 80%

of the care pathways. Only two key interventions appeared in all pathway documents. Nine out of 12 interventions that appeared in at least 80% of the pathway documents showed a variation of 1 day in the timing of care from the median timing. CONCLUSION: We conclude that important variation exists in the included interventions and in their timing. The results of this study suggest that, before use in daily patient care, CPDs should be reviewed by peers and checked to ensure that all evidence-based key interventions are included and properly planned. Only in this way can pathways documents be used interprofessionally during the entire perioperative period in the search for optimal quality and patient safety.

Simpson, J. C., Moonesinghe, S. R., Grocott, M. P., et al. (2015). "Enhanced recovery from surgery in the UK: an audit of the enhanced recovery partnership programme 2009-2012." Br J Anaesth 115(4) : 560-568.

BACKGROUND: The UK Department of Health Enhanced Recovery Partnership Programme collected data on 24 513 surgical patients in the UK from 2009-2012. Enhanced Recovery is an approach to major elective surgery aimed at minimizing perioperative stress for the patient. Previous studies have shown Enhanced Recovery to be associated with reduced hospital length of stay and perioperative morbidity. METHODS: In this national clinical audit, National Health Service hospitals in the UK were invited to submit patient-level data. The data regarding length of stay and compliance with each element of Enhanced Recovery protocols for colorectal, orthopaedic, urological and gynaecological surgery patients were analysed. The relationship between Enhanced Recovery protocol compliance and length of stay was measured. RESULTS: From 16 267 patients from 61 hospital trusts, three out of four surgical specialties showed Enhanced Recovery, compliance being weakly associated with shorter length of stay (correlation coefficients -0.18, -0.14, -0.25 in colorectal, orthopaedics and gynaecology respectively). At a cut-off of 80% compliance, good compliance was associated with two, one and three day reductions in median length of stay respectively in colorectal, orthopaedic and urological surgeries, with no saving in gynaecology. CONCLUSIONS: This study is the largest assessment of the relationship between Enhanced Recovery protocol compliance and outcome in four surgical specialties. The data suggest that higher compliance with an Enhanced Recovery protocol has a weak association with shorter length of stay. This suggests that changes in process, resulting from highly protocolised pathways, may be as important in reducing perioperative length of stay as any individual element of Enhanced Recovery protocols in isolation.

Snow, R., Granata, J., Ruhil, A. V., et al. (2014). "Associations between preoperative physical therapy and post-acute care utilization patterns and cost in total joint replacement." J Bone Joint Surg Am 96(19) : e165.

BACKGROUND: Health-care costs following acute hospital care have been identified as a major contributor to regional variation in Medicare spending. This study investigated the associations of preoperative physical therapy and post-acute care resource use and its effect on the total cost of care during primary hip or knee arthroplasty. METHODS: Historical claims data were analyzed using the Centers for Medicare & Medicaid Services Limited Data Set files for Diagnosis Related Group 470. Analysis included descriptive statistics of patient demographic characteristics, comorbidities, procedures, and post-acute care utilization patterns, which included skilled nursing facility, home health agency, or inpatient rehabilitation facility, during the ninety-day period after a surgical hospitalization. To evaluate the associations, we used bivariate and multivariate techniques focused on post-acute care use and total episode-of-care costs. RESULTS: The Limited Data Set provided 4733 index hip or knee replacement cases for analysis within the thirty-nine-county Medicare

hospital referral cluster. Post-acute care utilization was a significant variable in the total cost of care for the ninety-day episode. Overall, 77.0% of patients used post-acute care services after surgery. Post-acute care utilization decreased if preoperative physical therapy was used, with only 54.2% of the preoperative physical therapy cohort using post-acute care services. However, 79.7% of the non-preoperative physical therapy cohort used post-acute care services. After adjusting for demographic characteristics and comorbidities, the use of preoperative physical therapy was associated with a significant 29% reduction in post-acute care use, including an $871 reduction of episode payment driven largely by a reduction in payments for skilled nursing facility ($1093), home health agency ($527), and inpatient rehabilitation ($172). CONCLUSIONS: The use of preoperative physical therapy was associated with a 29% decrease in the use of any post-acute care services. This association was sustained after adjusting for comorbidities, demographic characteristics, and procedural variables. CLINICAL RELEVANCE: Health-care providers can use this methodology to achieve an integrative, cost-effective, patient care pathway using preoperative physical therapy.

Specht, K., Agerskov, H., Kjaersgaard-Andersen, P., et al. (2018). "Patients' experiences during the first 12 weeks after discharge in fast-track hip and knee arthroplasty - a qualitative study." Int J Orthop Trauma Nurs 31 : 13-19.

BACKGROUND: Due to the shortened length of stay in fast-track total hip and knee arthroplasty, patients must at a very early stage following surgery take responsibility for their postoperative care and treatment. It is important to establish if this treatment modality of fast-track is not only cost-effective, but meets patients' expectations and needs. AIM: To explore the lived experience of patients in fast-track total hip and knee arthroplasty during the first 12 weeks after discharge. METHODS: A phenomenological-hermeneutic approach was used inspired by Ricoeur's theory of narrative and interpretation. Data were collected through semi-structured interviews with 8 patients 2 and 12 weeks after discharge. FINDINGS: Through the structural analysis 3 themes emerged: 1) Dealing with transition between hospital and home, 2) Pain and self-management of medication, 3) Challenges in rehabilitation. CONCLUSION: Patients appreciated only 1 or 2 days in hospital. However, they were not sufficiently involved in the discharge planning. There was a feeling of uncertainty and being left on their own after discharge, which could affect their pain management and recovery at home. There is a need to develop in partnership with each individual patient a post discharge plan of care and rehabilitation to meet their individual needs, preferences and mode of motivation.

Specht, K., Kjaersgaard-Andersen, P. et Pedersen, B. D. (2016). "Patient experience in fast-track hip and knee arthroplasty--a qualitative study." J Clin Nurs 25(5-6) : 836-845.

AIMS AND OBJECTIVES: To explore the lived experience of patients in fast-track primary unilateral total hip and knee arthroplasty from the first visit at the outpatient clinic until discharge. BACKGROUND: Fast-track has resulted in increased effectiveness, including faster recovery and shorter length of stay to about two days after hip and knee arthroplasty. However, the patient perspective in fast-track with a median length of stay of less than three days has been less investigated. DESIGN: A qualitative design. METHODS: A phenomenological-hermeneutic approach was used, inspired by Paul Ricoeur's theory of narrative and interpretation. Eight patients were included. Semi-structured interviews and participant observation were performed. RESULTS: Three themes emerged: dealing with pain; feelings of confidence or uncertainty - the meaning of information; and readiness for discharge. Generally, the patients were resistant to taking analgesics and found it difficult to find out when to take supplementary analgesics; therefore, nursing staff needed enough

expertise to take responsibility. Factors that increased patients' confidence: information about fast-track, meeting staff before admission and involving relatives. In contrast, incorrect or conflicting information and a lack of respect for privacy led to uncertainty. In preparing for early discharge, sufficient pain management, feeling well-rested and optimal use of time during hospitalisation were important. CONCLUSION: The study shows the importance of dealing with pain and getting the right information and support to have confidence in the fast-track programme, to be ready for discharge and to manage postoperatively at home. RELEVANCE TO CLINICAL PRACTICE: In fast-track focusing on early discharge, there is an increased need for evidence-based nursing practice, including a qualified judgement of what is best for the patient in certain situations. The knowledge should be gleaned from: research; the patients' expertise, understanding and situation; and nurses' knowledge, skills and experience.

Špička, J., Lošťák, J., Gallo, J., et al. (2017). "Influence of Enhanced Recovery Regime on Early Outcomes of Total Knee Arthroplasty." Acta chirurgiae orthopaedicae et traumatologiae Cechoslovaca 84(5) : 361-367.
https://pubmed.ncbi.nlm.nih.gov/29351537

PURPOSE OF THE STUDY Our study compared early outcomes of total knee arthroplasty performed in conventional and enhanced perioperative care regimes, i.e. without the use of Redon drain, with intensified perioperative analgesia and more frequent and intensive rehabilitation regime in the latter. MATERIAL AND METHODS The prospective study included 194 patients (76 men and 118 women) implanted with primary knee endoprosthesis. The mean age was 68.8 (44.7 - 88.0 years). The patients were divided into two groups - the "enhanced" and "conventional" procedures. In the first group, Redon suction drain was not inserted at the end of the surgery, and the patients commenced passive knee mobility exercise of the operated knee immediately after being brought back from the operating theatre. The general anaesthesia was supplemented by a combined femoral nerve block and wound infiltration with local anaesthetics. The second group comprised the patients who underwent conventional surgery, i.e. with the use of drain, without femoral nerve block, with no wound infiltration with local anaesthetics, and without immediate post-operative mobilization of the joint. The evaluation was carried out using regular clinical tools (subjective evaluation, objective examination, questionnaire and Knee Society Score (KSS)). Standard statistical methods were applied to data processing. RESULTS The patients under the "conventional regime" showed a significantly sharper drop in haemoglobin and haematocrit levels, higher consumption of blood transfusion and analgesics during the first three days after the surgery. The patients under the "enhanced regime" showed a better range of joint motion at hospital discharge, flexion in particular (p = 0.001). During the hospital stay no frequent swelling, secretion or wound reddening was reported in any of the monitored groups. In the "conventional" group, however, haematomas were more frequently present. The postoperative checks did not reveal any differences in satisfaction of the patients with the surgery. At the first follow-up examination at the outpatient department the "conventional" group patients more often reported knee pain and a feeling of a swollen knee. Nonetheless, their statements did not correspond with the VAS score. In the period between the 6th and 12th months following the surgery, the differences in the range of motion disappeared. The KSS showed a noticeable improvement in both the groups as against the preoperative values. In the "enhanced" group patients, the score increased dramatically at the beginning, whereas in the "conventional" group, the score was growing slowly and gradually until the last follow-up check after the surgery. The "conventional" group patients more frequently reported infectious complications (surface and deep wound infections: 4 vs. 2 patients) requiring a revision surgery (p = 0.024). DISCUSSION Recently,

attention has been drawn to the rapid recovery approach, which eliminated postoperative immobilization and enabled the patient to start exercising already on the day of the surgery, with some patients even walking independently. The individual enhanced recovery regimes differ in details but mostly result in achieving the aim much sooner when compared to the conventional approaches. The patients under the enhanced recovery regimes can accomplish better functional outcomes in the first few months after the surgery than the patients undergoing the surgery under the conventional regime. The routine use of Redon drains in TKA is obviously unnecessary; it tends to be associated with a higher blood loss and a higher risk of prosthetic joint infection. CONCLUSIONS The TKA implant without suction drains combined with intensified perioperative analgesia and intensive postoperative rehabilitation is a safe way to earlier recovery of the function of the operated knee, or, by extension, the lower limb. The described approach is not associated with a higher risk of perioperative complications (bleeding, healing disorders or early infections). Patients also benefit from lower lood losses. Based on the results of our study, we recommend performing the TKA surgeries routinely without drains, with perioperative analgesia and immediate postoperative joint mobilization. Key words: total knee arthroplasty; perioperative care; rapid recovery; drainage; active movement; postoperative outcomes; pain; infection.

Stambough, J. B., Beaule, P. E., Nunley, R. M., et al. (2016). "Contemporary Strategies for Rapid Recovery Total Hip Arthroplasty." Instr Course Lect 65 : 211-224.

Over the past several years, rapid recovery protocols for total hip arthroplasty have evolved in parallel with advancements in pain management, regional anesthesia, focused rehabilitation, and the patient selection process. As fiscal pressures from payers of health care increase, surgical outcomes and complications are being scrutinized, which evokes a sense of urgency for arthroplasty surgeons as well as hospitals. The implementation of successful accelerated recovery pathways for total hip arthroplasty requires the coordinated efforts of surgeons, practice administrators, anesthesiologists, nurses, physical and occupational therapists, case managers, and postacute care providers. To optimize performance outcomes, it is important for surgeons to select patients who are eligible for rapid recovery. The fundamental tenets of multimodal pain control, regional anesthesia, prudent perioperative blood management, venous thromboembolic prophylaxis, and early ambulation and mobility should be collectively addressed for all patients who undergo primary total hip replacement.

Starks, I., Wainwright, T. W., Lewis, J., et al. (2014). "Older patients have the most to gain from orthopaedic enhanced recovery programmes." Age and Ageing 43(5) : 642-648. https://academic.oup.com/ageing/article/43/5/642/46852

BACKGROUND: Between August 2007 and May 2009, 2128 consecutive patients underwent either primary hip or knee joint replacement surgery at our institute on an enhanced recovery pathway. We aimed to investigate the potential benefits of this pathway in patients over the age of 85 years. METHODS: Data extracted from Hospital Episode Statistics were analysed. This data are prospectively collected and independently collated. RESULTS: In all patients median length of stay was reduced when compared with both our own data before the introduction of the pathway (6 to 4 days) and national averages over the same time period for both hip and knee replacements (5 to 4 days). Difference in length of stay was most pronounced in the group of patients aged 85 years and over (9 to 5 days for total hip replacement and 8 to 5 days for total knee replacement). Nearly all patients were discharged directly home (97.4%). Readmission rates were over 45% lower in patients aged 85 and over when compared with national averages (5.2 vs. 9.4%). CONCLUSIONS: This is the first series

in the literature to assess the role of enhanced recovery pathways in the very elderly. This study not only shows that successful fast track rehabilitation can be achieved in the very elderly population undergoing elective joint replacement surgery, but that it is this cohort of vulnerable patients who have the most to gain from such multidisciplinary recovery programmes.

Stowers, M. D., Lemanu, D. P., Coleman, B., et al. (2014). "Review article: Perioperative care in enhanced recovery for total hip and knee arthroplasty." J Orthop Surg (Hong Kong) 22(3) : 383-392.

Enhanced recovery pathways for total hip and knee arthroplasty can reduce length of hospital stay and perioperative morbidity. 22 studies were reviewed for identification of perioperative care interventions, including preoperative (n=4), intra-operative (n=8), and postoperative (n=4) care interventions. Factors that improve outcomes included use of pre-emptive and multimodal analgesia regimens to reduce opioid consumption, identification of patients with poor nutritional status and provision of supplements preoperatively to improve wound healing and reduce length of hospital stay, use of warming systems and tranexamic acid, avoidance of drains to reduce operative blood loss and subsequent transfusion, and early ambulation with pharmacological and mechanical prophylaxis to reduce venous thromboembolism and to speed recovery.

Suhm, N., Kaelin, R., Studer, P., et al. (2014). "Orthogeriatric care pathway: a prospective survey of impact on length of stay, mortality and institutionalisation." Arch Orthop Trauma Surg 134(9) : 1261-1269.

INTRODUCTION: Care pathways for elderly hip fracture patients are increasingly implemented but there has been only limited evaluation of their use. Our objective was to investigate the impact of such a care pathway on the use of healthcare resources and on patients' outcomes. MATERIALS AND METHODS: The prospective survey covered 493 hip fracture patients 65 years of age or older that were treated either before "Usual Care = (UC)" or after "Co-Managed-Care = (CMC)" implementation of the care pathway. Primary outcome was length of stay (LoS). Secondary outcomes were 1-year mortality and change in residential status from prefracture baseline to 1-year after surgery. Data were analysed by descriptive and interferential statistics and adjustment for baseline differences amongst the two patient groups was done. RESULTS: Patients in the CMC sample had more preexisting comorbidities (CCI 2.5 versus 2.1). Prior to the fracture, a larger proportion amongst them needed help in ADL (49 versus 26%), and they were more likely to reside in a nursing home (36 versus 29%). Prefracture mobility status was equal in both samples. In the CMC sample LoS was significantly shorter (LoS 8.6 versus 11.3 days, $p < 0.01$) and patients were less likely to experience a complication (59 vs 73%, $p < 0.01$) while being in the hospital. There was no significant difference in 1-year mortality or in change of residential status. CONCLUSIONS: A care pathway for elderly hip fracture patients allowed decreased LoS without affecting mortality or change of residential status 1 year after fracture compared to prefracture baseline.

Tan, N. L. T., Hunt, J. L. et Gwini, S. M. (2018). "Does implementation of an enhanced recovery after surgery program for hip replacement improve quality of recovery in an Australian private hospital: a quality improvement study." BMC anesthesiology 18(1) : 64-64.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6001129/

BACKGROUND: Enhanced recovery after surgery programs may improve recovery and reduce duration of hospital stay after joint replacement surgery. However, uptake is incomplete, and

the relative importance of program components is unknown. This before-and-after quality improvement study was designed to determine whether adding 'non-surgical' components, to pre-existing 'surgical' components, in an Australian private healthcare setting, would improve patient recovery after total hip replacement. METHODS: We prospectively collected data regarding care processes and health outcomes of 115 consecutive patients undergoing hip replacement with a single surgeon in a private hospital in Melbourne, Australia. Based on this data, a multidisciplinary team (surgeon, anesthetists, nurse unit managers, physiotherapists, perioperative physician) chose and implemented 12 'non-surgical' program components. Identical data were collected from a further 115 consecutive patients. The primary outcome measure was Quality of Recovery-15 score at 6 weeks postoperatively; the linear regression model was adjusted for baseline group differences. RESULTS: The majority of health outcomes, including the primary outcome measure, were similar in pre- and post-implementation groups (quality of recovery score, pain rating and disability score, at time-points up to six weeks postoperatively). The proportion of patients with zero oral morphine equivalent consumption at six weeks increased from 57 to 80% (RR 1.34, 95% CI 1.13, 1.58). Mean (SD) length of hospital stay decreased from 5.94 (5.21) to 5.02 (2.46) days but was not statistically significant once adjusted for baseline group differences. Four of ten measurable program components were successfully implemented. Antiemetic prophylaxis increased by 53% (risk ratio [RR] 95% confidence interval [CI] 1.16, 2.02). Tranexamic acid use increased by 41% (RR 95% CI 1.18, 1.68). Postoperative physiotherapy treatment on the day of surgery increased by 87% (RR 95% CI 1.36, 2.59). Postoperative patient mobilisation ≥ three metres on the day of surgery increased by 151% (RR 95% CI 1.27, 4.97). CONCLUSIONS: Implementation of a full enhanced recovery after surgery program, and optimal choice of program components, remains a challenge. Improved implementation of non-surgical components of a program may further reduce duration of acute hospital stay, while maintaining quality of recovery. TRIAL REGISTRATION: Australian New Zealand Clinical Trials Registry (ACTRN12615001170516), 2.11.2015 (retrospective).

Tanzer, D., Smith, K. et Tanzer, M. (2018). "Changing Patient Expectations Decreases Length of Stay in an Enhanced Recovery Program for THA." Clin Orthop Relat Res 476(2) : 372-378.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6259689/

BACKGROUND: The implementation of care pathways in hip arthroplasty programs has been shown to result in a decreased length of stay (LOS), but often multiple elements of a care pathway are implemented at the same time. As a result, it is difficult to understand the impact each of the individual modifications has made to the patient's prepathway care. In particular, it is unknown what the role of patient expectations pertaining to anticipated LOS alone is on the LOS after primary THA. QUESTIONS/PURPOSES: (1) Does changing the patient's expectations regarding his or her anticipated LOS, without intentionally changing the rest of the care pathway, result in a change in the patient's LOS after primary THA? (2) Is the resultant LOS associated with the patient's age, gender, or day of the week the surgery was performed? METHODS: We retrospectively compared the LOS in 100 consecutive patients undergoing THA immediately after the implementation of a 4-day care pathway (4-day Group) with 100 consecutive patients, 3 months later, who were also in the same pathway but were told by their surgeon preoperatively and in the hospital to expect a LOS of 2 days (2-day Group). Aside from reeducation by the surgeon, there was no difference in the surgery or intentional changes to the intraoperative or postoperative management of the two groups. Only the patient and the surgeon were made aware of the accelerated discharge plan. We compared the LOS between the two groups and the number of patients who met their discharge goal. As well, the ability to meet the discharge goal for each group was further determined based on age, gender, and day of the week the surgery was performed.

RESULTS: Overall, patients in the 2-day Group had a shorter LOS than those in the 4-day Group (2.9 ± 0.88 days versus 3.9 ± 1.71 days; mean difference 1 day; 95% confidence interval [CI], 0.60-1.36; p = 0.001). In the 2-day Group, the LOS was 2 days in 32% compared with 8% in the 4-day Group (odds ratio, 4.0; 95% CI, 1.76-9.11; p < 0.001). Men in the 4-day Group had a shorter LOS than women (3.4 ± 1.22 days versus 4.2 ± 1.89 days; mean difference 0.8 days; 95% CI, 0.17-1.78; p = 0.019), but there was no difference in LOS by gender in the 2-day Group (2.8 ± 0.81 days versus 3.1 ± 0.93 days; mean difference 0.3 days; 95% CI, -0.14 to 0.61; p = 0.219). For all patients > 40 years and < 90 years of age, a greater percentage of patients in the 2-day Group went home by postoperative day 2 than those in the 4-day Group (32% compared with 7%; odds ratio, 4.6; p < 0.001). In both groups, there was no difference in the LOS if the surgery was on Friday compared with an earlier day of the week (4-day Group: 3.4 ± 0.67 days versus 4.0 ± 1.80 days; p = 0.477 and 2-day Group: 2.8 ± 0.62 days versus 3.0 ± 0.93 days; p = 0.547). CONCLUSIONS: We found that a surgeon who sets a clear expectation in terms of LOS could achieve a reduction in this parameter. Although it is impossible to be certain in the context of a retrospective study whether other caregivers adjusted the pathway in response to the surgeon's preferences, and we suspect this probably did occur, this still points to an opportunity on the topic of expectations setting that future studies should explore. This study highlights the influence patient education and expectations has on the effectiveness of care pathways in THA as well as the importance of continuous reinforcement of discharge planning both preoperatively and in the hospital. LEVEL OF EVIDENCE: Level III, therapeutic study.

Tseng, M. Y., Shyu, Y. I. et Liang, J. (2012). "Functional recovery of older hip-fracture patients after interdisciplinary intervention follows three distinct trajectories." Gerontologist 52(6) : 833-842.

PURPOSE: To assess the effects of an interdisciplinary intervention on the trajectories of functional recovery among older patients with hip fracture during 2 years after hospitalization. DESIGN AND METHODS: In a randomized controlled trial with 24-month follow-up, 162 patients >60 years were enrolled after hip-fracture surgery at a 3,000-bed medical center in northern Taiwan. Patients received an interdisciplinary program of geriatric consultation, in-hospital and at-home rehabilitation, and discharge planning (n = 80) or usual care (n = 82). Patients' functional status was assessed by the Chinese Barthel Index before discharge and at 1, 3, 6, 12, 18, and 24 months after discharge. Covariates included demographic attributes, depressive symptoms, and cognitive functioning. Latent class growth modeling was used to examine distinctive groups of individual trajectories within the sample. RESULTS: Functional recovery followed 3 distinct paths, approximated by either a quadratic or cubic function over time. These paths were (a) poor recovery (6.8%), (b) moderate recovery (47.5%), and (c) excellent recovery (45.7%). The interdisciplinary intervention significantly reduced the likelihood of poor recovery (relative risk ratio [RRR] = 0.05, p < .01) and moderate recovery (RRR = 0.17, p < .01), relative to excellent recovery. In addition, the major risk factors for poor or moderate recovery were older age, lower prefracture physical functioning, as well as higher depression scores and lower cognitive functioning before discharge. IMPLICATIONS: Distinct trajectories of functional recovery can serve as useful outcome measures in clinical research and practice.

Vanhaecht, K., Bellemans, J., De Witte, K., et al. (2010). "Does the organization of care processes affect outcomes in patients undergoing total joint replacement?" J Eval Clin Pract 16(1) : 121-128.

BACKGROUND: Surgeons realize that safe and efficient care processes for total joint replacement requires more than just well-performed operations. Orthopaedic teams are reorganizing care process to improve efficacy and shorten length of stay. Little is known on

the impact of organizational changes on patient outcome. This paper studies the relation between the organization of care processes and patient outcomes in hip and knee. Clinical pathways are used as one of the methods to structure the care process. Although evidence is available on the effect of pathways in total joint replacement, their impact with the organization of the care process has not been studied previously. METHODS: A cross-sectional multicentre study was performed on 39 care processes and 737 consecutive patients. Regression models were used to analyse the relation between the organization of the care process and risk-adjusted patient outcomes. The use of pathways and the organization of the care process, measured by the Care Process Self Evaluation Tool (CPSET), were measured at organizational level. Length of stay, pain, mobility and elapsed time to discharge were measured at patient level. RESULTS: The use of pathways had a positive effect on four out of five subscales and the overall CPSET score. Using pathways decreased length of stay (P = 0.014), pain (P = 0.052) and elapsed time to discharge (P = 0.003). The CPSET subscale communication was related with three risk adjusted outcomes. Multivariate analysis demonstrated a significant effect by three different variables on the length of stay; (1) use of pathways; (2) coordination of care processes; and (3) communication with patients and family. Both the use of pathways and coordination of the care process were determinants for the elapsed time to discharge. A significant interaction effect was found between use of pathways and coordination of the care process. CONCLUSION: This large multicentre study revealed the relation between the use of pathways, organization of the care process and patient outcomes. This information is important for both clinicians and managers to understand and further improve the organization of orthopaedic care. LEVEL OF EVIDENCE: Level I prognostic study.

Vesterby, M. S., Pedersen, P. U., Laursen, M., et al. (2017). "Telemedicine support shortens length of stay after fast-track hip replacement." Acta Orthop 88(1) : 41-47.

Background and purpose - Telemedicine could allow patients to be discharged more quickly after surgery and contribute to improve fast-track procedures without compromising quality, patient safety, functionality, anxiety, or other patient-perceived parameters. We investigated whether using telemedicine support (TMS) would permit hospital discharge after 1 day without loss of self-assessed quality of life, loss of functionality, increased anxiety, increased rates of re-admission, or increased rates of complications after hip replacement. Patients and methods - We performed a randomized controlled trial involving 72 Danish patients in 1 region who were referred for elective fast-track total hip replacement between August 2009 and March 2011 (654 were screened for eligibility). Half of the patients received a telemedicine solution connected to their TV. The patients were followed until 1 year after surgery. Results - Length of stay was reduced from 2.1 days (95% CI: 2.0-2.3) to 1.1 day (CI: 0.9-1.4; p < 0.001) with the TMS intervention. Health-related quality of life increased in both groups, but there were no statistically significant differences between groups. There were also no statistically significant differences between groups regarding timed up-and-go test and Oxford hip score at 3-month follow-up. At 12-month follow-up, the rates of complications and re-admissions were similar between the groups, but the number of postoperative hospital contacts was lower in the TMS group. Interpretation - Length of postoperative stay was shortened in patients with the TMS solution, without compromising patient-perceived or clinical parameters in patients undergoing elective fast-track surgery. These results indicate that telemedicine can be of value in fast-track treatment of patients undergoing total hip replacement.

von Lewinski, G., Floerkemeier, T., Budde, S., et al. (2015). "[Experience in establishing a certified endoprosthesis center]." Orthopade 44(3) : 193-202.

BACKGROUND: It is well known that morbidity rates of arthroplasties are inversely related to procedure volume. In the department of orthopaedics at a German medical school, a performance of certification of high-volume center for total hip and knee arthroplasties, called the EndoCert((R)) Initiative, was started. This project was initiated by the German society of orthopaedic surgery (DGOOC) to secure the quality of total knee and hip arthroplasties. OBJECTIVES: The aim of this study is to evaluate effects of certification, pathwaycontrolled therapy and quality indicators on outcome in arthroplasty three years after implentation. MATERIALS AND METHODS: Arthroplasties performed in this certified center for total hip and knee arthroplasties were evaluated. Outcome was evaluated after the implementation of quality indicators and clinical pathways. RESULTS: After establishment of certification in the center for total hip and knee arthroplasties morbidity rates decreased as quality increased. CONCLUSION: The implementation of pathway-controlled therapy and quality indicators in a high-volume center for total joint arthroplasties shows better clinical results. Capital investment and efforts are legitimated.

Wainwright, T. W. et Burgess, L. C. (2018). "To what extent do current total hip and knee replacement patient information resources adhere to enhanced recovery after surgery principles?" Physiotherapy 104(3) : 327-337.
https://www.physiotherapyjournal.com/article/S0031-9406(18)30072-5/fulltext

OBJECTIVES: Total hip replacement (THR) and total knee replacement (TKR) are two of the most common orthopaedic surgeries that occur in the United Kingdom (UK) annually. Enhanced recovery after surgery (ERAS) programmes aim to decrease convalescence across procedures. It has been highlighted that post operative physiotherapy routines may not contain the correct ingredients for promoting acceleration of return to function. This research aims to analyse if current THR and TKR patient information resources adhere to ERAS principles, thus optimising post operative recovery. DATA SOURCES: Twenty hip and knee replacement patient information booklets were sourced using a UK Google search. A flowchart of exercise prescription components was formulated from a review of 5 trial booklets. A content analysis was utilised to assess the information included within the patient information booklets. RESULTS: Forty percent of patient information booklets identified their pathways to be ERAS. Fifty five percent of the hospitals stated their patients would be mobilised on the day of surgery. Ninety percent of THR and 100% of TKR guidelines suggested the use of bed exercises for rehabilitation. Fifteen percent of THR and 35% of TKR booklets suggested functional exercise as a method of rehabilitation. Strength or resistance based exercises were proposed in 40% of THR and 55% of TKR booklets. CONCLUSION: Many patient information booklets do not follow ERAS principles for fast-track rehabilitation and the exercise prescription procedure is non-specific. This must be considered within post operative rehabilitation in order to enhance recovery and reduce length of stay following THR or TKR surgery.

Wainwright, T. W. et Kehlet, H. (2019). "Fast-track hip and knee arthroplasty - have we reached the goal?" Acta Orthop 90(1) : 3-5.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6366461/

Wallny, T. A., Strauss, A. C., Goldmann, G., et al. (2014). "Elective total knee arthroplasty in haemophilic patients. Proposal for a clinical pathway." Hamostaseologie 34 Suppl 1 : S23-29.

UNLABELLED: Total knee arthroplasty (TKA) provides significant pain relief and better function in patients with end-stage haemophilic knee arthropathy. Peri- and postoperative

care tends to be more complex than in non-haemophilic patients undergoing TKA and requires a multidisciplinary team approach. AIM: The implementation of standardized clinical pathways in non-haemophilic patients undergoing TKA has been shown to increase quality of care and to reduce postoperative complication rates. Consequently, the use of clinical pathways in haemophilic patients undergoing TKA may be beneficial to this particular subpopulation of patients. METHODS: A clinical pathway for TKA for haemophilic patients was designed in a consensus process involving all participating departments. RESULTS: We propose a specifically adjusted clinical pathway for TKA for haemophilic patients to show that standardization of elective orthopaedic surgery in haemophilia is feasible. CONCLUSION: The authors emphasize that there are limitations on categorizing haemophilic patients and stress that individual interdisciplinary treatment should take precedence over a standardized approach.

Walters, J. L., Mackintosh, S. et Sheppard, L. (2012). "The journey to total hip or knee replacement." Aust Health Rev 36(2) : 130-135.

OBJECTIVES: Despite the incidence of joint replacements in Australia, there is a paucity of information regarding how patients progress from their referral to their surgery. The aim of this study was to describe a patient pathway from referral to receipt of total hip replacement (THR) or total knee replacement (TKR) surgery in South Australian public hospitals. METHODS: Patient perspectives of the pathway to THR and TKR surgery were obtained via a postal survey (n=450) and hospital employee perspectives were attained via semi-structured interviews (n=19). Survey data were analysed using descriptive statistics and interview data were analysed thematically. RESULTS: A typical patient pathway to THR and TKR surgery can be divided into two distinct phases; referral-to-initial appointment (9-24 months), and initial appointment-to-surgery (12-15 months). This gives an overall waiting period between 2 and 3 years for THR or TKR surgery. CONCLUSIONS: Waiting times for THR and TKR surgery reported in this study were longer than other reports in the literature. Current Australian health policy does not consider the first (and longest) phase of the patient pathway. Excluding this initial phase could be generating an erroneous perception of the patient pathway to THR or TKR surgery, possibly leading to poorly considered health reforms.

Waugh, E. J., Badley, E. M., Borkhoff, C. M., et al. (2016). "Primary care physicians' perceptions about and confidence in deciding which patients to refer for total joint arthroplasty of the hip and knee." Osteoarthritis Cartilage 24(3) : 451-457.

OBJECTIVE: The purpose of this study is to examine the perceptions of primary care physicians (PCPs) regarding indications, contraindications, risks and benefits of total joint arthroplasty (TJA) and their confidence in selecting patients for referral for TJA. DESIGN: PCPs recruited from among those providing care to participants in an established community cohort with hip or knee osteoarthritis (OA). Self-completed questionnaires were used to collect demographic and practice characteristics and perceptions about TJA. Confidence in referring appropriate patients for TJA was measured on a scale from 1 to 10; respondents scoring in the lowest tertile were considered to have 'low confidence'. Descriptive analyses were conducted and multiple logistic regression was used to determine key predictors of low confidence. RESULTS: 212 PCPs participated (58% response rate) (65% aged 50+ years, 45% female, 77% >15 years of practice). Perceptions about TJA were highly variable but on average, PCPs perceived that a typical surgical candidate would have moderate pain and disability, identified few absolute contraindications to TJA, and overestimated both the effectiveness and risks of TJA. On average, PCPs indicated moderate confidence in deciding who to refer. Independent predictors of low confidence were female physicians (OR = 2.18,

95% confidence interval (CI): 1.06-4.46) and reporting a 'lack of clarity about surgical indications' (OR = 3.54, 95% CI: 1.87-6.66). CONCLUSIONS: Variability in perceptions and lack of clarity about surgical indications underscore the need for decision support tools to inform PCP - patient decision making regarding referral for TJA.

Weber, M. et Zeman, F. (2019). "Predicting Outcome after Total Hip Arthroplasty: The Role of Preoperative Patient-Reported Measures." 2019 : 4909561.

Choosing the appropriate patient for surgery is crucial for good outcome in total hip arthroplasty (THA). Therefore, parameters predicting outcome preoperatively are of major interest. In the current study, we compared the predictive power of different presurgical measures in minimally invasive THA. In the course of a prospective clinical trial preoperative HOOS, EQ-5D and SF-36 were obtained in 140 patients undergoing THA. Responder rate was defined by the modified OMERACT-OARSI criteria at six-month-, one-year, two-year, and three-year follow-up. Logistic regression was performed to compare the different questionnaires regarding their power of predicting positive responders. ROC-curve analysis was used to define benchmarks in preoperative measures associated with good outcome. Preoperative HOOS ($p<0.001$), EQ-5D ($p=0.007$), and PCS of SF-36 ($p<0.001$) were higher in responders than in nonresponders whereas no differences between responders and nonresponders were found for preoperative MCS ($p=0.96$) of SF-36. However, preoperative HOOS revealed best predictive power (OR=0.84 95%CI=0.78-0.90, $p<0.001$, Pseudo R-Squared according to Nagelkerke=0.48, effect size according to Cohen=0.96) compared to all other preoperative measures. Multivariable analysis confirmed preoperative HOOS as an independent parameter correlating with postoperative responder status (OR=0.76, 95% CI=0.66-0.88, $p<0.001$). In ROC-curve analysis nonresponders were identified with a sensitivity of 91.7% and specificity of 68.9% using a cutoff in preoperative HOOS of 40.3. Presurgical HOOS can predict outcome in THA better than other preoperative outcome measures. Patients with a preoperative HOOS value less than 40.3 have the highest probability of a positive response in terms of pain and function after THA.

Wiering, B., de Boer, D. et Delnoij, D. (2018). "Meeting patient expectations: patient expectations and recovery after hip or knee surgery." Musculoskelet Surg 102(3) : 231-240.

BACKGROUND: Although patient-centred care could help increase the value of healthcare, practice variations in hip and knee surgery suggest that physicians guide clinical decisions more than patients do. This raises the question whether treatment outcomes still meet patients' expectations. This study investigated whether treatment outcomes measured by patient-reported outcome measures fulfil patients' main expectations (i.e. decreased pain or improved functioning). METHODS: Patients who underwent hip or knee surgery in 20 Dutch hospitals in 2014 were invited to a survey consisting of the KOOS Physical Function Short Form or the HOOS Physical Function Short Form, the NRS pain and the EQ-5D. Patients were asked their main reason for surgery and whether the expectations regarding this reason were fulfilled. RESULTS: A total of 2776 patients completed the survey. The most common reason for surgery was improved functioning (43.7%). Patients who were unable to choose between pain relief and improved functioning and patients who aimed for pain relief experienced more problems before surgery. However, patients who were unable to choose improved more than patients who wanted to improve their functioning on the NRS pain during use and the EQ-5D. More patients who aimed for pain relief felt that their expectations were fulfilled compared to other patients. CONCLUSIONS: Although an expectation for an outcome was not related to a greater improvement on that outcome, patient expectations were an indication of patients' improvement due to surgery. Differences

in expectation fulfilment may be due to unrealistic expectations. To achieve optimal value, tailoring treatment using patient preferences and managing patient expectations is vital.

Zhou, Y., Yang, T., Li, Y., et al. (2015). "[Efficacy of health education on patients with hip replacement based on the Internet]." Zhong Nan Da Xue Xue Bao Yi Xue Ban 40(3) : 298-302.

OBJECTIVE: To evaluate the efficacy of health education on patients with hip replacement based on the Internet, and to establish a new health education model through modern technology. METHODS: A total of 300 patients with hip replacement from March to August, 2015 were enrolled in this study. The participants were divided into a control group and an experimental group according to months surgeries performed. Traditional education was applied in the control group while the multimedia source material plus the Internet platform of Joint Registration System were applied in the experimental group. Levels of anxiety, degree of satisfaction, and postoperative complications were analyzed. RESULTS: The levels of knowledge, attitude and behavior compliance in the patients of the experimental group were significantly improved, while the levels of postoperative anxiety were decreased compared with those in the control group (P<0.05). CONCLUSION: Education based on the Internet platform of Joint Registration System and the computer video could improve patients' knowledge, attitude, and behavior, which is worthy of clinical spread.

Winther, S. B., Foss, O. A., Wik, T. S., et al. (2015). "1-year follow-up of 920 hip and knee arthroplasty patients after implementing fast-track." Acta Orthop 86(1) : 78-85.

BACKGROUND: Fast-track has become a well-known concept resulting in improved patient satisfaction and postoperative results. Concerns have been raised about whether increased efficiency could compromise safety, and whether early hospital discharge might result in an increased number of complications. We present 1-year follow-up results after implementing fast-track in a Norwegian university hospital. METHODS: This was a register-based study of 1,069 consecutive fast-track hip and knee arthroplasty patients who were operated on between September 2010 and December 2012. Patients were followed up until 1 year after surgery. RESULTS: 987 primary and 82 revision hip or knee arthroplasty patients were included. 869 primary and 51 revision hip or knee patients attended 1-year follow-up. Mean patient satisfaction was 9.3 out of a maximum of 10. Mean length of stay was 3.1 days for primary patients. It was 4.2 days in the revision hip patients and 3.9 in the revision knee patients. Revision rates until 1-year follow-up were 2.9% and 3.3% for primary hip and knee patients, and 3.7% and 7.1% for revision hip and knee patients. Function scores and patient-reported outcome scores were improved in all groups. INTERPRETATION: We found reduced length of stay, a high level of patient satisfaction, and low revision rates, together with improved health-related quality of life and functionality, when we introduced fast-track into an orthopedic department in a Norwegian university hospital.

Yanik, J. M., Bedard, N. A., Hanley, J. M., et al. (2018). "Rapid Recovery Total Joint Arthroplasty is Safe, Efficient, and Cost-Effective in the Veterans Administration Setting." J Arthroplasty 33(10) : 3138-3142.
https://www.arthroplastyjournal.org/article/S0883-5403(18)30612-0/fulltext

BACKGROUND: Institutional pathways in total joint arthroplasty (TJA) have been shown to reduce costs and improve patient care, but questions remain regarding their efficacy in certain populations. We sought to evaluate the comprehensive effect of a rapid recovery perioperative TJA protocol in the Veterans Health Administration (VA) setting. METHODS: In a VA hospital, a rapid recovery protocol was implemented for all patients undergoing primary

total hip or knee arthroplasty. A retrospective chart review was performed comparing pre-protocol (n = 174) and protocol (n = 78) cohorts. Measured outcomes included length of stay (LOS), discharge destination, unplanned readmissions, overall complications, and total cost of healthcare during admission and at 30 and 90 days postoperatively. RESULTS: After implementation of the protocol, the average LOS decreased from 3.2 to 1.7 days (P < .0001). In the protocol group, there was a 12.3% increase in patients discharging directly home (85.1% vs 97.4%, P = .005). There were lower unplanned readmissions (6.3% vs 3.8%, P = .56) and overall complications (7.5% vs 3.8%, P = .40), but these were not statistically significant. The summative cost of all perioperative healthcare was lower after implementation of the protocol during the inpatient stay ($19,015 vs $21,719, P = .002) and out to 30 days postoperatively ($21,083 vs $23,420, P = .03) and 90 days postoperatively ($24,189 vs $26,514, P = .07). CONCLUSION: In the VA setting, implementation of a rapid recovery TJA protocol led to decreased LOS, decreased cost of perioperative healthcare, and an increase in patients discharging directly home without increased readmission or complication rates. Such protocols are essential as we transition into an era of value-based arthroplasty.

Études d'évaluation de la qualité des soins et des procédures

Évaluation d'impact d'une nouvelle organisation en chirurgie orthopédique sur les parcours de soins

La coordination des soins avant et après une hospitalisation est importante pour améliorer la qualité de prise en charge des patients et l'efficience du système de santé. Différents protocoles de soins centrés sur le patient ont été développés dans la littérature médicale. Ils sont de plus en plus promus et employés dans les établissements de santé. Une étude de l'Irdes parue en 2019[2] évalue l'impact de la mise en place d'un protocole de Réhabilitation améliorée après chirurgie (Raac) en chirurgie orthopédique sur les parcours de soins dans les cliniques privées. Les données mobilisées proviennent du Programme de médicalisation des systèmes d'information en Médecine, chirurgie, obstétrique (PMSI-MCO) concernant les patients ayant séjourné en établissement de santé pour pose de prothèse de hanche ou du genou dans les cliniques privées. Cette étude analyse l'impact de la Raac sur les durées de séjour, les modes de sortie (Soins de suite et de réadaptation (SSR) ou domicile) et la probabilité de réadmission à 30 et 90 jours. A partir de régressions en doubles différences, elle compare les résultats des patients opérés dans les établissements labellisés Raac par le Groupe francophone de réhabilitation améliorée après chirurgie (Grace) avec ceux des patients pris en charge dans des cliniques témoins comparables. Elle isole l'effet de la Raac en prenant en compte l'impact potentiel d'autres facteurs tels que l'âge, le sexe du patient, son indice de co-morbidité et l'offre de soins proche de la résidence du patient. Les patients opérés dans un service de chirurgie qui pratique la Raac ont, en moyenne, une durée de séjour plus courte que ceux qui sont opérés dans un service de chirurgie classique (-0,4 jour). Ces patients ont une probabilité plus élevée de retour à domicile (OR 1,15), sans avoir un plus grand risque de réadmission. La labellisation Raac semble aussi avoir un impact positif sur le volume d'activité des établissements par le biais de la concurrence en qualité : toutes choses égales par ailleurs, les hôpitaux labélisés Raac ont enregistré un taux de croissance supérieur par rapport aux cliniques témoins.

ÉTUDES FRANÇAISES

Bricard, D., Or, Z. et Penneau, A. (2018). "Evaluation d'impact de l'expérimentation Parcours santé des aînés (Paerpa)." Questions D'economie De La Sante (Irdes) (235) : 1-8.
http://www.irdes.fr/recherche/questions-d-economie-de-la-sante/235-evaluation-d-impact-de-l-experimentation-parcours-sante-des-aines-paerpa.pdf

Les expérimentations Parcours santé des aînés (Paerpa), lancées en 2014 dans neuf territoires pilotes, ont pour objectif d'améliorer la prise en charge et la qualité de vie des personnes âgées de 75 ans et plus et de leurs aidants en faisant progresser la coordination des différents intervenants des secteurs sanitaire, social et médico-social au niveau local. L'évaluation des impacts médicaux et économiques des projets pilotes, prévue dans le cahier des charges Paerpa, renvoie à des enjeux méthodologiques multiples en raison du nombre et de la diversité des acteurs impliqués, de la variété des interventions déployées dans chaque territoire, et de l'hétérogénéité des territoires sélectionnés parmi un ensemble de territoires volontaires. Les premiers résultats observés à partir des données 2015 et 2016, années correspondant à la montée en charge des expérimentations, ne permettent pas d'établir un effet moyen significatif propre à Paerpa sur les indicateurs de résultats retenus lorsqu'on étudie l'ensemble des territoires. Néanmoins, les analyses par territoire permettent de déceler des effets significatifs dans quelques-uns d'entre eux, notamment pour les indicateurs de résultats les plus sensibles aux soins primaires.

Bricard, D., Or, Z. et Penneau, A. (2018). Méthodologie de l'évaluation d'impact de l'expérimentation Parcours santé des aînés (Paerpa). Document de travail Irdes ; 74. Paris Irdes **:** 60.
http://www.irdes.fr/recherche/documents-de-travail/074-methodologie-de-l-evaluation-d-impact-de-l-experimentation-parcours-sante-des-aines-paerpa.pdf

[2] Mallejac, N., Or, Z. et Fournier, C. c. (2019). Évaluation d'impact d'une nouvelle organisation en chirurgie orthopédique sur les parcours de soins. Document de travail Irdes ; 79.

L'expérimentation sur les Parcours santé des aînés (Paerpa), lancée en 2014 dans neuf territoires pilotes, avec l'objectif d'améliorer la prise en charge et la qualité de vie des personnes âgées de 75 ans et plus, est un exemple d'expérimentation complexe. Elle combine une série de dispositifs nationaux implémentés de façon hétérogène d'un territoire à l'autre. L'évaluation d'expérimentations territoriales comme Paerpa renvoie à des enjeux méthodologiques importants car le traitement de ces expérimentations est hétérogène et l'effet de ce traitement peut varier selon les contextes territoriaux. Dans cet article, la méthode du contrôle synthétique (CS) est présentée comme une méthode pertinente pour l'évaluation d'impact des politiques territoriales et sa robustesse est testée comparativement aux méthodes alternatives plus classiques. L'évaluation s'appuie principalement sur les données du Système national des données de santé (SNDS) de 12 régions françaises de 2010 à 2016. Les contextes socio-économiques et l'offre sanitaire et médico-sociale des territoires sont appréhendés à partir de nombreuses sources de données, à un niveau communal ou départemental.

Gand, S., Periac, E., Bloch, M.-A., et al. (2017). "Évaluation qualitative PAERPA : rapport final." Serie Etudes Et Recherches - Document De Travail – Drees (135) : 72.
http://drees.solidarites-sante.gouv.fr/etudes-et-statistiques/publications/documents-de-travail/serie-etudes-et-recherche/article/evaluation-qualitative-paerpa-rapport-final

[BDSP. Notice produite par MIN-SANTE rFHR0x8s. Diffusion soumise à autorisation]. Les personnes âgées de 75 ans et plus représentent en France une personne sur dix, et 85% d'entre elles ont au moins une pathologie. Ainsi, les parcours de santé pilotes PAERPA (Personnes Âgées en Risque de Perte d'Autonomie), expérimenté dès 2013, ont pour objectif que les personnes âgées reçoivent les bons soins, par les bons professionnels, dans les bonnes structures, au bon moment, le tout au meilleur coût.

Mallejac, N., Or, Z. et Fournier, C. c. (2019). Évaluation d'impact d'une nouvelle organisation en chirurgie orthopédique sur les parcours de soins. Document de travail Irdes ; 79. Paris Irdes **:** 32, tabl., graph.
https://www.irdes.fr/recherche/documents-de-travail/079-evaluation-d-impact-d-une-nouvelle-organisation-en-chirurgie-orthopedique-sur-les-parcours-de-soins.pdf

La coordination des soins avant et après une hospitalisation est importante pour améliorer la qualité de prise en charge des patients et l'efficience du système de santé. Différents protocoles de soins centrés sur le patient ont été développés dans la littérature médicale. Ils sont de plus en plus promus et employés dans les établissements de santé. Dans cette étude, nous évaluons l'impact de la mise en place d'un protocole de Réhabilitation améliorée après chirurgie (Raac) en chirurgie orthopédique sur les parcours de soins dans les cliniques privées. Les données mobilisées proviennent du Programme de médicalisation des systèmes d'information en Médecine, chirurgie, obstétrique (PMSI-MCO) concernant les patients ayant séjourné en établissement de santé pour pose de prothèse de hanche ou du genou dans les cliniques privées. Nous analysons l'impact de la Raac sur les durées de séjour, les modes de sortie (Soins de suite et de réadaptation (SSR) ou domicile) et la probabilité de réadmission à 30 et 90 jours. A partir de régressions en doubles différences, nous comparons les résultats des patients opérés dans les établissements labellisés Raac par le Groupe francophone de réhabilitation améliorée après chirurgie (Grace) avec ceux des patients pris en charge dans des cliniques témoins comparables. On isole l'effet de la Raac en prenant en compte l'impact potentiel d'autres facteurs tels que l'âge, le sexe du patient, son indice de co-morbidité et l'offre de soins proche de la résidence du patient (résumé d'auteur).

Malléjac, N. et Or, Z. (2019). "Évaluation d'impact d'une nouvelle organisation des soins à l'hôpital sur les parcours de soins." Revue d'Épidémiologie et de Santé Publique 67 : S86-S87.
http://www.sciencedirect.com/science/article/pii/S039876201930046X

Introduction La coordination des soins avant et après une hospitalisation est importante pour améliorer la qualité de prise en charge des patients et l'efficience du système de santé. Différents protocoles de soins centrés sur le patient ont été développés dans la littérature médicale. Ils sont de plus en plus employés dans les établissements de santé. Nous évaluons l'impact de la mise en place d'un protocole de Réhabilitation améliorée après chirurgie (RAAC) en chirurgie orthopédique sur les parcours de soins dans différentes cliniques privées. Méthodes Les données proviennent du PMSI-MCO des patients ayant séjourné pour pose de prothèse de hanche ou de genou. Nous analysons l'impact de la RAAC sur les durées de séjours, les modes de sortie et la probabilité de réadmission à 90jours. A partir de régressions en double-différences, nous comparons les résultats des patients opérés dans les établissements labellisés RAAC par le Groupe francophone de réhabilitation améliorée après chirurgie (GRACE) avec ceux des patients pris en charge dans des cliniques non labellisées. La difficulté de l'étude réside dans la comparabilité des cliniques. On isole l'effet de la RAAC en prenant en compte l'impact d'autres facteurs tels que l'âge, le sexe du patient, son indice de co-morbidité et l'offre de soins environnante. Résultats Les patients opérés avec un protocole RAAC ont, en moyenne, une durée de séjour plus courte que ceux qui sont opérés dans un service de chirurgie classique (−0,3 jour). Ces patients ont une probabilité plus élevée de retour à domicile (+15 %), sans avoir un plus grand risque de réadmission à 90jours. La probabilité de sortie à domicile diminue avec la proximité du domicile à un établissement SSR, et augmente avec le niveau de vie médian de la commune de résidence. Ce dernier résultat suggère un effet différent suivant l'origine sociale des patients. Discussion/Conclusion La RAAC a un impact significatif sur le nombre de séjours en SSR et le nombre de journées d'hospitalisation, sans compromettre la sécurité du patient.

Or, Z., Bricard, D., Le Guen, N., et al. (2018). Évaluation d'impact de l'expérimentation Parcours santé des aînés (Paerpa). Premiers résultats et Annexes. Paris Irdes **:** 62, 15.
www.irdes.fr/recherche/rapports/567-evaluation-d-impact-de-l-experimentation-paerpa.pdf

Les expérimentations Paerpa (Parcours santé des aînés), lancées en 2014 dans neuf territoires pilotes, ont pour objectif d'améliorer la prise en charge et la qualité de vie des personnes âgées de 75 ans et plus et de leurs aidants. Les projets visent à faire progresser la coordination des différents intervenants des secteurs sanitaire, social et médico-social pour améliorer la qualité de la prise en charge globale, prévenir la perte d'autonomie et éviter le recours inapproprié à l'hospitalisation. L'évaluation conçue par l'Irdes vise à porter un jugement global sur les résultats des projets, en tenant compte de leurs spécificités territoriales, au regard des objectifs de Paerpa et au moyen de critères communs. Ce rapport intermédiaire présente les principales étapes et méthodes de l'évaluation d'impact, et dévoile les premiers résultats sur les données 2015-2016. Le document annexe propose une description des indicateurs qui sont suivis dans le cadre de l'évaluation d'impact Parcours santé des aînés (Paerpa). Ces indicateurs sont calculés sur la période 2010 à 2017 par l'Irdes pour suivre la consommation des personnes âgées de 75 ans et plus dans les territoires Paerpa et dans les territoires témoins.

ÉTUDES ETRANGERES

Akhavan, S., Ward, L. et Bozic, K. J. (2016). "Time-driven Activity-based Costing More Accurately Reflects Costs in Arthroplasty Surgery." Clin Orthop Relat Res 474(1) : 8-15.

> BACKGROUND: Cost estimates derived from traditional hospital cost accounting systems have inherent limitations that restrict their usefulness for measuring process and quality improvement. Newer approaches such as time-driven activity-based costing (TDABC) may offer more precise estimates of true cost, but to our knowledge, the differences between this TDABC and more traditional approaches have not been explored systematically in arthroplasty surgery. QUESTIONS/PURPOSES: The purposes of this study were to compare the costs associated with (1) primary total hip arthroplasty (THA); (2) primary total knee arthroplasty (TKA); and (3) three surgeons performing these total joint arthroplasties (TJAs) as measured using TDABC versus traditional hospital accounting (TA). METHODS: Process maps were developed for each phase of care (preoperative, intraoperative, and postoperative) for patients undergoing primary TJA performed by one of three surgeons at a tertiary care medical center. Personnel costs for each phase of care were measured using TDABC based on fully loaded labor rates, including physician compensation. Costs associated with consumables (including implants) were calculated based on direct purchase price. Total costs for 677 primary TJAs were aggregated over 17 months (January 2012 to May 2013) and organized into cost categories (room and board, implant, operating room services, drugs, supplies, other services). Costs derived using TDABC, based on actual time and intensity of resources used, were compared with costs derived using TA techniques based on activity-based costing and indirect costs calculated as a percentage of direct costs from the hospital decision support system. RESULTS: Substantial differences between cost estimates using TDABC and TA were found for primary THA (USD 12,982 TDABC versus USD 23,915 TA), primary TKA (USD 13,661 TDABC versus USD 24,796 TA), and individually across all three surgeons for both (THA: TDABC = 49%-55% of TA total cost; TKA: TDABC = 53%-55% of TA total cost). Cost categories with the most variability between TA and TDABC estimates were operating room services and room and board. CONCLUSIONS: Traditional hospital cost accounting systems overestimate the costs associated with many surgical procedures, including primary TJA. TDABC provides a more accurate measure of true resource use associated with TJAs and can be used to identify high-cost/high-variability processes that can be targeted for process/quality improvement. LEVEL OF EVIDENCE: Level III, therapeutic study.

Alviar, M. J., Olver, J., Brand, C., et al. (2011). "Do patient-reported outcome measures in hip and knee arthroplasty rehabilitation have robust measurement attributes? A systematic review." J Rehabil Med 43(7) : 572-583.

> OBJECTIVE: The aim of this study was to systematically review and compare the measurement attributes of multidimensional, patient-reported outcome measures used in hip and knee arthroplasty rehabilitation. METHODS: A search of PubMed, CINAHL, Cochrane Central Registry, SCOPUS and PEDro databases up to December 2009 identified the validation studies. The quality of the measurement properties were assessed based on the Terwee and Bot criteria, and Scientific Advisory Committee of the Medical Outcomes Trust guidelines. RESULTS: A total of 68 studies examining 28 instruments were identified. Three instruments had positive ratings for content validity. None of the instruments satisfied both factor analysis and Cronbach's alpha criteria for internal consistency. Four measures were positively-rated for agreement. Nine tools had positive ratings for construct validity. Twenty-

four of the instruments had indeterminate ratings for responsiveness to clinical change. Only certain subscales of 2 instruments were positively-rated for responsiveness to clinical change. CONCLUSION: A wide variety of multidimensional patient-reported instruments has been used to assess rehabilitation outcomes after hip and knee arthroplasty, but information about their measurement attributes in these populations is inadequate. More data are needed to clarify their reproducibility and responsiveness to clinical change. :

Appleby, J., Poteliakhoff, E., Shah, K., et al. (2013). "Using patient-reported outcome measures to estimate cost-effectiveness of hip replacements in English hospitals." J R Soc Med 106(8) : 323-331.

OBJECTIVE: To estimate the average cost per quality adjusted life year (QALY) gained from hip surgery, and to examine the variation in that between hospitals. DESIGN: The transformation of patient-reported outcome measures (EQ-5D data) into QALYs, covering 25,463 NHS patient episodes between April 2009 and August 2010 from hospitals in England, using a model of future health change arising from a hip operation compared to a counterfactual of no operation. Hospital-level costs for hip procedures from the National Reference Costs data-set was used to calculate the hospitals' cost per QALY. SETTING: English hospitals treating NHS-funded patients undergoing hip replacement. PARTICIPANTS: NHS-funded patients undergoing primary hip replacement. MAIN OUTCOME MEASURE: Cost per QALY. RESULTS: Assuming some degradation in patients' health over the lifetime of the hip prosthesis, average health gain arising from a hip operation was 2.77 QALYs. For procedures paid for by the NHS but carried out in the independent sector the average gain was 2.97 QALYs. Average NHS hospital hip procedure costs were estimated to be pound5844. The unweighted average cost per QALY for NHS hospitals was pound2128. There were significant variations in cost per QALY between hospitals; most of this variation appears to be driven by variations in cost, not QALYs. CONCLUSIONS: Using the new patient-assessed health-related quality of life data combined with routine hospital-level cost data it is possible to estimate a procedure-based measure of efficiency for hospitals. The fact that variations in cost per QALY are strongly driven by variations in cost suggests that further work is needed to investigate the causes of cost variations per se--especially the quality of routine NHS cost data.

Bamm, E. L., Rosenbaum, P. et Stratford, P. (2010). "Validation of the measure of processes of care for adults: a measure of client-centred care." Int J Qual Health Care 22(4) : 302-309.

OBJECTIVE: To assess the psychometric properties of the measure of processes of care for adults (MPOC-A), a measure of client-centredness of care for parents of children with disabilities, adapted for adult health-care settings. DESIGN: A validation study. SETTING: Regional orthopaedic service of a university-affiliated hospital in ON, Canada. PARTICIPANTS: All patients and families who had had joint replacement surgery (Knee or Hip) between January and August of 2007. MAIN OUTCOME MEASURES: MPOC-A and the client satisfaction questionnaire (CSQ). RESULTS: One hundred and seventy-six questionnaires filled out by patients and 81 by family members were analysed. Scales demonstrated high internal consistency (Cronbach's alpha varying from 0.81 to 0.93 for patients and from 0.88 to 0.96 for family members). MPOC-A domain scores were moderately correlated with CSQ total scores (Pearson coefficients varying from 0.44 to 0.66 for patients and from 0.53 to 0.72 for family members). Moderate to good inter-rater agreement [intraclass correlation coefficient (ICC) from 0.50 to 0.74] and high test-retest reliability were found (ICCs varying from 0.73 to 0.83 for patients and from 0.75 to 0.91 for family members). CONCLUSIONS: MPOC-A has demonstrated good psychometric properties. As general satisfaction scores are notoriously poor indicators of the quality of care, this measure can help us understand the elements that

contribute to overall judgements of satisfaction and provide a level of understanding that is important to improve service quality and delivery.

Barham, L. et Devlin, N. (2011). "Patient-reported outcome measures: implications for nursing." Nurs Stand 25(18): 42-45.

The Patient Reported Outcome Measures (PROMs) Programme, which was implemented by the NHS in 2009, gives prominence to patients' views about their health. Self-reported measures of health are now being sought from all patients before and after four elective procedures--hip and knee replacement surgery, hernia repair and varicose veins surgery. This information will be used to assess changes in health and provides routine information on NHS patients' health outcomes for the first time. The information will be used to identify and reward good performance by providers; help patients to make choices and clinicians to monitor and improve quality; and inform commissioners' decisions about which services to prioritise. The aim of this article is to inform nurses about PROMs and encourage them to engage with it.

Behery, O. A., Kouk, S., Chen, K. K., et al. (2018). "Skilled Nursing Facility Partnerships May Decrease 90-Day Costs in a Total Joint Arthroplasty Episode Under the Bundled Payments for Care Improvement Initiative." J Arthroplasty 33(3) : 639-642.
http://www.sciencedirect.com/science/article/pii/S0883540317309075

Background The Bundled Payments for Care Improvement initiative was developed to reduce costs associated with total joint arthroplasty through a single payment for all patient care from index admission through a 90-day post-discharge period, including care at skilled nursing facilities (SNFs). The aim of this study is to investigate whether forming partnerships between hospitals and SNFs could lower the post-discharge costs. We hypothesize that institutionally aligned SNFs have lower post-discharge costs than non-aligned SNFs. Methods A cohort of 615 elective, primary total hip and knee arthroplasty subjects discharged to an SNF under the Bundled Payments for Care Improvement from 2014 to 2016 were included in our analysis. Patients were grouped into one of the 3 categories of SNF alignment: group 1: non-partners; group 2: agreement-based partners; group 3: institution-owned partners. Demographics, comorbidities, length of stay (LOS) at SNF, and associated costs during the 90-day post-operative period were compared between the 3 groups. Results Mean index hospital LOS was statistically shortest in group 3 (mean 2.7 days vs 3.5 for groups 1 and 2, P = .001). SNF LOS was also shortest in group 3 (mean 11 days vs 19 and 21 days in groups 2 and 1 respectively, P < .001). Total SNF costs and total 90-day costs were both significantly lower in group 3 compared with groups 1 and 2 (P < .001 for all), even after controlling for medical comorbidities. Conclusion Institution-owned partner SNFs demonstrated the shortest patient LOS, and the lowest SNF and total 90-day costs, without increased risk of readmissions, compared with other SNFs.

Boyce, M. B. et Browne, J. P. (2015). "The effectiveness of providing peer benchmarked feedback to hip replacement surgeons based on patient-reported outcome measures--results from the PROFILE (Patient-Reported Outcomes: Feedback Interpretation and Learning Experiment) trial: a cluster randomised controlled study." BMJ Open 5(7) : e008325.

OBJECTIVE: To test whether providing surgeons with peer benchmarked feedback about patient-reported outcomes is effective in improving patient outcomes. DESIGN: Cluster randomised controlled trial. SETTING: Secondary care--Ireland. PARTICIPANTS: Surgeons were recruited through the Irish Institute of Trauma and Orthopaedic Surgery, and patients

were recruited in hospitals prior to surgery. We randomly allocated 21 surgeons and 550 patients. INTERVENTION: Surgeons in the intervention group received peer benchmarked patient-reported outcome measures (PROMs) feedback and education. MAIN OUTCOME VARIABLE: Postoperative Oxford Hip Score (OHS). RESULTS: Primary outcome data were available for 11 intervention surgeons with responsibility for 230 patients and 10 control surgeons with responsibility for 228 patients. The mean postoperative OHS for the intervention group was 40.8 (95% CI 39.8 to 41.7) and for the control group was 41.9 (95% CI 41.1 to 42.7). The adjusted effect estimate was -1.1 (95% CI -2.4 to 0.2, p=0.09). Secondary outcomes were the Hip Osteoarthritis Outcome Score (HOOS), EQ-5D and the proportion of patients reporting a problem after surgery. The mean postoperative HOOS for the intervention group was 36.2 and for the control group was 37.1. The adjusted effect estimate was -1.1 (95% CI -2.4 to 0.3, p=0.1). The mean postoperative EQ-5D for the intervention group was 0.85 and for the control group was 0.87. The adjusted effect estimate was -0.02 (95% CI -0.05 to 0.008, p=0.2). 27% of intervention patients and 24% of control patients reported at least one complication after surgery (adjusted OR=1.2, 95% CI 0.6 to 2.3, p=0.6). CONCLUSIONS: Outcomes for patients operated on by surgeons who had received peer benchmarked PROMs data were not statistically different from the outcomes of patients operated on by surgeons who did not receive feedback. PROMs information alone seems to be insufficient to identify opportunities for quality improvement. TRIAL REGISTRATION NUMBER: ISRCTN 69032522.

Bream, E., Charman, S. C., Clift, B., et al. (2010). "Relationship between patients' and clinicians' assessments of health status before and after knee arthroplasty." Qual Saf Health Care 19(6) : e6.

INTRODUCTION: The use of patient reported outcome measures (PROMs) for four elective operations is mandatory in the English NHS from April 2009. In view of some scepticism by some clinicians as to the validity of PROMs, our aim was to explore the relationship between patients' and clinicians' reports of health status before and after knee arthroplasty. METHODS: A secondary analysis of linked data from the Knee Arthroplasty Trial (patients' reports using the Oxford Knee Score) and the Tayside Arthroplasty Audit (clinicians' reports using the American Knee Society Score--Knee Score and Functional Score) was carried out. Correlations of scores were obtained for 284 patients before and 226 patients after surgery. RESULTS: There was a moderately strong correlation between patients' and clinicians' views 1 year after surgery: Oxford Knee Score (OKS) versus American Knee Society Scores (AKSS) Knee Score r = -0.64; OKS versus AKSS Functional Score r = -0.44. Before surgery, the correlation between the OKS and the AKSS Functional Score was also moderate (r = -0.55) but was weak with the Knee Score (r = -0.23). There was no systematic direction to the differences between patients' and clinicians' assessments; patients were just as likely to report better health than their clinician as to report worse health. DISCUSSION: Patients' postoperative assessments following knee arthroplasty, as regards their symptoms and disability, are practical to collect and can make a meaningful and useful contribution in routine use. In view of the advantages of collecting data on symptoms and disability directly from patients-lower cost, higher response rates, avoidance of systematic biases-confirmation of a moderately strong association with clinicians' views offers further reassurance for the routine use of PROMs, at least with knee arthroplasty.

Brennan, G. P., Fritz, J. M., Houck, L. T., et al. (2015). "Outpatient rehabilitation care process factors and clinical outcomes among patients discharged home following unilateral total knee arthroplasty." J Arthroplasty 30(5) : 885-890.

Research examining care process variables and their relationship to clinical outcomes after total knee arthroplasty has focused primarily on inpatient variables. Care process factors related to outpatient rehabilitation have not been adequately examined. We conducted a retrospective review of 321 patients evaluating outpatient care process variables including use of continuous passive motion, home health physical therapy, number of days from inpatient discharge to beginning outpatient physical therapy, and aspects of outpatient physical therapy (number of visits, length of stay) as possible predictors of pain and disability outcomes of outpatient physical therapy. Only the number of days between inpatient discharge and outpatient physical therapy predicted better outcomes, suggesting that this may be a target for improving outcomes after total knee arthroplasty for patients discharged directly home.

Brown, K., Topp, R., Brosky, J. A., et al. (2012). "Prehabilitation and quality of life three months after total knee arthroplasty: a pilot study." Percept Mot Skills 115(3) : 765-774.

Knee osteoarthritis (OA), which affects over 27 million Americans, decreases the individual's quality of life through decreasing mobility, deconditioning, reducing functional ability, and increasing knee pain. The present aim was to assess whether such patients engaging in exercise prior to surgery ("prehabilitation"; preoperative exercise intervention) rate higher quality of life 3 mo. after their surgery compared with ratings by patients who did not engage in prehabilitation. Standard populations consist of OA patients that do not participate in any preoperative exercise programs, such as a prehabilitation exercise intervention. 18 knee osteoarthritis patients were randomly assigned to a control or a prehabilitation group. The latter group participated in an exercise intervention three times per week, once at home and twice at the physical therapy lab, for 8 wk. prior to their surgery. The control group participated in their usual preoperative care prescribed by the physician for all patients. Eight health-related quality of life domains were assessed at 3 mo. post surgery. These preliminary findings suggest efficacy of prehabilitation in facilitating quality of life of total knee arthroplasty (TKA) patients 3 mo. after surgery.

Cabana, F., Boissy, P., Tousignant, M., et al. (2010). "Interrater agreement between telerehabilitation and face-to-face clinical outcome measurements for total knee arthroplasty." Telemed J E Health 16(3) : 293-298.

Outcome measures in physical therapy provide the basis for determining the patient's rehabilitation needs, developing an individual intervention plan, and reassessing the evolution of the condition after therapeutic intervention. Questions surrounding the validity and reliability of outcome measures obtained in the context of telerehabilitation remain. The goal of this study was to explore which outcome measures can be used reliably in the context of telerehabilitation after discharge from an acute care hospital for lower limb orthopedic surgery. Fifteen patients recently discharged after total knee arthroplasty were evaluated by two experienced therapists. Each therapist evaluated under a given condition (face-to-face assessment, telerehabilitation assessment) eight outcome measures taken from standard clinical tests routinely used in the management of orthopedic rehabilitation after total knee arthroplasty. Evaluations were measured at 1-day intervals. Telerehabilitation evaluations were conducted with a videoconference link (H.264 CoDecs with Pan, Tilt, Zoom cameras) between either the participant's home or a clinical environment and a remote clinical station over residential DSL lines at 512 kbps. Interrater agreement between the two measurement modes was analyzed using the Bland and Altman method and Kripendorff's alpha reliability estimate. The 95% confidence interval for mean difference between evaluation methods varied between -20% and 8% for knee range of motion measures, -85% and 55% for scar

management, -33% and 29% for functional evaluations. Five out of the eight outcome measures showed reliability estimates of >0.80, with lowest reliability obtained for the scar assessment scale (0.34) and the highest reliability for the evaluation of the range of motion at the knee (0.87 in flexion and 0.85 in extension). Clinical variables typically measured in face-to-face evaluations can be measured successfully under telerehabilitation conditions with moderate reliability.

Chan, H. Y., Sultana, R., Yeo, S. J., et al. (2018). "Comparison of outcome measures from different pathways following total knee arthroplasty." Singapore medical journal 59(9) : 476-486. https://pubmed.ncbi.nlm.nih.gov/29372260

INTRODUCTION: The benefits of extended inpatient rehabilitation following total knee arthroplasty (TKA) in local community hospitals (CHs) are unproven. Our study compared functional outcomes between patients discharged home and to CHs following TKA. METHODS: A case-control study was conducted of patients undergoing primary unilateral TKA. Consecutive patients (n = 1,065) were retrospectively reviewed using the Knee Society Clinical Rating System (KSCRS), 36-item Short Form Health Survey (SF-36) and Oxford Knee Score (OKS) preoperatively, and at the six-month and two-year follow-ups. RESULTS: Overall, 967 (90.8%) patients were discharged home and 98 (9.2%) to CHs. CH patients were older (mean age 70.7 vs. 67.2 years; p < 0.0001), female (86.7% vs. 77.5%; p = 0.0388) and less educated (primary education and above: 61.7% vs. 73.8%; p = 0.0081). Median CH length of stay was 23.0 (range 17.0-32.0) days. Significant predictors of discharge destination were older age, female gender, lower education, and poorer ambulatory status and physical health. Preoperatively, CH patients had worse KSCRS Function (49.2 ± 19.5 vs. 54.4 ± 16.8; p = 0.0201), SF-36 Physical Functioning (34.3 ± 22.6 vs. 40.4 ± 22.2; p = 0.0017) and Social Functioning (48.2 ± 35.1 vs. 56.0 ± 35.6; p = 0.0447) scores. CH patients had less improvement for all scores at all follow-ups. Regardless of preoperative confounders, with repeated analysis of variance, discharge destination was significantly associated with KSCRS, SF-36 and OKS scores. CONCLUSION: Older, female and less educated patients with poorer preoperative functional scores were more likely to be discharged to CHs after TKA. At the two-year follow-up, patients in CHs had less improvement in functional outcomes than those discharged home.

Chen, T.-T., Hsueh, Y.-S., Liaw, C.-K., et al. (2019). "Does public report card matter? A 10-year interrupted time series analysis on total knee replacement." Eur J Public Health 30(1) : 4-9. https://doi.org/10.1093/eurpub/ckz112

There is a lack of evidence that shows whether a report card can improve health outcomes in terms of infection rates or unscheduled readmission by using rigorous methods to evaluate its impact.We used the National Health Insurance Administration's claims database from 1 January 2004 to 30 December 2013 and a time series analysis to evaluate the impact of the quality report card initiative on three negative outcomes of total knee replacement for each quarter of the year, including the rates of superficial infection of a knee replacement, deep infection of knee arthroplasty and unplanned readmissions for surgical site infection.These negative outcomes (original scale) do not show significant decreases in terms of superficial infection (−0.05‰, −0.63 to 0.53‰, P = 0.87), deep infection (−0.003‰, −0.19 to 0.18‰, P = 0.97) and unscheduled readmission (0.02‰, −0.21 to 0.25‰, P = 0.88).The total knee replacement public report card initiative did not improve the rate of infection and unscheduled readmission for surgical site infection. This report card in Taiwan should involve physicians' participation in the design and be tailored to be suitable for reading by patients in order to further enhance the chance of improvement in these negative outcomes.

Giesinger, K., Hamilton, D. F., Jost, B., et al. (2014). "Comparative responsiveness of outcome measures for total knee arthroplasty." Osteoarthritis Cartilage 22(2) : 184-189.

OBJECTIVE: The aim of this study was to compare the responsiveness of various patient-reported outcome measures (PROMs) and clinician-reported outcomes following total knee arthroplasty (TKA) over a 2-year period. METHODS: Data were collected in a prospective cohort study of primary TKA. Patients who had completed Forgotten Joint Score-12 (FJS-12), Western Ontario and McMaster Universities (WOMAC) osteoarthritis (OA) index, EQ-5D, Knee Society Score and range of movement (ROM) assessment were included. Five time points were assessed: pre-operative, 2 months, 6 months, 1 year and 2 years post-operative. RESULTS: Data from 98 TKAs were available for analysis. Largest effect sizes (ES) for change from pre-operative to 2-month follow-up were observed for the Knee Society Score (KSS) Knee score (1.70) and WOMAC Total (-1.50). For the period from 6 months to 1 year the largest ES for change were shown by the FJS-12 (0.99) and the KSS Function Score (0.88). The EQ-5D showed the strongest ceiling effect at 1-year follow-up with 84.4% of patients scoring the maximum score. ES for the time from 1- to 2-year follow-up were largest for the FJS-12 (0.50). All other outcome measures showed ES equal or below 0.30. CONCLUSION: Outcome measures differ considerably in responsiveness, especially beyond one year post-operatively. Joint-specific outcome measures are more responsive than clinician-reported or generic health outcome tools. The FJS-12 was the most responsive of the tools assessed; suggesting that joint awareness may be a more discerning measure of patient outcome than traditional PROMs.

Goldstein, J. P., Babikian, G. M., Rana, A. J., et al. (2016). "The Cost and Outcome Effectiveness of Total Hip Replacement: Technique Choice and Volume-Output Effects Matter." Appl Health Econ Health Policy 14(6) : 703-718.

BACKGROUND: Total hip replacement (THR) must be managed in a more sustainable manner. More cost-effective surgical techniques and the centralization/regionalization of services are two solutions. The former requires an assessment of newer minimally invasive and muscle-sparing surgical techniques. The latter necessitates an effective volume-outcome (VO) relationship. Prior studies have failed to evaluate and control for the VO relation. OBJECTIVE: The objective of this study was to evaluate the relative cost and outcome effectiveness of two minimally invasive and one muscle-sparing techniques while evaluating and controlling for a potentially endogenous VO relation. METHODS: An all payer claims database for all THR performed in Maine in 2011 was used. The cost and outcome effectiveness of newer minimally invasive (modified Hardinge) and muscle-sparing (modified Watson-Jones) techniques were compared with the standard bearer posterior minimally invasive method. Using regression analysis, the outcomes analyzed were as follows: total costs, length of hospital stay, nursing care and home discharges, and use of physical therapy. Regression analysis was also used to evaluate and control for VO effects. RESULTS: (1) Newer muscle-sparing and minimally invasive approaches are substantially more effective; (2) irrespective of technique, higher volume surgeons are more effective; (3) technique-specific VO effects for more complex techniques exist and show substantial savings when yearly volume exceeds 30-50; and (4) the anterolateral muscle-sparing technique is accessible to the average surgeon. CONCLUSION: Reliance on newer surgical techniques and centralization/regionalization of THR services can reduce costs.

Hentschker, C. et Mennicken, R. (2012). The Relationship between Quality and Hospital Case Volume. An Empirical Examination with German Data. Ruhr Economic Papers ; 341. Bochum Ruhr-Universität Bochum : 23, tabl., fig.
http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2084172

This paper examines the effects of hospital case volume on quality of care on the example of intact abdominal aortic aneurysm (AAA) and hip fracture (HIP). We conduct the analysis on patient level with multiple logistic regression analysis. Quality is measured

Hentschker, C. et Mennicken, R. (2014). Selective-referral and Unobserved Patient Heterogeneity – Bias in the Volume-outcome Relationship. Ruhr Economic Papers ; 527. Bochum Ruhr-Universität Bochum : 25, tabl., fig.
http://hdl.handle.net/10419/104736

This paper examines the causal effect of the experience of a hospital with treating hip fractures (volume) on treatment outcome for patients. A full sample of administrative data from Germany for the year 2007 is used. We apply an instrumental variable approach to eliminate endogeneity concerns due to reverse causality and unobserved patient heterogeneity. As instruments for case volume we use the number of potential patients and the number of further hospitals in the region around every hospital. Our results indicate that after application of an IV regression of volume on outcome, volume significantly increases quality.

Hervey, S. L., Purves, H. R., Guller, U., et al. (2003). "Provider volume of total knee arthroplasties and patient outcomes in the HCUP-Nationwide Inpatient Sample." Journal of Bone and Joint Surgery Incorporated. American Volume 85-A(9) : 1775-1783.

Huang, C. S., Cheu, Y. D., Ying, J., et al. (2011). "Association between provider volume and comorbidity on hospital utilization and outcomes of total hip arthroplasty among National Health Insurance enrollees." J Formos Med Assoc 110(6) : 401-409.

BACKGROUND/PURPOSE: The impact of provider volume, comorbidity and adverse outcomes on hospital utilization of total hip arthroplasty (THA) has not yet been studied scientifically in Taiwan. This study aimed to examine the relationship between surgeon/hospital volume, perioperative complications, acute infections and hospital utilization for patients who underwent primary (THA). METHODS: We analyzed National Health Insurance (NHI) annual reimbursement data for all hospital admissions due to primary THA between January 2005 and December 2006. A total of 9335 patients with rheumatoid arthritis, osteoarthritis, avascular necrosis and other joint disorders were identified. Multivari-ate regression analyses were used to assess the relationship between provider volume and hospital utilization and the risk of adverse outcomes. Statistical analyses were adjusted for patient age, gender, comorbidity, type of arthritis, as well as hospital attributes. RESULTS: Reversed linear associations were found among hospital utilization, surgeon volume, and comorbidity score. Patients with acute infection tended to stay 8 days more and cost NT$32,451 more than their counterparts. Patients with perioperative complication tended to stay 2.30 days more and cost NT$15,327 more than their counterparts. Longer hospital stay and higher total hospital charge were associated with patient's age and Charlson index. CONCLUSIONS: This study revealed that the volume of THAs performed by individual surgeons was a more important determinant of hospital utilization than hospital volume. Perioperative adverse events were associated with patients' age and comorbidity.

Huber, J., Dabis, E., Zumstein, M. D., et al. (2013). "[Relative effect per patient (REPP)--outcome groups for total hip replacement and total knee replacement]." Z Orthop Unfall 151(3) : 239-242.

BACKGROUND: The outcome of orthopaedic surgery such as total hip replacement (THR) or total knee replacement (TKR) is commonly given by the change in mean scores on patient-reported outcome measures (Prom's). This may give the impression that all enrolled patients have experienced an improvement. But the Swedish hip registry and other studies report a reduction of complaints in 80-85 % of patients ("responders"), with the remainder (approximately one in six) remaining unchanged or reporting worse complaints ("non-responders"). According to Cohen, the degree of success in the "responders" group can be subdivided into excellent, good and moderate. For a given treatment, a total of 5 different outcome groups can therefore be defined: excellent, good, moderate, unchanged and worse. Allocation to the groups is based on the "relative effect per patient" (REPP). The REPP is calculated as the base-line score minus the post-treatment score divided by the baseline score. The maximum possible REPP is 1; a REPP of 0 means no effect and a negative REPP means deterioration. Allocation to the outcome groups is as follows: excellent 0.95 to 1 REPP, good 0.5 to 0.95 REPP, moderate over 0.2 to 0.5 REPP, unchanged -0.2 to 0.2 REPP and worse below -0.2 REPP. PATIENTS AND METHODS: Our local arthroplasty register was used to evaluate the 1-year outcomes of THR and TKR patients operated between March 2003 and November 2008, using WOMAC scores and EuroQoL scores. Only patients with complete data sets and unilateral THR/TKR were included. The success rate given by the REPP method was compared with that of the "responder rate" method defined by the OMERACT-OARSI criteria. RESULTS: With the WOMAC questionnaire, outcomes were as follows (THR/TKR): excellent 29/14 %, good 51/54 %, moderate 11/13 %, unchanged at 5/12 %, worse 4/7 %. The corresponding values for the EuroQoL were (THR/TKR): excellent 16/6 %, good 41/42 %, moderate 25/28 %, unchanged 12/16 %, worse 6/8 %. For THR, success rates were 92 % using the "responder rate" method (OMERACT-OARSI criteria) and 91 % using the REPP method with the WOMAC. CONCLUSION: Calculation of the REPP and the subsequent allocation to outcome groups is simple. The distribution of outcomes depends on the intervention (THR results better than TKR) and the patient questionnaire used (better results with a condition-specific than a generic questionnaire). The proportion of "unchanged" and "moderate" outcomes was greater with the generic questionnaire than with the condition-specific questionnaire, while the proportion of "worse" outcomes was similar for the two instruments. Partitioning of the degree of success into sub-groups, based on the REPP, provides more information for both the patient and the orthopaedic surgeon.

Husni, M. E., Losina, E., Fossel, A. H., et al. (2010). "Decreasing medical complications for total knee arthroplasty: effect of critical pathways on outcomes." BMC Musculoskelet Disord 11 : 160.

BACKGROUND: Studies on critical pathway use have demonstrated decreased length of stay and cost without compromise in quality of care. However, pathway effectiveness is difficult to determine given methodological flaws, such as small or single center cohorts. We studied the effect of critical pathways on total knee replacement outcomes in a large population-based study. METHODS: We identified hospitals in four US states that performed total knee replacements. We sent a questionnaire to surgical administrators in these hospitals including items about critical pathway use and hospital characteristics potentially related to outcomes. Patient data were obtained from Medicare claims, including demographics, comorbidities, 90-day postoperative complications and length of hospital stay. The principal outcome measure was the risk of having one or more postoperative complications. RESULTS: Two hundred ninety five hospitals (73%) responded to the questionnaire, with 201 reporting the use of critical pathways. 9,157 Medicare beneficiaries underwent TKR in these hospitals with

a mean age of 74 years (+/- 5.8). After adjusting for both patient and hospital related variables, patients in hospitals with pathways were 32% less likely to have a postoperative complication compared to patients in hospitals without pathways (OR 0.68, 95% CI 0.50-0.92). Patients managed on a critical pathway had an average length of stay 0.5 days (95% CI 0.3-0.6) shorter than patients not managed on a pathway. CONCLUSION: Medicare patients undergoing total knee replacement surgery in hospitals that used critical pathways had fewer postoperative complications than patients in hospitals without pathways, even after adjusting for patient and hospital related factors. This study has helped to establish that critical pathway use is associated with lower rates of postoperative mortality and complications following total knee replacement after adjusting for measured variables.

Jeschke, E., Heyde, K. et Gunster, C. (2013). "[The relationship of in-hospital and post-discharge complications and implications for quality measurement in hip replacement surgery - an analysis of AOK administrative data]." Gesundheitswesen **75**(5) : 288-295.

AIM: This study analyses the information gain achieved by additionally taking into account complications in the follow-up period instead of merely considering in-house events for a hospital-based quality measurement using the example of hip replacement. METHOD: The analysis was performed with anonymous statutory health insurance data (AOK) for the years 2007-2009 within the framework of the quality measurement method "Quality Assurance with Administrative Data (QSR)". It included cases of hip replacement surgery due to osteoarthritis. In order to analyse hospital-related outcome quality, 6 quality indicators were formed (revision surgery within 365 days, surgical complications within 90 days, thrombosis/pulmonary embolism within 90 days, femur fracture within 90 days, mortality within 90 days and complication index). For each hospital, the adjusted SMRs (standardised mortality or morbidity ratio) with 95% confidence intervals were calculated. The relation between the in-hospital and the follow-up SMR was analysed by Spearman's rank correlation coefficient. Furthermore, the percentage consistency of hospital SMRs categorised into quartiles on the basis of in-hospital and post-discharge events was determined. RESULTS: A total of 154 470 AOK patients from 930 hospitals were included in the analysis. The hospitals had a median overall complication rate of 11,22%. One quarter of the hospitals had complication rates of 8,18% or below. Another quarter of the hospitals had complication rates nearly twice as high (>/=15,49%). Nearly one-third of all complications occurred after the initial hospitalisation. Regarding clinic-related complications, there was little correlation between the events in the initial case and during follow-up (r<0,3) for all indicators. The order of the hospitals defined by quartiles of SMR changed significantly by adding the complications in the follow-up for the indicators considered (min 21%, max 47% changes between quartiles). In particular, for the indicators revision and death, a change in the SMR quartile occurred in almost 50% of all hospitals. CONCLUSION: Quality assessment of hip replacement surgery based exclusively on in-house events is quite unreliable. On the one hand, nearly a third of all complications occur in the follow-up period. On the other hand, predicting the occurrence of post-discharge events from in-house complications of a clinic is not considered acceptable for the indicators analysed in this study.

Johansson Stark, A., Charalambous, A., Istomina, N., et al. (2016). "The quality of recovery on discharge from hospital, a comparison between patients undergoing hip and knee replacement - a European study." J Clin Nurs 25(17-18) : 2489-2501.

AIMS AND OBJECTIVES: To describe and compare the quality of recovery on discharge from hospital among patients undergoing elective hip or knee replacement. The study will also attempt to identify any predicting factors. BACKGROUND: Arthroplasty is commonly used for

an increasing population of patients with osteoarthritis, and the recovery process starts directly after surgery. Today's shorter hospital stay may be a challenge for the patients during the early period of recovery. It is therefore important to identify factors associated with quality of recovery at discharge from hospital. DESIGN: A descriptive, comparative study including 12 hospitals in 5 European countries; Cyprus, Finland, Greece, Iceland and Sweden. METHODS: Consecutively included patients responded on: health-related quality of life, and emotions before surgery and at hospital discharge; quality of recovery, patient satisfaction and fulfilment of knowledge expectations. Related factors and associations were analysed separately for each kind of arthroplasty. In total, 865 patients were included (hip n = 413, knee n = 452). RESULTS: In the dimension of pain, patients undergoing hip replacement had significantly better quality of recovery compared to those undergoing knee replacement. Both patient groups experienced negative emotions before surgery that were related to poorer quality of recovery. Fulfilment of knowledge expectations has a limited effect on quality of recovery. Greater satisfaction with care predicted better quality of recovery. CONCLUSIONS: Negative preoperative emotions were related to poorer quality of recovery. For both kinds of arthroplasty, greater satisfaction with care was associated with better quality of recovery. RELEVANCE TO CLINICAL PRACTICE: The result emphasises the need to detect patients in need of support in their preparation and recovery process, taking into account the perspective of their emotional state.

Judge, A., Arden, N. K., Price, A., et al. (2011). "Assessing patients for joint replacement: can pre-operative Oxford hip and knee scores be used to predict patient satisfaction following joint replacement surgery and to guide patient selection?" J Bone Joint Surg Br 93(12) : 1660-1664.

We obtained pre-operative and six-month post-operative Oxford hip (OHS) and knee scores (OKS) for 1523 patients who underwent total hip replacement and 1784 patients who underwent total knee replacement. They all also completed a six-month satisfaction question. Scatter plots showed no relationship between pre-operative Oxford scores and six-month satisfaction scores. Spearman's rank correlation coefficients were -0.04 (95% confidence interval (CI) -0.09 to 0.01) between OHS and satisfaction and 0.04 (95% CI -0.01 to 0.08) between OKS and satisfaction. A receiver operating characteristic (ROC) curve analysis was used to identify a cut-off point for the pre-operative OHS/OKS that identifies whether or not a patient is satisfied with surgery. We obtained an area under the ROC curve of 0.51 (95% CI 0.45 to 0.56) for hip replacement and 0.56 (95% CI 0.51 to 0.60) for knee replacement, indicating that pre-operative Oxford scores have no predictive accuracy in distinguishing satisfied from dissatisfied patients. In the NHS widespread attempts are being made to use patient-reported outcome measures (PROMs) data for the purpose of prioritising patients for surgery. Oxford hip and knee scores have no predictive accuracy in relation to post-operative patient satisfaction. This evidence does not support their current use in prioritising access to care.

Makela, K. T., Peltola, M., Sund, R., et al. (2011). "Regional and hospital variance in performance of total hip and knee replacements: a national population-based study." Ann Med 43 Suppl 1 : S31-38.

INTRODUCTION: This article in the supplement on the Performance, Effectiveness, and Costs of Treatment episodes (PERFECT)-project describes the PERFECT Hip and Knee Replacement Database and its possibilities by evaluating regional and hospital-level differences in length of stay (LOS), costs and complication rates of total hip arthroplasty (THA) and total knee arthroplasty (TKA) in Finland. MATERIAL AND METHODS: All hip and knee arthroplasties are recorded in the Finnish Hospital Discharge Register (FHDR) and Finnish Arthroplasty Register (FAR). LOS, length of uninterrupted institutional care (LUIC), complication rates and other

parameters of treatment were determined by region and hospital during 1998-2008 based on these. RESULTS: LOS and LUIC following THA and TKA diminished during the follow-up period. In 1998 average LOS after THA and TKA was 9.9 and 10 days. In 2008, these had shortened to 5.2 and 5.3 days, respectively. There was a 5.0 and 7.5 percentage point difference in revision rate between regions in THAs and TKAs, respectively, performed during 2005-2007 and followed to the end of 2009. DISCUSSION: The Finnish health care registers provide a monitoring system for evaluating hospital- and regional-level differences in THA and TKA. The differences in LOS, LUIC and revision rates between hospitals and regions are considerable.

Mizner, R. L., Petterson, S. C., Clements, K. E., et al. (2011). "Measuring functional improvement after total knee arthroplasty requires both performance-based and patient-report assessments: a longitudinal analysis of outcomes." J Arthroplasty 26(5) : 728-737.

The purpose was to explore the responsiveness of both patient-report and performance-based outcome measures to determine functional changes during the acute and long-term postoperative recovery after total knee arthroplasty (TKA). One hundred patients scheduled for unilateral TKA underwent testing preoperatively and at 1 and 12 months postoperatively using the Delaware Osteoarthritis Profile. All physical performance measures decreased initially after surgery then increased in the long term; however, the perceived function did not follow the same trend, and some showed an increase immediately after surgery. Patient-report measures were variable, with no to small response early, but had excellent long-term responsiveness that was twice as large as performance measures. Patient perception fails to capture the acute functional declines after TKA and may overstate the long-term functional improvement with surgery.

Monticone, M., Ferrante, S., Salvaderi, S., et al. (2013). "Responsiveness and minimal important changes for the Knee Injury and Osteoarthritis Outcome Score in subjects undergoing rehabilitation after total knee arthroplasty." Am J Phys Med Rehabil 92(10) : 864-870.

OBJECTIVE: The aim of this study was to evaluate the responsiveness and minimal important changes for the Knee Injury and Osteoarthritis Outcome Score (KOOS) in subjects undergoing rehabilitation after total knee arthroplasty. DESIGN: At the beginning and end of a rehabilitation program, 148 patients completed the KOOS. A global perception of change scale was also completed at the end of the program and collapsed to produce a dichotomous outcome (improved vs. stable). Responsiveness was assessed on the KOOS subscales and calculated by distribution methods (effect size; standardized response mean). The minimal important changes of the KOOS subscales were assessed using anchor-based methods (receiver operating characteristic curves) to compute the best cutoff levels between the improved and stable subjects. RESULTS: The effect sizes ranged from 0.83 to 1.35, and the standardized response means ranged from 0.76 to 1.22. The receiver operating characteristic analyses revealed an area under the curve of 0.89, 0.88, 0.94, 0.93, and 0.85 for the Pain, Symptoms, Activities of Daily Living, Sport/Recreation, and Quality of Life subscales, respectively, showing discriminative capacities; the minimal important changes were 16.7 for Pain (sensitivity: 83%; specificity: 82%), 10.7 for Symptoms (80%; 80%), 18.4 for Activities of Daily Living (82%; 82%), 12.5 for Sport/Recreation (96%; 78%), and 15.6 for Quality of Life (88%; 67%). CONCLUSIONS: The KOOS was sensitive in detecting clinical changes. The authors recommend taking the minimal important changes provided into account when assessing patient improvement or planning studies in this clinical context.

Navathe, A. S., Emanuel, E. J., Venkataramani, A. S., et al. (2020). "Spending And Quality After Three Years Of Medicare's Voluntary Bundled Payment For Joint Replacement Surgery." Health Affairs 39(1) : 58-66.
https://doi.org/10.1377/hlthaff.2019.00466

Medicare has reinforced its commitment to voluntary bundled payment by building upon the Bundled Payments for Care Improvement (BPCI) initiative via an ongoing successor program, the BPCI Advanced Model. Although lower extremity joint replacement (LEJR) is the highest-volume episode in both BPCI and BPCI Advanced, there is a paucity of independent evidence about its long-term impact on outcomes and about whether improvements vary by timing of participation or arise from patient selection rather than changes in clinical practice. We found that over three years, compared to no participation, participation in BPCI was associated with a 1.6 percent differential decrease in average LEJR episode spending with no differential changes in quality, driven by early participants. Patient selection accounted for 27 percent of episode savings. Our findings have important policy implications in view of BPCI Advanced and its two participation waves.

Paans, W., Muller-Staub, M. et Krijnen, W. P. (2016). "Outcome Calculations Based on Nursing Documentation in the First Generation of Electronic Health Records in the Netherlands." Stud Health Technol Inform 225 : 457-460.

OBJECTIVES: Previous studies regarding nursing documentation focused primarily on documentation quality, for instance, in terms of the accuracy of the documentation. The combination between accuracy measurements and the quality and frequencies of outcome variables such as the length of the hospital stay were only minimally addressed. METHOD: An audit of 300 randomly selected digital nursing records of patients (age of >70 years) admitted between 2013-2014 for hip surgery in two orthopaedic wards of a general Dutch hospital was conducted. RESULTS: Nursing diagnoses: Impaired tissue perfusion (wound), Pressure ulcer, and Deficient fluid volume had significant influence on the length of the hospital stay. CONCLUSION: Nursing process documentation can be used for outcome calculations. Nevertheless, in the first generation of electronic health records, nursing diagnoses were not documented in a standardized manner (First generation 2010-2015; the first generation of electronic records implemented in clinical practice in the Netherlands).

Pabinger, C., Lumenta, D. B., Cupak, D., et al. (2015). "Quality of outcome data in knee arthroplasty." Acta Orthop 86(1) : 58-62.

BACKGROUND AND PURPOSE: Recent reports on developer bias in unicondylar knee arthroplasty led to concerns about quality of publications regarding knee implants. We therefore compared revision rates of registry and non-registry studies from the beginning of knee arthroplasty up to the present. We assessed the time interval between market introduction of an implant and emergence of reliable data in non-registry studies. MATERIAL AND METHODS: We systematically reviewed registry studies (n = 6) and non-registry studies (n = 241) on knee arthroplasty published in indexed, peer-reviewed international scientific journals. The main outcome measure was revision rate per 100 observed component years. RESULTS AND INTERPRETATION: For 82% of the 34 knee implants assessed, revision data from non-registry studies are either absent or poor. 91% of all studies were published in the second and third decade after market introduction. Only 5% of all studies and 1% of all revisions were published in the first decade. The first publications on revision rates of total knee arthroplasty (TKA) started 6 years after market introduction, and reliable data were found from year 12 onward in non-registry studies. However, in unicondylar knee

arthroplasty (UKA) the first publications on revision rates could be found first 13 years after market introduction. Revision rates of TKA from non-registry studies were reliable after year 12 following market introduction. UKA revision rates remained below the threshold of registry indices, and failed to demonstrate adjustment towards registries. Thus, the superiority of registry data over non-registry data regarding outcome measurement was validated.

Piscitelli, P., Iolascon, G., Di Tanna, G., et al. (2012). "Socioeconomic burden of total joint arthroplasty for symptomatic hip and knee osteoarthritis in the Italian population: a 5-year analysis based on hospitalization records." Arthritis Care Res (Hoboken) 64(9) : 1320-1327.

OBJECTIVE: To assess the burden of total joint arthroplasties (TJAs) performed for symptomatic hip and knee osteoarthritis (OA) in the Italian population. METHODS: We analyzed national hospitalizations and diagnosis-related group databases to compute incidence, annual percent change (APC), direct costs, and working days lost between 2001 and 2005 following TJA due to OA. RESULTS: In 2005, we recorded a total of 41,816 (APC +5.4; 95% confidence interval [95% CI] 5.1-5.8) and 44,051 (APC +13.4; 95% CI 13.1-13.8) hip and knee arthroplasties, respectively. Women represented the majority of patients undergoing TJA procedures (female:male ratio 1.7:1 for hip arthroplasties and 2.9:1 for knee arthroplasties). When analyzing the data by age groups, most of the patients were in the age groups 65-74 years and >/=75 years, although the highest increases were observed in those ages <65 years. Revisions accounted for 6,387 (APC +4.9; 95% CI 4.0-5.7) and 2,295 (APC +17.4; 95% CI 15.7-19.2) procedures for the hip and knee, respectively. Loss of working days in patients ages <65 years was estimated between 805,000 and 1 million days. Hospital costs increased from 741 million to 1 billion euros over the 5-year period (from 412 to 538 million euros for hip arthroplasties and from 329 to 517 million euros for knee arthroplasties). Rehabilitation costs increased from 228 to 322 million euros. Postoperative complications were estimated between 3.1 and 4.4 million euros. The average costs per patient were 16,835 and 15,358 euros for hip and knee arthroplasties, respectively. CONCLUSION: The socioeconomic burden of TJAs performed for symptomatic OA in Italy is remarkable and calls for the adoption of proper preventive measures.

Pugely, A. J., Martin, C. T., Gao, Y., et al. (2014). "Comorbidities in patients undergoing total knee arthroplasty: do they influence hospital costs and length of stay?" Clin Orthop Relat Res 472(12) : 3943-3950.

BACKGROUND: Increasing national expenditures and use associated with TKA have resulted in pressure to reduce costs through various reimbursement cuts. However, within the arthroplasty literature, few studies have examined the association of medical comorbidities on resource use and length of stay after joint arthroplasty. QUESTIONS/PURPOSES: The purpose of this study was to examine the association between individual patient characteristics (including demographic factors and medical comorbidities) on resource allocation and length of stay (LOS) after TKA. METHODS: We queried the 2009 Nationwide Inpatient Sample dataset for International Classification of Diseases, 9(th) Revision code, 81.54, for TKAs. An initial 621,029-patient cohort was narrowed to 516,745 after inclusion of elective TKAs on patients aged between 40 and 95 years. Using generalized linear models, we estimated the effect of comorbidities on resource use (using cost-to-charge conversions to estimate hospital costs) and the LOS controlling for patient and hospital characteristics. Across the 2009 national cohort with TKAs, 12.7% had no comorbidities, whereas 32.6% had three or more. The most common conditions included hypertension (67.8%), diabetes (20.0%), and obesity (19.8%). Mean hospital costs were USD 14,491 (95% confidence interval

[CI], 14,455-14,525) and mean hospital LOS was 3.3 days (95% CI, 3.29-3.31) in this data set. RESULTS: Patients with multiple comorbidities were associated with increased resource use and LOS. Higher marginal costs and LOS were associated with patients who had an inpatient death (USD +8017 [95% CI, 8006-8028], +2.3 [CI, 2.15-2.44] days over baseline), patients with recent weight loss (USD +4587 [95% CI, 4581-4593], +1.5 [CI, 1.45-1.61) days], minority race (USD +1037 [95% CI, 1035-1038], +0.3 [CI, 0.28-0.33] days), pulmonary-circulatory disorders (USD +3218 [95% CI, 3214-3221], +1.3 [CI, 1.25-1.34] days), and electrolyte disturbances (USD +1313 [95% CI, 1312-1314], +0.6 [CI, 0.57-0.60] days). All p values were < 0.001. CONCLUSION: Multiple patient comorbidities were associated with additive resource use and LOS after TKA. Current reimbursement may not adequately account for these patient characteristics. To avoid potential loss of access to care for sicker patients, payment needs to be adjusted to reflect actual resource use. LEVEL OF EVIDENCE: Level IV, economic and decision analysis. See the Instructions for Authors for a complete description of levels of evidence.

Ramos, N. L., Wang, E. L., Karia, R. J., et al. (2014). "Correlation between physician specific discharge costs, LOS, and 30-day readmission rates: an analysis of 1,831 cases." J Arthroplasty 29(9) : 1717-1722.

There is currently wide variation in the use and cost of post acute care following total joint arthroplasty. Additionally the optimum setting to which patients should be discharged after surgery is controversial. Discharge patterns following joint replacement vary widely between physicians at our institution, however, only weak correlations were found between the cost of discharge and length of stay or readmission rates. The inter-physician variance in discharge cost did not correlate to a difference in quality, as measured by length of stay and readmission rates, but does imply there is significant opportunity to modify physician discharge practices without impacting patient outcomes and the quality of care.

Sanmartin, C., McGrail, K., Dunbar, M., et al. (2010). "Using population data to measure outcomes of care: the case of hip and knee replacements." Health Rep 21(2) : 23-30.

BACKGROUND: Accumulating evidence points to overall improvements in health-related quality of life after joint replacement for osteoarthritis. Some patients, however, do not appear to benefit from joint replacement. This study investigates health outcomes of patients who underwent hip or knee replacement surgery. METHODS: Linked survey and administrative data were used to compare the health-related quality of life of individuals who underwent surgery (surgical group) with that of their contemporaries who did not (comparison group), adjusting for other determinants of health. Weighted multivariate linear regression analyses were conducted. RESULTS: When the results were adjusted for other covariates known to be associated with health, the surgical group reported lower functional health (post-operative) than did the comparison group. Differences ranged from 6% lower functional health among hip replacement patients diagnosed with osteoarthritis to 21% lower functional health for those with hip fractures. Among surgical patients with osteoarthritis, co-morbid conditions and being underweight were associated with lower post-operative functional health. INTERPRETATION: This study is a unique application of linked data to the study of health outcomes of joint replacement at the population level. Outcomes of joint replacement differed by the initial diagnosis or reason for the surgery. For patients with osteoarthritis, poorer post-operative health outcomes were associated with co-morbidites and with being underweight.

Styron, J. F., Koroukian, S. M., Klika, A. K., et al. (2011). "Patient vs provider characteristics impacting hospital lengths of stay after total knee or hip arthroplasty." J Arthroplasty 26(8) : 1418-1426.e1411-1412.

This study aims to identify whether patient-level or provider-level characteristics are most influential on a patient's length of stay in the acute care hospital. A data set containing a nationally representative sample of inpatient discharge abstracts was used. Multilevel linear regression models were used to evaluate the associations between patient-level and provider-level characteristics on patients' lengths of stay. The target population included 322,894 discharges with a primary procedure code for primary total knee arthroplasty and 193,553 discharges for total hip arthroplasty. The variables associated with the greatest increases in length of stay were a higher comorbidity level among patient level attributes (+17.4%) and low surgeon volume among provider-level characteristics (+18.8%). Provider-level characteristics, particularly provider volume, had a greater impact on length of stay.

Topel, A. M. et Schini, C. A. (2014). "An integrated health care system's approach to development of a process to collect patient functional outcomes on total joint replacement procedures." Am J Med Qual 29(2) : 160-164.

Health care organizations are challenged to find ways to measure not only process of care but also outcomes of care. Gundersen Health System's Orthopaedic Surgery Department in the La Crosse, Wisconsin area developed a process to collect outcomes of care for patients having hip or knee arthroplasty procedures and planned to use these data to determine impact on patients' lives. The Hip Osteoarthritis Outcomes Score and Knee Osteoarthritis Outcomes Score, adapted from the widely used Western Ontario and McMaster Universities Osteoarthritis Index, were collected preoperatively and at 1 year postoperatively. From these data, the health system determined that patients were experiencing significant improvement in 4 of 5 scales. Further recommendations include evaluating the impact of patients' age, sex, and preoperative body mass index on outcomes, as well as evaluating the impact of more patient involvement in goal setting on recovery time and functional outcomes.

Tuominen, U., Sintonen, H., Hirvonen, J., et al. (2010). "Is longer waiting time for total knee replacement associated with health outcomes and medication costs? Randomized clinical trial." Value Health 13(8) : 998-1004.

BACKGROUND: The aim of this prospective randomized study was to evaluate the effect of waiting time (WT) on health-related quality of life (HRQoL), knee pain and physical function, and the use and costs of medication of patients awaiting total knee replacement. METHODS: When placed on the waiting list, 438 patients were randomized into a short waiting time (SWT </= 3 months) or a nonfixed waiting time (NFWT > 3 months) group. HRQoL was measured by the 15D, and pain and physical function by modified Knee Society Clinical Rating System at baseline, admission, and 3 and 12 months postoperatively. The costs of medication due to osteoarthritis were calculated at the same measurement points. All analyses were performed using the intention-to-treat principle. RESULTS: The mean WT was 94 and 239 days in the SWT and NFWT groups, respectively. Apart from higher weekly cost of medication in the SWT group at admission and better HRQoL in the NFWT group 1 year postoperatively, there were no statistically significant differences between the groups in other outcomes during the follow-up. CONCLUSION: Those in the SWT group had higher weekly costs of medication at admission, and reached better HRQoL 3 months earlier than those in the NFWT group, but the latter had better HRQoL after operation. Otherwise, the length of WT was not associated with different health and HRQoL outcomes in the groups.

van der Sluis, G., Goldbohm, R. A., Elings, J. E., et al. (2017). "Pre-operative functional mobility as an independent determinant of inpatient functional recovery after total knee arthroplasty during three periods that coincided with changes in clinical pathways." Bone Joint J 99-B(2) : 211-217. https://online.boneandjoint.org.uk/doi/abs/10.1302/0301-620X.99B2.BJJ-2016-0508.R1?journalCode=bjj

AIMS: To investigate whether pre-operative functional mobility is a determinant of delayed inpatient recovery of activities (IRoA) after total knee arthroplasty (TKA) in three periods that coincided with changes in the clinical pathway. PATIENTS AND METHODS: All patients (n = 682, 73% women, mean age 70 years, standard deviation 9) scheduled for TKA between 2009 and 2015 were pre-operatively screened for functional mobility by the Timed-up-and-Go test (TUG) and De Morton mobility index (DEMMI). The cut-off point for delayed IRoA was set on the day that 70% of the patients were recovered, according to the Modified Iowa Levels of Assistance Scale (mILAS) (a 5-item activity scale). In a multivariable logistic regression analysis, we added either the TUG or the DEMMI to a reference model including established determinants. RESULTS: Both the TUG (Odds Ratio (OR) 1.10 per second, 95% confidence intervals (CI) 1.06 to 1.15) and the DEMMI (OR 0.96 per point on the 100-point scale, 95% CI 0.95 to 0.98) were statistically significant determinants of delayed IRoA in a model that also included age, BMI, ASA score and ISAR score. These associations did not depend on the time period during which the TKA took place, as assessed by tests for interaction. CONCLUSION: Functional mobility, as assessed pre-operatively by the TUG and DEMMI, is an independent and stable determinant of delayed inpatient recovery of activities after TKA. Future research, focusing on improvement of pre-operative functional mobility through tailored physiotherapy intervention, should indicate whether such intervention enhances post-operative recovery among high-risk patients. Cite this article: Bone Joint J 2017;99-B:211-17.

Vetter, T. R., Barman, J., Hunter, J. M., Jr., et al. (2017). "The Effect of Implementation of Preoperative and Postoperative Care Elements of a Perioperative Surgical Home Model on Outcomes in Patients Undergoing Hip Arthroplasty or Knee Arthroplasty." Anesth Analg 124(5) : 1450-1458. https://journals.lww.com/anesthesia-analgesia/Fulltext/2017/05000/The_Effect_of_Implementation_of_Preoperative_and.19.aspx

BACKGROUND: The Perioperative Surgical Home (PSH) seeks to remedy the currently highly fragmented and expensive perioperative care in the United States. The 2 specific aims of this health services research study were to assess the association between the preoperative and postoperative elements of an initial PSH model and a set of (1) clinical, quality, and patient safety outcomes and (2) operational and financial outcomes, in patients undergoing total hip arthroplasty (THA) or total knee arthroplasty (TKA). METHODS: A 2-group before-and-after study design, with a nonrandomized preintervention PSH (PRE-PSH group, N = 1225) and postintervention PSH (POST-PSH group, N = 1363) data-collection strategy, was applied in this retrospective observational study. The 2 study groups were derived from 2 sequential 24-month time periods. Conventional inferential statistical tests were applied to assess group differences and associations, including regression modeling. RESULTS: Compared with the PRE-PSH group, there was a 7.2% (95% confidence interval [CI], 4.0%-10.4%, P < .001) increase in day of surgery on-time starts (adjusted odds ratio [aOR] 2.54; 95% CI, 1.70-3.80; P < .001); a 5.8% (95% CI, 3.1%-8.5%, P < .001) decrease in day of surgery anesthesia-related delays (aOR 0.66; 95% CI, 0.52-0.84, P < .001); and a 2.2% (95% CI, 0.5%-3.9%, P = .011) decrease in ICU admission rate (aOR 0.45; 95% CI, 0.31-0.66, P < .001) in the POST-PSH group. There was a 0.6 (95% CI, 0.5-0.7) decrease in the number of ICU days in the POST-PSH group compared with the PRE-PSH group (P = .028); however, there was no significant

difference (0.1 day; 95% CI, -0.03 to 0.23) in the total hospital length of stay between the 2 study groups (P = .14). There was also no significant difference (1.2%; 95% CI, -0.6 to 3.0) in the all-cause readmission rate between the study groups (P = .18). Compared with the PRE-PSH group, the entire POST-PSH group was associated with a $432 (95% CI, 270-594) decrease in direct nonsurgery costs for the THA (P < .001) and a $601 (95% CI, 430-772) decrease in direct nonsurgery costs for the TKA (P < .001) patients. CONCLUSIONS: On the basis of our preliminary findings, it appears that a PSH model with its expanded role of the anesthesiologist as the "perioperativist" can be associated with improvements in the operational outcomes of increased on-time surgery starts and reduced anesthesia-related delays and day-of-surgery case cancellations, and decreased selected costs in patients undergoing THA and TKA.

Walker, R., Gough, A. T. et Williams, D. H. (2017). "Patient-reported outcome measures (PROMs): enhancing decision making and follow-up." BMJ case reports 2017 : bcr2017221172. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5624013/

A case presentation of patient undergoing elective total knee replacement. Patient-reported outcome measures prospectively collected electronically pre and postoperatively allowed real-time review, aiding follow-up and reducing the need for clinical, face-to-face follow-up.

Weeks, W. B., Kotzbauer, G. R. et Weinstein, J. N. (2016). "Using Publicly Available Data to Construct a Transparent Measure of Health Care Value: A Method and Initial Results." Milbank Q 94(2) : 314-333.

POLICY POINTS: Using publicly available Hospital Compare and Medicare data, we found a substantial range of hospital-level performance on quality, expenditure, and value measures for 4 common reasons for admission. Hospitals' ability to consistently deliver high-quality, low-cost care varied across the different reasons for admission. With the exception of coronary artery bypass grafting, hospitals that provided the highest-value care had more beds and a larger average daily census than those providing the lowest-value care. Transparent data like those we present can empower patients to compare hospital performance, make better-informed treatment decisions, and decide where to obtain care for particular health care problems. CONTEXT: In the United States, the transition from volume to value dominates discussions of health care reform. While shared decision making might help patients determine whether to get care, transparency in procedure- and hospital-specific value measures would help them determine where to get care. METHODS: Using Hospital Compare and Medicare expenditure data, we constructed a hospital-level measure of value from a numerator composed of quality-of-care measures (satisfaction, use of timely and effective care, and avoidance of harms) and a denominator composed of risk-adjusted 30-day episode-of-care expenditures for acute myocardial infarction (1,900 hospitals), coronary artery bypass grafting (884 hospitals), colectomy (1,252 hospitals), and hip replacement surgery (1,243 hospitals). FINDINGS: We found substantial variation in aggregate measures of quality, cost, and value at the hospital level. Value calculation provided additional richness when compared to assessment based on quality or cost alone: about 50% of hospitals in an extreme quality- (and about 65% more in an extreme cost-) quintile were in the same extreme value quintile. With the exception of coronary artery bypass grafting, higher-value hospitals were larger and had a higher average daily census than lower-value hospitals, but were no more likely to be accredited by the Joint Commission or to have a residency program accredited by the American Council of Graduate Medical Education. CONCLUSIONS: While future efforts to compose value measures will certainly be modified and expanded to examine other reasons for admission, the construct that we

present could allow patients to transparently compare procedure- and hospital-specific quality, spending, and value and empower them to decide where to obtain care.

Yang, L., Wang, X.-M., Zuo, X.-L., et al. (2016). "Systematic evaluation of the clinical nursing pathway with the GRADE approach applied to functional exercise in patients with hip replacements before and after surgery." Chinese Nursing Research 3(4) : 185-193.
http://www.sciencedirect.com/science/article/pii/S2095771816300974

AbstractObjective To evaluate the effect of the clinical nursing pathway applied to functional exercise in patients with hip replacements before and after the operation. Methods The China National Knowledge Infrastructure (CNKI), WanFang Data, Chinese science and technology journal database (VIP), PubMed, Web of Science, EMBASE, CBM and the Cochrane Library (2015-5) were searched for randomized controlled trials (RCTs) on clinical nursing pathways for functional exercise in patients with hip replacements before and after surgery from June 2015 to January 2010. The references included in the literature were also retrieved. To meet the literature standard, 2 reviewers independently selected and extracted data according to the inclusion criteria and assessed the risks of bias. RevMan 5.3 software was used in this meta-analysis. The quality of evidence was evaluated using grade profiler3.6 software, the level recommended for grading. Results A total of 15 RCTs and 1248 patients were included. The meta-analysis showed that, in the clinical nursing path group, the Harris score of hip function [SMD = 3.35, 95%CI (2.53, 4.16), P < 0.00001] and incidence of thrombosis embolism [RR = 0.28, 95%CI (0.15, 0.53), P < 0.0001], pulmonary infection [RR = 0.33, 95%CI (0.14, 0.82), P = 0.02], urinary retention [RR = 0.22, 95%CI (0.09, 0.52), P = 0.0005], constipation [RR = 0.20, 95%CI (0.10, 0.40), P < 0.00001], patients' satisfaction for nursing care [RR = 1.26, 95%CI (1.17, 1.36), P < 0.00001] and shortened hospitalization times [SMD = −1.91, 95%CI (−2.39, −1.43), P < 0.0001]were statistically significantly better than those in the control group. However, in reducing joint dislocations [RR = 0.25, 95%CI (0.05, 1.15), P = 0.08], pressure ulcers [RR = 0.25, 95%CI (0.03, 2.19), P = 0.21], and incidence of complications [RR = 0.42, 95%CI (0.15, 1.12), P = 0.08], there was no statistically significant difference between the two groups. Funnel plot analysis of the average length of stay showed that there might be some publication bias in the literature. The GRADE evaluation results showed that the level of Harris scores for hip function was moderate and the incidence of thrombosis, urinary retention and satisfaction of patients regarding nursing were low, and the rest of the factors analyzed were very low. Conclusions The effect of the clinical nursing pathway applied to functional exercises in patients with hip replacements before and after surgery was significantly better than that of routine nursing. However, it was restricted by the evaluation grade of the research results and the standardization and uniformity of the research. The results of the above study need to be verified by more high-quality RCTs.