



**ScotPHN**

r e p o r t

## **Scottish Public Health Network (ScotPHN)**

**Scoping Report: Surgical Interventions for Knees and Hips**

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## **What is a scoping report?**

Scoping reports are not comprehensive systematic reviews. They are based on a limited literature search and the best evidence that ScotPHN, on behalf of NHS Lothian, could identify and retrieve within the time allowed. The studies included within the reports are not themselves explicitly subjected to a systematic appraisal of the quality of the study, but rather considered for their potential contribution in relation to the research question which is being considered by the scoping report. The reports are subject to peer review but do not undergo external consultation. ScotPHN has taken care to ensure that the content is accurate but does not make any guarantee to that effect.

### **Research Question**

“Does the evidence support the introduction of thresholds for surgical interventions for knees and hips - Is the Croydon approach worth pursuing in Scotland?”

### **Key definitions**

Knee arthroscopy

Knee prosthesis

Knee arthroplasty

Knee Surgery

Hip replacement

Hip prosthesis

Measures of outcome or benefit

Severity

Decision making

Thresholds

Effectiveness

## Background

NHS Croydon Primary Care Trust (PCT) identified 34 clinical treatments which, according to its analysis of the evidence, are of 'low priority' or, in the terms of the Audit Commission report, of 'low clinical value'.<sup>1</sup> The treatments on the Croydon list fall into five categories:

- effective procedures where cost-effective alternatives should be tried first;
- effective interventions with a close benefit or risk balance in mild cases;
- potentially cosmetic interventions;
- relatively ineffective procedures; and
- cancelled procedures.<sup>2</sup>

Specific knee and hip interventions are included on this list are:

- knee revisions and joint surgery as effective interventions with a close benefit or risk balance in mild cases;
- knee washouts identified as being relatively ineffective;
- bilateral hip surgery as an effective procedure where cost-effective alternatives should be tried first; and
- hip revision and primary hip replacement as effective interventions with a close benefit or risk balance in mild cases.<sup>3</sup>

In Scotland, a 2010 review of orthopaedic services noted that the most commonly performed orthopaedic procedures in Scotland included arthroscopy, knee replacement, hip replacement and carpal tunnel release. Patients generally access orthopaedic services through their GP referring them to an outpatient clinic or via hospital emergency departments. Most patients referred by a GP are added to consultants' outpatient waiting lists.

Rates of arthroplasty have increased in most Western countries because of aging, reduced surgical risk and broader criteria for surgery and questions have been

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<sup>1</sup> [<http://www.audit-commission.gov.uk/sitecollectiondocuments/downloads/20110414reducingexpenditure.pdf>]

<sup>2</sup> These occur when a patient is admitted for a procedure, but the hospital is unable to carry it out. An example would be when there is an emergency and the operating theatre is needed and booked procedures are cancelled.

<sup>3</sup> [<http://www.audit-commission.gov.uk/sitecollectiondocuments/downloads/20110414reducingexpenditure.pdf>]

raised as to whether such surgeries are always the most appropriate intervention at the time of intervention. [2-4] A 2011 UK study of 3 PCTs found that half of the people experiencing severe knee pain or disability did not get referred to secondary care, and primary care management and referral were found to be based more on clinical need than patient characteristics. [5]

In Scotland, the number of surgical interventions for knee and hip interventions has increased overall over the last nine years. For example, arthroscopies have increased by 14 per cent from 7,573 to 8,645 procedures. Between 1999 and 2008 the annual number of knee replacements almost doubled (from 3,102 to 6,160) as did the number of knee revision procedures (from 211 to 421). Around 84% of knee replacements were carried out on people over the age of 60 in 2007/08. Between 1999 and 2008 the annual number of hip replacements increased by 43 per cent (from 4,414 to 6,312), with around 78 per cent of hip replacements carried out on people aged over 60 in 2007/08.

However, it has been suggested that the criteria for why patients are put on the waiting list for total joint replacement are not clear cut, with the basis for decision appearing to vary between surgeons and hospitals [6]. The presence of a hip or knee condition does not in itself signify the need for surgical intervention. Analysis of Patient Reported Outcome Measures (PROMs) by the NHS Information Centre found that 10% of patients undergoing knee replacements reported no change following surgery and a further 7.5% reported being in a worse health status, and that 5% of patients having hip replacements reported no change following surgery with a further 4% reported being in a worse health status<sup>4, 5</sup>. However, improvement rates vary according to the scoring system utilised. A report in 2011 by the BOA suggests that generic measures of health improvement report lower rates of improvement after surgery than the reported improvements utilising the condition

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<sup>4</sup> <http://www.nds.ox.ac.uk/qrstu/our-team/documents/Observing%20and%20Categorising%20Process%20Deviations%20in%20Orthopaedic%20Surgery.pdf>

<sup>5</sup> <http://www.oxfordshirepct.nhs.uk/about-us/documents/EIASTANDARDhipandkneereplacement2010.pdf>

specific scoring systems (Oxford knee and hip scores).<sup>6</sup> This can be seen by comparing the unadjusted PROMS scores<sup>7</sup> by scoring system, published in December 2012 ( table one).

**Table one: Unadjusted PROMS scores, December 2012**

Source:

<http://www.ic.nhs.uk/searchcatalogue?productid=10067&infotype=0%2fOfficial+statistics&sort=Relevance&size=10&page=1#top>

<b>Index</b>	<b>Hip</b>	<b>Knee</b>
Comparing pre- and post-operative 'EQ-5D Index (a combination of five key criteria concerning patients' self-reported general health)	Increase in general health for 87.4% of hip replacement respondents (86.7% for 2010-11)	Increase in general health for 78.5% of knee replacement respondents (77.9% for 2010-11)
Comparing pre- and post-operative 'EQ-VAS(the current state of the patient's self-reported general health)	Increase in general health for 63.7% of hip replacement respondents (61.4% for 2010-11)	Increase in general health for 53.7% of knee replacement respondents (50.8% for 2010-11)
Comparing pre-post operative responses to condition-specific questions	Improvements in patient conditions for 95.8% of hip replacement respondents (95.8% for 2010-11) ['Oxford Hip Score']	Improvement in patient conditions for 91.7% of knee replacement respondents (91.4% for 2010-11) ['Oxford Knee Score']

<sup>6</sup> <http://www.boa.ac.uk/LIB/LIBPUB/Documents/BON%20Issue%20no.%2049%20-%20Autumn%202011.pdf>

<sup>7</sup>

<http://www.ic.nhs.uk/searchcatalogue?productid=10067&infotype=0%2fOfficial+statistics&sort=Relevance&size=10&page=1#top>

A 2008 study suggested that there may be a place for using validated measurement tools to assess more accurately the severity of symptoms in individuals who are being assessed for joint replacement. [1]

Robust thresholds could avoid inappropriate and high risk interventions and maximise health benefits, ensuring timely referral, and potentially reducing the requirements for further revision and surgery. The purpose of identifying a threshold is to:

- ensure that patients with the greatest clinical need, and who are likely to achieve the maximum health benefit, receive the specified intervention/surgery in a timely manner;
- reduce 'too early' intervention, which subjects patients to unnecessary risk and, potentially, the future need for revision surgery or other treatment;
- provide explicit thresholds for treatment to ensure equitable access to surgery regardless of provider/where patients choose to be treated; and
- provide information that will support the management of patients with the specified conditions.

Therefore this implies a threshold should be capable of accurately assessing patient need, evidence based, transparent, and equitable in terms of its application and outcomes. A threshold should not exclude, or additionally disadvantage, people from less affluent socio-economic groups, minority cultures or different geographical areas. In effect, thresholds should support health services to ensure that all eligible patients have equitable access to appropriate and timely services (right patient, right support, right time).

## **Literature search**

A literature search was conducted during August 2012 by ScotPHN to identify evidence on decision making in relation to hip and knee interventions. The searches sought to identify peer reviewed articles, including guidelines, health technology assessments (HTAs), systematic reviews and primary level evidence. Database searches were limited to English language and publications from 2000 to August

2012. The review included both national and international literature. A copy of the search strategy can be accessed in Appendix one.

## **Findings**

### **Referrals**

Timely and appropriate treatment results in better health outcomes. Agreeing appropriate thresholds for interventions between clinicians and patients can avoid inappropriate and high risk interventions and maximise health benefits.

Across the literature, a number of tools are utilised to assess the clinical significance of conditions, and to assess the extent to which an individual's functional ability and quality of life has been affected. These tools are often used in concert, and reflect a number of clinical and non-clinical factors, which can be utilised to determine the suitability of patients for referral and surgery. A number of different factors are reflected in the criteria utilised to inform determination of need for intervention: pain levels, the period prevalence of pain over a defined timeframe (12 months), and rates of joint pain [6], reduction in daily activities, and patient preference.

### **Evaluating pain levels**

#### Knee interventions

The impact of knee conditions on health status and pain levels has been assessed utilising a number of instruments.

The Oxford Knee Score (OKS) is a validated 12 item questionnaire for assessing health status and outcomes in relation to knee replacement, giving an unweighted total score ranging from 0 (severe problems on all items) to 48 (no problems on any item.) It has been used in PCTs to set thresholds for total knee replacement, using thresholds from 18-32. It is unclear on what basis the thresholds have been determined, [12] and the correlation between OKS scores and clinical priorities has been questioned, with one study noting that individuals who had received a very urgent clinical priority within their study had been assessed with lower (better) OKS than those who were listed as routine or urgent. [5]



The New Zealand score, which was used to identify people in need of surgery, [10] is a final composite score scale, which includes sub scores on pain (40), disability (20), clinical findings (20) and multiple joint disease and ability to live independently (20). Within the literature, a number of different thresholds have been utilised using this scoring system, including a cut off of 48 out of 80[10], and an upper cut off score of 55/100 and a lower score of 43[15] [13], which was based on hip replacement reports, which had identified degrees of pain and disability associated with these cut off points [14]. The rationale for these cut off points was not clear within the studies, and concerns have been expressed that these threshold levels may not be reflected in practice. UK studies of waiting list patients have found that the upper cut off of 55 may be too conservative an estimate of need compared with surgical practice, whilst the lower cut off more than doubles the number in need of surgery,[15] with a 2000 study [16] noting that 60% of patients on the waiting list had New Zealand scores over 55 and 80% scores over 43.

Other commonly used scoring systems included Lequesne's index[17, 18], with a score range of 0-24 points, and a threshold of 14 used as an indication of need for specialist review, indicating extreme distress and disability, with a threshold of 11 (severe pain) giving a 60% higher level of need. [18] Also reported in the literature is the WOMAC score [5], and visual analogue scales[5, 9]. One study mentioned KNEST, which is a knee pain screening tool. [4] However, whilst these instruments were commonly used within studies to grade severity of symptoms, they were often used in conjunction with other scoring systems, rather than in isolation, or in adapted form, rather than pure form.

### Hip Interventions

Commonly used subjective assessment tools include Visual Analogue Scales (VAS), which were used to measure current pain status (10 cm line to mark pain, with 0 = no pain, 10cm = extreme pain)[5] and the Oxford Hips Score©[19-21].

The Oxford Hip Score (OHS) is a self-administered questionnaire consisting of 12 items related to daily tasks directly affected by poor hip function. It is intended to be used as a single summed score with the total score reflecting the perceived severity of problems with the patient's hip. The range of scores is from 12-60 with a high

score indicating a poor perceived state of health. It has been validated with reference to arthritis specific and generic health status measures and with the Charnley Hip Score. The Oxford Hip Score has been used to support the development of fast track selection criteria for hip interventions, with a threshold Oxford score of 34 or less, plus radiological change including complete loss of joint space and/or severe marginal osteophyte formation [19].

The Harris hip score combines objective and subjective measurements. It is a questionnaire on hip function that includes items reflecting on patients ability to perform normal daily tasks and objective measurements such as range of movement exercises – completed partly by patient, partly by clinician / physiotherapist) [20, 22, 23].

Whilst the Oxford Hip Score has higher follow up rates than the more widely used Harris hip score[20], one study suggested that patient responses to this questionnaire would need to be qualified with radiological changes to ascertain aetiologies of pain[19], which would limit its value in terms of setting a threshold. Radiological testing using modified Kellgren-Lawrence criteria (surface irregularity, marginal osteophytes, sub-chondral sclerosis, bone cysts and loss of joint space assessed across a four category scale)[19] was used in one study, alongside the Oxford Hips Score, to confirm aetiology of pain.

The impacts of hip impairment on physical functioning has been assessed using the Disability rating index (self-administered 12 item visual analogue scale questionnaire assessing the patient's own rating of disability)[20] and the Paffenbarger physical activity questionnaire which assesses weekly energy expenditure on leisure and physical activities [20].

#### Efficacy of scoring systems

The validity of the measurement tools has been tested, with studies such as McHugh et al suggesting that there was some agreement between clinical assessments and the measures obtained using the measurement tools within their study (WOMAC, Oxford Knee and Hip Score and VAS scales) – particularly between poor OHS and urgent/very urgent clinical assessments. [5]

The impacts of hip conditions on quality of life and social functioning[24] has been considered, using subjective questionnaires for subjective assessment. Whilst each of the scoring instruments provides a lens to consider health status and quality of life, the mechanisms which are utilised to gather scoring vary. Scores can be analysed with both a visual analogue health scale and with responses to questions using published algorithms to obtain values for health related quality of life)[9, 20]. Examples of questionnaires which have been utilised include: the Health Utilities Index Mark (HU13), [9, 23] EuroQOL 5D (EQ5D; the Sf36 [23, 24], and disease specific questionnaires such as the Western Ontario McMaster Osteoarthritic index (WOMAC ) [7, 9, 23].

The dimensions which are considered within the instruments are also not standard. The SF36, for example, provides a measure of health status across 8 dimensions – physical functioning, social functioning, mental health, energy/vitality, general health perception, using measurement scales between 0-100, with 0 representing worst health. The EQ5D is a validated quality of life questionnaire consisting of five questions related to daily activities scored on a three point ordinal score scale. Whilst both instruments were considered to be valid tools, the link between the score and the appropriate thresholds for treatment was generally not articulated within the papers.

### Summary

Evaluation of pain levels is multifaceted and complex, informed by both subjective and objective analysis of pain experience and consequence, and differing values on what constitutes a good outcome for an intervention. Whilst the tools which are utilised provide a mechanism for assessing pain and physical functionality, clinical judgement about appropriate eligibility for both referral and surgery and patient perspectives remain important factors. Radiological confirmation that there is an underlying physical cause for pain tends to be utilised alongside other instruments to inform clinical decision making.

## Prioritisation of patients

It has been suggested that the criteria for why patients are put on the waiting list for total joint replacement are not clear cut, with the basis for decision appearing to vary between surgeons and hospitals[6]. The rationales informing decisions can include radiological, clinical, measurement of pain levels and physical function.[6] Whilst several governments have considered the need to prioritise patients on waiting lists for elective surgery instead of allocating surgery according to the time waited [3], systems and instruments which can be used for prioritisation differ, with criterion including surgical need, clinical indications, functional difficulties and social challenges. [3]

A search of the literature identified a number of mechanisms which had been successfully utilised to determine surgical priority, including 'surgical priority instruments' [7, 8]. These included instruments which claimed to measure appropriateness, which considered levels of pain, previous non-surgical procedures, functional limitation assessment, and surgical risk measurements<sup>8</sup> utilising the American Society of Anaesthesiologists score and age, [8]<sup>9</sup> and patient decision aids, which were designed to help patients choose between two or more equally relevant treatment options. Whilst these studies showed the use of instruments to define appropriateness, they did not provide explicit thresholds that would help clinicians to determine whether to intervene or not.

In contrast, other studies utilised the New Zealand score, with a cut off of 48 out of 80[9] and the Index of severity of osteoarthritis of the hip (adapted version<sup>10</sup>). This included measurement of self-rated hip stiffness and pain and disability which have been validated against clinical diagnosis and decision making [10], with a score of 0-

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<sup>8</sup> Used Charleson co-morbidity index, with high surgical risk defined as a CCI score of 3 or higher.

<sup>9</sup> NB Bone quality was initially considered as a criterion to assess THR appropriateness in Spain but was excluded from final classification algorithm as it was observed that it did not influence the appropriateness assessment.

<sup>10</sup> Not clear how adapted

24 points and a threshold of 14 points set as an indication of need for specialist review, indicating extreme discomfort and pain<sup>11</sup>.

### Knee interventions

The tools identified within the literature to inform case selection were the priority criteria from Ontario and New Zealand, both of which have been utilised to inform case selection for TKR , [11] and the Salisbury Priority Scoring System which assesses four criteria: progression of disease, pain or distress, disability or dependence on others and loss of usual occupation. [12] In addition, conjoint analysis has been utilised to inform prioritisation of patients. This system assumes an appropriate indication including clinical (pain, severity of the disease and prognosis), functional (difficulty in performing daily living activities and work limitations) and social (providing or receiving care). Possible scores range between 0 and 100, with higher scores representing greater need. The highest weighted criterion is pain, followed by difficulty in performing acts of daily living [3, 8]

### Hip interventions

Determining priority for surgery is complex. Across the literature, great variability can be seen in the criteria used to schedule interventions. Typical criteria identified include time on the waiting list, patient need in response to the negative effects that a delay in surgery can have on the health of the patient and scheduling to try to avoid having patients with the same level of need experiencing different waiting periods. [3, 4] However, whilst many waiting list studies have been undertaken, most did not start data collection from the time of patient referral, simultaneously measure HRQOL and mobility, or prospectively assess the relationship between the entire wait and postoperative outcome. Thus declines in wellbeing before the surgeon's assessment, the relation between disability at referral and length of wait, and whether longer waits lead to poorer postoperative outcomes has not been fully addressed in the literature. [5]

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<sup>11</sup> A threshold of 11, indicating severe pain and/or discomfort, increased the numbers identified requiring hip replacement to 9.5% of those aged 65 or over without co-morbidity.

With no defined standardisation for the prioritisation of patients (based on need and urgency) evident within the literature, a number of studies have focused on the identification and measurement of the clinical and non-clinical factors which could be utilised to determine the suitability of patients for referral and surgery. These included conjoint analysis, which has been used to develop a linear point scoring instrument for setting priority. The conjoint analysis instrument consists of seven criteria (disease severity, level of pain, limitation in acts of daily living, probability of recovery, limitations on ability to work, whether there is someone to look after the patient and whether the patient is a care giver). Each criterion is measured on a scale, with between two and four levels of severity with each level assigned a score. The range of the score is from 0-100, where 0 is the lowest priority. [8]

Other validated and tested methodologies include the RAND based criteria, developed by Quintana, which provide a lens through which to consider the appropriateness of interventions. [13] This system includes 216 indicators developed through a literature review, which incorporate variables on diagnosis, age, pain, functional limitation, surgical risk, previous non surgical treatments, bone quality, with rating of the variables determined by a panel of nine experts. Ratings were scored on a nine point scale, with patients/scenarios scoring a median of between 7 and 9 points being considered necessary, 4-6 requiring discussion, and 1-3 being for rejection.

In addition, the New Zealand Score has also been used to assess need for surgery [9]. Quintana et al have also developed 'decision trees' [14] based on WOMAC functional and pain domain scores, with classification into four groups – inappropriate, uncertain, uncertain / appropriate, appropriate / necessary.

## Discussion

Throughout this review, a number of instruments were identified, which had been utilised to assess pain, and determine prioritisation for patients. The instruments identified are likely to constitute just a small snapshot of those currently in use. Two studies [12, 17] reported that a total of 34 different rating systems were used to assess patients for total knee arthroplasty between 1972 and 1992, although the instruments themselves were not identified. Whilst it is possible that very few of these 34 systems are still in use, it is not possible to state this definitively based on the literature review carried out.

In this review, a number of instruments were identified which have been utilised to assess pain levels, and to judge the clinical significance of knee and hip pain. The literature generally supported the validity of each of the instruments identified within each study. However, there was limited comparative analysis of the efficacy of the instruments, and limited discussion of the relationship between thresholds utilised within different scoring systems, or comparability of the criteria that define appropriate patients for referral and/or surgery, although there was some consensus on the types of criteria which could be utilised to inform the development of thresholds – eg clinical symptoms, pain, etc. Each of the instruments provided an insight into different elements of the patient experience, rather than a comprehensive picture. Furthermore, the choice to use adapted versions of the indices was common. For example, Yong utilised an adapted version of Lequesne's index in his study[18]. The nature of the adaptations was generally not explained.

Research has shown that estimates of need may be sensitive to both instrument and thresholds chosen, with a Yorkshire study, using the Lequesne[15] index for severity of osteoarthritis for hips and needs identifying less than half the prevalent need for surgery identified using the Juni [11] method. [16] One study, which looked explicitly at the cost effectiveness of TKR, used an OKS/QALY. This found that limiting TKR to people with OKS of 26+ would prevent 10k people from receiving TKR, which would result in increased inequality as TKR costs 10697/QALY, versus the NICE recommendation with ICERs of 20-30k/QALY gained. [12] Whilst this demonstrates that the choice of thresholds effects patient numbers, there was limited discussion on

the clinical or broader impacts of different thresholds in terms of outcomes for individuals, or economic costs for the health system.

Other challenges which may need greater consideration in developing threshold scores include the effects of pain on mental health, perceived general health and vitality. [19] Given the known associations between pain and mental health and wellbeing, consideration should be given to how best to reflect these dimensions in any threshold development.



## Conclusion and Recommendations

In the absence of comparative data on the measurement tools and systems identified in the literature review, it would be inappropriate to make a conclusive statement about the comparative effectiveness of the instruments utilised for determining need for interventions or prioritisation of patients for interventions.

However, the plethora of instruments routinely referenced within the literature suggests that there is academic consensus on a number of objective and subjective criteria which could be used to appropriately identify and prioritise patients for referral and surgery, subject to continuous evaluation against developing guidelines and clinical practice. Factors which should be considered include pain levels, physical, social and mental wellbeing and functionality, and clinical judgement. At present, based on the information provided within the studies reviewed to inform this report, no single measurement scale seems appropriate to determine thresholds for interventions across each of these aspects. The studies incorporated in this review utilised a combination of measurement tools, each with a specific purpose, identifying and defining the impact of knee and hip impairment on different physical, social and pain experiences, with limited explicit consideration of mental health as a factor reflected within the papers.

This report was based on a review of the literature on knee and hip interventions. It was not based on a comparative study of the actual tools utilised. However, it would appear that there are some candidate instruments which could usefully be further explored to determine whether they are suitable for usage in Scotland. The information given within the Quintana studies on conjoint analysis and the decision trees, for example, suggests that this methodology may be worth further consideration and possible development to meet the needs of the NHS in Scotland.

A number of recommendations flow from this scoping study. These are:

- that further analysis of the instruments currently used, or proposed for use, to inform prioritisation and referrals is undertaken, with involvement of both clinicians and patients in the process;

- the importance of patient wellbeing and mental health appears to be one area where further consideration should be given in assessing the appropriateness of using such instruments; and
- locally developed priority criteria need to be continuously evaluated against current national guidelines for validity and appropriateness as they are implemented.

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## Appendix One Literature Search Strategies

The following resources were searched:

- Medline
- Embase
- Cochrane
- Web of Science
- Cinahl

The following strategies were used for Medline and Embase and adapted for Cochrane:

### UK Search

Database: Ovid MEDLINE(R) <1946 to 2012>

Search Strategy:

- 1 exp Arthroscopy/ (15355)
- 2 exp Knee/ (10013)
- 3 1 and 2 (366)
- 4 exp Knee Prosthesis/ or exp Arthroplasty, Replacement, Knee/ (16264)
- 5 exp Arthroplasty, Replacement, Hip/ or exp Hip Prosthesis/ (28272)
- 6 "knee washout".mp. (3)
- 7 3 or 4 or 5 or 6 (41592)
- 8 limit 7 to (english language and humans and yr="2000 -Current") (21735)
- 9 exp "Referral and Consultation"/ (53542)
- 10 exp Surgical Procedures, Operative/ (2254175)
- 11 intervention\*.mp. or exp Intervention Studies/ (471179)
- 12 exp General Practice/ (62333)
- 13 exp Primary Health Care/ (72027)
- 14 "secondary care".mp. (2722)
- 15 exp Hospitals/ (189668)
- 16 exp Decision Making/ (110100)
- 17 decision rule\*.mp. (1629)
- 18 (appropriate\* adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (318)

- 19 (appropriate\* adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (332)
- 20 (criteria adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (511)
- 21 (criteria adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (577)
- 22 (evaluat\* adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (4555)
- 23 (evaluat\* adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (5241)
- 24 exp Questionnaires/ (273446)
- 25 (eligib\* adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (76)
- 26 (eligib\* adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (94)
- 27 (tool\* adj10 surg\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (5680)
- 28 "oxford hip score".mp. (183)
- 29 exp Cost-Benefit Analysis/ (56140)
- 30 (decision adj10 tool\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (3491)
- 31 threshold\*.mp. (164035)
- 32 exp Quality-Adjusted Life Years/ (6160)
- 33 exp Great Britain/ (288099)

- 34 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 (3386282)
- 35 8 and 33 and 34 (378)
- 36 limit 35 to (english language and yr="2000 -Current") (378)

Database: Embase <1996 to 2012>

Search Strategy:

- 1 exp Arthroscopy/ (13719)
- 2 exp Knee/ (20639)
- 3 1 and 2 (1231)
- 4 exp Knee Prosthesis/ or exp Arthroplasty, Replacement, Knee/ (19943)
- 5 exp Arthroplasty, Replacement, Hip/ or exp Hip Prosthesis/ (26624)
- 6 "knee washout".mp. (2)
- 7 3 or 4 or 5 or 6 (43126)
- 8 limit 7 to (english language and humans and yr="2000 -Current") (29858)
- 9 exp "Referral and Consultation"/ (47456)
- 10 exp Surgical Procedures, Operative/ (2018014)
- 11 intervention\*.mp. or exp Intervention Studies/ (549232)
- 12 exp General Practice/ (39620)
- 13 exp Primary Health Care/ (76337)
- 14 "secondary care".mp. (4253)
- 15 exp Hospitals/ (388356)
- 16 exp Decision Making/ (97262)
- 17 decision rule\*.mp. (1797)
- 18 (appropriate\* adj10 hip).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (351)
- 19 (appropriate\* adj10 knee).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (383)
- 20 (criteria adj10 hip).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (591)

- 21 (criteria adj10 knee).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (799)
- 22 (evaluat\* adj10 hip).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (4789)
- 23 (evaluat\* adj10 knee).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (5912)
- 24 exp Questionnaires/ (301334)
- 25 (eligib\* adj10 knee).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (154)
- 26 (eligib\* adj10 hip).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (130)
- 27 (tool\* adj10 surg\*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (7150)
- 28 "oxford hip score".mp. (206)
- 29 exp Cost-Benefit Analysis/ (48552)
- 30 (decision adj10 tool\*).mp. [mp=title, abstract, subject headings, heading word, drug trade name, original title, device manufacturer, drug manufacturer, device trade name, keyword] (4662)
- 31 threshold\*.mp. (138831)
- 32 exp Quality-Adjusted Life Years/ (9854)
- 33 exp Great Britain/ (191271)
- 34 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 (3216902)
- 35 8 and 33 and 34 (437)
- 36 limit 35 to (english language and yr="2000 -Current") (437)



## International Search

Database: Ovid MEDLINE(R) Daily Update <August 10, 2012>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1946 to Present>

Search Strategy:

- 1 exp Arthroscopy/ (14986)
- 2 exp Knee/ (9815)
- 3 1 and 2 (354)
- 4 exp Knee Prosthesis/ or exp Arthroplasty, Replacement, Knee/ (15778)
- 5 exp Arthroplasty, Replacement, Hip/ or exp Hip Prosthesis/ (27534)
- 6 "knee washout".mp. (3)
- 7 3 or 4 or 5 or 6 (40472)
- 8 limit 7 to (english language and humans and yr="2000 -Current") (20934)
- 9 exp "Referral and Consultation"/ (52562)
- 10 intervention\*.mp. or exp Intervention Studies/ (481300)
- 11 exp General Practice/ (61558)
- 12 exp Decision Making/ (107202)
- 13 decision rule\*.mp. (1736)
- 14 (appropriate\* adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (326)
- 15 (appropriate\* adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (344)
- 16 (criteria adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (514)
- 17 (criteria adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (599)
- 18 (evaluat\* adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (4612)

- 19 (evaluat\* adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (5351)
- 20 exp Questionnaires/ (265064)
- 21 (eligib\* adj10 knee).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (78)
- 22 (eligib\* adj10 hip).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (99)
- 23 (tool\* adj10 surg\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (5857)
- 24 "oxford hip score".mp. (185)
- 25 exp Cost-Benefit Analysis/ (54813)
- 26 (decision adj10 tool\*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier] (3629)
- 27 threshold\*.mp. (173098)
- 28 exp Quality-Adjusted Life Years/ (5824)
- 29 exp United States/ (1037392)
- 30 exp Canada/ (110149)
- 31 exp France/ (72139)
- 34 exp Germany/ (116714)
- 32 exp Italy/ (64012)
- 33 exp Spain/ (48228)
- 34 exp Finland/ (25953)
- 35 exp Australia/ (90225)
- 36 exp New Zealand/ (26710)
- 37 exp Sweden/ (53192)
- 38 exp Norway/ (27542)
- 39 exp Denmark/ (34492)
- 40 exp Netherlands/ (44928)
- 41 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 (1731571)

- 42 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 (3353375)
- 43 8 and 41 and 42 (1466)
- 44 limit 43 to (english language and yr="2007 -Current") (981)
- 45 limit 44 to yr="2010 - 2012" (610)

## Web of Science

# 9 [656](#) #8 AND #5  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*  
*Lemmatization=On*

# 8 [872](#) #7 AND #2  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*  
*Lemmatization=On*

# 7 [13,082](#) #6 OR #1  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*  
*Lemmatization=On*

# 6 [13,080](#) #4 AND #3  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*  
*Lemmatization=On*

# 5 [3,214,542](#) TS=refer\* OR TS=surger\* OR TS=intervention\* OR TS=GP OR  
TS="general practic" OR TS="Primary Health Care" OR TS=  
"primary care" OR TS="secondary care" OR TS=Hospital\* OR  
TS=decision\* OR TS=decide\* OR TS=criteria OR TS=evaluat\* OR  
TS=appropriate\* OR TS="decision rule\*" OR TS=eligib\*  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*  
*Lemmatization=On*

# 4 [70,350](#) TI=knee\* OR TI=hip\*  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*  
*Lemmatization=On*

# 3 [48,498](#) TI=Prosthesis OR TI=prosthetic\* OR TI=Arthroplasty OR

Tl=replace\*

*Databases=SCI-EXPANDED, SSCI Timespan=All Years*

*Lemmatization=On*

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# 2 [779,144](#) TS="great britain" OR TS="united kingdom" OR TS=UK OR  
TS=scotland OR TS=england OR TS=wales OR TS="northern  
ireland" OR TS="n. Ireland" OR TS=United States OR TS=Canada  
OR TS=France OR TS=Germany OR TS=Italy OR TS=Spain OR  
TS=Finland OR TS=Australia OR TS=New Zealand OR  
TS=Sweden OR TS=Norway OR TS=Denmark OR TS=Netherlands  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*  
*Lemmatization=On*

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# 1 [2](#) Tl=anthroscopy OR Tl="knee washout"  
*Databases=SCI-EXPANDED, SSCI Timespan=All Years*

## Cinahl

S 21	S1 AND S2 AND S19	Limiters - Published Date from: 20010101-20121231 Search modes - Boolean/Phrase	Results (1,355)
S 20	S1 AND S2 AND S19	Search modes - Boolean/Phrase	Results (1,449)
S 19	S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18	Search modes - Boolean/Phrase	Results (975,865)
S 18	intervention*	Search modes - Boolean/Phrase	Results (165,511)
S 17	"decision rule*"	Search modes - Boolean/Phrase	Results (430)
S 16	"Appropriate*"	Search modes - Boolean/Phrase	Results (60,701)
S 15	"evaluat*"	Search modes - Boolean/Phrase	Results (426,084)
S 14	"criteria" OR eligib*	Search modes - Boolean/Phrase	Results (66,284)
S 13	(MH "Decision Making+") OR (MH "Decision Making, Clinical")	Search modes - Boolean/Phrase	Results (56,925)
S 12	(MH "Hospitals+")	Search modes - Boolean/Phrase	Results (66,133)

S 11	"secondary care"	Search modes - Boolean/Phrase	Results (1,288)
S 10	(MH "Primary Health Care")	Search modes - Boolean/Phrase	Results (31,948)
S 9	"General Practice" OR (MH "Family Practice")	Search modes - Boolean/Phrase	Results (18,530)
S 8	(MH "Surgery, Operative+")	Search modes - Boolean/Phrase	Results (300,369)
S 7	(MH "Referral and Consultation+")	Search modes - Boolean/Phrase	Results (19,786)
S 6	S2 OR S5	Search modes - Boolean/Phrase	Results (12,261)
S 5	S3 AND S4	Search modes - Boolean/Phrase	Results (234)
S 4	(MH "Arthroscopy")	Search modes - Boolean/Phrase	Results (5,055)
S 3	(MH "Knee")	Search modes - Boolean/Phrase	Results (5,748)
S 2	(MH "Arthroplasty, Replacement, Hip") OR (MH "Arthroplasty, Replacement, Knee+")	Search modes - Boolean/Phrase	Results (12,038)
S 1	"United Kingdom" OR UK OR "Great Britain" OR England	Search modes - Boolean/Phrase	Results (700,516)

OR Wales OR Scotland OR "Northern Ireland" OR "N. Ireland" OR "United States" OR USA OR Canada OR France OR Germany OR Italy OR Spain OR Finland OR Australia OR New Zealand OR Sweden Or Denmark Or Norway OR Netherlands		
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# ScotPHN r e p o r t

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Web: [www.scotphn.net](http://www.scotphn.net)