The following content is courtesy of the PHAST team: Richard Gibbs, Richard Wilmer, David Lawrence and Samanta Adomaviciute

Appendix 3. 'Long list' of possible musculoskeletal service quality indicators

Introduction to this Appendix

During the Recommended Musculoskeletal (MSK) Indicator Set project we assembled a list of possible measures which might be suitable indicators of MSK service quality. The list of all the possible indicators suggested, called the 'Long List', is given below.

In the 'Indicator description column' in the 'Long list' below, Indicators which are numbered and in a large font, are those selected to be in the Final List of recommended MSK indicators.

In the Long List below, in the 'Indicator Description column and in the column called 'References' in the list below, references numbered (e.g., (137) refer to the numbered references at the end of the research report by Samanta Adomaviciute. This research report, including numbered references, is reproduced below, after the end of the 'Long List'. The column 'References' also has hyperlinks to reference sources on the Internet (last accessed Autumn 2016)

The Long List data were originally stored in a spreadsheet.

Population & preventive medicine indicators		
Indicator description (Those given a number refer to the final chosen list of indicators	**Musculoskeletal (MSK) conditions covered**	**References**
Prevalence of specified MSK conditions: modelled prevalence of Rheumatoid arthritis (RA), Osteoarthritis (OA), back pain, fracture risk	RA, OA, Back pain, Risk of fragility fracture risk	Http://www.arthritisresearchuk.org/mskcalculator
Prevalence rate of hip fracture (= rate of hospital admissions for fractured neck of femur in the elderly (expressed as indirectly standardised rate))	Fragility fractures, falls prevention	HSCIC. Emergency hospital admissions: Fractured proximal femur. 2015. (137)
Percent of patients with osteoarthritis or rheumatoid arthritis who have a body mass index of 30 and above (obese)	RA. OA	
Rate of fractured neck of femur/expected incidence from synthetic models	Fragility fractures	

Service cost measures		
Indicator description	**MSK conditions covered**	**Reference**
Percent of total Clinical Commissioning Group (CCG) annual spend which is on services for musculoskeletal (MSK) conditions (=CCG Programme Budgeting Benchmarking Tool musculoskeletal system annual spend)	All musculoskeletal	https://www.england.nhs.uk/resources/resources-for-ccgs/prog-budgeting/
Number of MSK expected cases (from MSK prevalence estimates) divided by MSK programme budget spend - comparison between MSK systems	All musculoskeletal	Not applicable

Service cost effectiveness		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Average change in Health-related outcome measure – Euroqol 5 dimension (EQ-5D) scores for all MSK patients for year divided by total annual CCG Programme Budgeting Benchmarking Tool (PBBT) MSK spend in year	All musculoskeletal	http://www.euroqol.org/ https://www.england.nhs.uk/resources/resources-for-ccgs/prog-budgeting/

Organisational structure: resources		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Number of rheumatologists and orthopaedic specialists per 100,000 population	All musculoskeletal	http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442459733 p 19
2 Ratio of MSK-related consultants (trauma & orthopaedics, spinal surgeons, rheumatology, pain medicine) to MSK-specialist allied health professionals	All musculoskeletal	
Number of consultants who are in falls clinics per network/local area	Osteoporosis, Fragility fractures	
Number of (rheumatologists + orthopaedic specialists + physios) per (RA + OA + back pain + fracture risk) expected prevalence	All musculoskeletal	

Organisational structure: organisation		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Percent of General Practices with defined electronic MSK patient clinical profile and the ability to disseminate to patients and others in suitable non-digital format	All musculoskeletal	

Clinical process quality: Patient Reported Experience Measures (PREMs)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Osteoarthritis Quality Indicator (OA-QI) questionnaire	Osteoarthritis	Osteras N et al. Arthritis Care & Research Vol. 65, No. 7, July 2013, pp 1043–1051 DOI 10.1002/acr.21976
Friends and family test	All musculoskeletal	
Patient activation measure PAM - 13	All musculoskeletal	Link to article on PAM development
Commissioning for Quality in Rheumatoid Arthritis (CQRA) - Rheumatoid arthritis care patient experience questionnaire	Rheumatoid arthritis	http://www.nras.org.uk/data/files/For%20professionals/CQRA%20/CQRA%20PREMS_RA.pdf
CQRA 'Patient metric data collection form for ESTABLISHED rheumatoid arthritis (RA)	Rheumatoid arthritis	http://www.nras.org.uk/data/files/For%20professionals/CQRA%20/ESTABLISHED%20RA_METRICS%20DATA%20COLLECTION%20FORM.pdf
CQRA 'Patient metric data collection form for RECENT ONSET rheumatoid arthritis	Rheumatoid arthritis	http://www.nras.org.uk/data/files/For%20professionals/CQRA%20/RECENT%20ONSET%20RA_METRICS%20DATA%20COLLECTION%20FORM.pdf
Rheumatic conditions care patient service experience scores. Derived from: CQRA Rheumatic conditions care patient experience questionnaire	All rheumatic conditions (see referenced questionnaire for detailed conditions covered)	http://www.nras.org.uk/data/files/For%20professionals/CQRA%20/CQRA%20PREMS_NON-RA%20RHEUMATIC%20CONDITIONS.pdf
CQRA Rh condition PREM adapted to OA	Osteoarthritis	

Clinical process quality: Clinician Reported patient experience (CRPE)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Number and quality of MSK clinical audit reviews per year in primary and specialist care	All musculoskeletal	http://www.hqip.org.uk/resources/guide-to-quality-improvement-methods/ p 11

Clinical process quality: Service Level Process measures (SL)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Percent of hospital inpatient admissions for hip fracture which qualify for fragility hip fracture conditional best practice tariff payments	Fragility fractures	reference PbR-Guidance-2013-14 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/214902/PbR-Guidance-2013-14.pdf
Proportion of patients recommended a treatment who are followed up within 4 months following fracture (National Osteoporosis Society)	Fragility fractures	National Osteoporosis Society (NOS)
Proportion of patients who are on recommended treatment 12 months (National Osteoporosis Society)	Fragility fractures	National Osteoporosis Society (NOS)
Number of patients who were admitted with a fracture who were already taking a bone protecting treatment (National Osteoporosis Society)	Fragility fractures	National Osteoporosis Society (NOS)
Percent of fragility fracture patients aged over 50 years identified by the Fracture Liaison Service	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Identification Denominator for all fragility fractures can be best estimated by multiplying total hip fractures in over 50 year olds by a factor of 5(1).	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Investigation Percent of identified patients who have a bone health assessment within 3 months of incident fracture.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Investigation Percent of identified patients who have a falls risk assessment within 3 months of incident fracture.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Information Percent of identified patients given information	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Intervention Percent of assessed patients offered bone-protection treatment within 3 months and 6 months of incident fracture.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Intervention Percent of assessed patients referred for falls assessment or intervention within 3 months and within 6 months	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Integration Measure of communication including percent of patients copied in to Fracture Liaison Services letters.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Percent of patients recommended drug therapy who have initiated treatment by 4 months following fracture.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Integration Percent of patients on treatment who have been reviewed within the last 12 months.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015

Quality Date of last audit against Fracture Liaison Services standards.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Quality Date of last patient satisfaction survey.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Quality Review of competencies and training needs in annual appraisals.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Quality Assessment of CPD attained.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Quality Date of last peer review and progress against an agreed action plan.	Fragility fractures	National Osteoporosis Society. Fracture Liaison Services Clinical-Standards-Report 2015
Intervention proportions of fragility fracture patients assessed for (i) osteoporosis and (ii) falls risk	Fragility fractures	Ref RCP Falls and Fragility Fractures Audit https://www.rcplondon.ac.uk/projects/falls-and-fragility-fracture-audit-programme-fffap-2014
Intervention proportion of patients initiated on evidence based bone protection therapy within 4 months of fracture.	Fragility fractures	Ref RCP Falls and Fragility Fractures Audit https://www.rcplondon.ac.uk/projects/falls-and-fragility-fracture-audit-programme-fffap-2015
Intervention proportion of patients initiated with evidence based falls prevention intervention within 4 months of fracture.	Fragility fractures	Ref RCP Falls and Fragility Fractures Audit https://www.rcplondon.ac.uk/projects/falls-and-fragility-fracture-audit-programme-fffap-2016
Intervention proportion of patients still persist with (i) bone protection and (ii) fall prevention treatment at 12 months.	Fragility fractures	Ref RCP Falls and Fragility Fractures Audit https://www.rcplondon.ac.uk/projects/falls-and-fragility-fracture-audit-programme-fffap-2017
Intervention proportion of patients of were identified by the service that have a subsequent fracture	Fragility fractures	Ref RCP Falls and Fragility Fractures Audit https://www.rcplondon.ac.uk/projects/falls-and-fragility-fracture-audit-programme-fffap-2018
Percent of patients with hip fractures having surgery within 36 hours (National Hip Fracture Database National (NHFD) Report (129). Similar to NICE QS16, Statement 5, qv. Also, CCG OIS)	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p26
Percent of individuals with hip fracture having surgery within 48 hours and during working hours (NHFD) (129)	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p28
Percent of patients with hip fracture who had a pre-operative assessment by an ortho-geriatrician (NHFD) **(129)**	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p8

Percent with hip fracture being offered a formal Hip Fracture Programme from admission (NICE QS16, Statement 1)	Hip fractures	NICE QS16, 2012 p10
Proportion of people with hip fracture transferred from hospital for early supported discharge or intermediate care for whom the Hip Fracture Programme team makes (and documents the reasons for) the decision to transfer. NICE QS16, statement 2	Hip fractures	NICE QS16, 2012, p 14
a) Percent of people with hip fracture receiving recorded preoperative cognitive assessment and measurement using a validated tool. b) Proportion of people with hip fracture who have undergone surgery receiving a recorded postoperative cognitive assessment and measurement using a validated tool. (NICE QS16, Statement 3)	Hip fractures	NICE QS16, 2012, statement 3 p 16
Same as Indicator above - different wording from NICE QS16 percent of individuals with hip fracture with pre-and post-operative abbreviated mental test score assessment (NICE QS16)	Hip fractures	It is the same indicator as above NICE QS16, Statement 3, but from NHFD with different wording
a) Percent of people with hip fracture who receive a formal, recorded pain assessment immediately on admission to the emergency department and within 30 minutes of initial analgesic administration. b) Percent of people with hip fracture who are offered paracetamol as first-line analgesia on admission to the emergency department and every 6 hours preoperatively, unless contraindicated. c) % of people with hip fracture who are offered paracetamol every 6 hours postoperatively. (NICE QS16, Statement 4)	Hip fractures	NICE QS16, 2012, statement 4 p 18
Percent of people with hip fracture who receive surgery on the day of, or the day after, admission. (NICE QS16, Statement 5 Similar to NHFD - % having surgery within 36 hours	Hip fractures	NICE QS16, 2012, statement 5 p 21
a) Percent of people with hip fracture who receive surgery on a planned trauma list. b) Percent of people with hip fracture having surgery who receive surgery with consultant or senior staff supervision. (NICE QS16, Statement 6)	Hip fractures	NICE QS16, 2012, statement 6 p 24
Percent of people with intrascapular fracture receiving cemented arthroplasty (NICE QS16, Statement 7)	Hip fractures	NICE QS16, 2012, statement 7 p 27
Percent of people with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2) receiving extramedullary implants such as sliding hip screw in preference to an	Hip fractures	NICE QS16, 2012, statement 8 p 30

intramedullary nail (NICE QS16, Statement 8)		
a) Percent of people who receive a physiotherapist assessment the day after surgery unless contraindicated. b) Percent of people who receive physiotherapist-led daily mobilisation from the day after surgery unless contraindicated. (NICE QS16, Statement 9)	Hip fractures	NICE QS16, 2012, statement 9 p 32
Percent of people with hip fracture who receive early supported discharge (if they are eligible), led by the Hip Fracture Programme team. (NICE QS 16, Statement 10)	Hip fractures	NICE QS16, 2012, statement 10 p 35
Percent of people with hip fracture being offered a multifactorial risk assessment to identify and address future falls risk (NICE QS16, Statement 11, CCG OIS).	Hip fractures	NICE QS16, 2012, statement 11 p 38
a) Percent of individuals with hip fracture being offered a bone health assessment c) percent of people aged 75 years and over with a hip fracture, who are discharged on appropriate medication to help prevent further fractures. (NICE QS16, Statement 12 a percent c) (similar to NHFD below)	Hip fractures	NICE QS16, 2012, statement 12 p 41
Percent of individuals with hip fracture that had shared care by surgeon and geriatrician	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p5**)**
Percent of individuals with hip fracture receiving a falls assessment prior to discharge (NHFD)	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p4
Percent of individuals with hip fracture meeting the Best Practice Tariff (BPT) set standards (129)	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p5
Percent of individuals with hip fracture having secondary prevention of falls (NHFD) (129)	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p5
Percent of individuals with hip fracture having geriatrician-led multi-disciplinary rehabilitation (NHFD) (CCG OIS)	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p5
Percent of individuals with hip fracture having an assessment by geriatrician within 72 hours (NHFD)	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p5
Percent of individuals with hip fracture being admitted to orthopaedic ward within 4 hours	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p4

Average length of stay for individuals with hip fracture	Hip fractures	http://www.nhfd.co.uk/20/hipfractureR.nsf/0/CA920122A244F2ED802579C900553993/$file/NHFD%20Report%202013.pdf p9
Mean length of stay for elective hip and knee replacement patients. Derived from: Average length of stay for hip replacement patients for standardised population	Osteoarthritis	https://www.evidence.nhs.uk/Search?q=enhanced+recovery+in+orthopaedics
Rate of elective primary hip replacement per expected prevalence of severe hip osteoarthritis. Adaptation of 'Rate of Hip replacement by adjusted popln, incl deprivation'.	Osteoarthritis	http://www.hsj.co.uk/news/investigation-unwarranted-and-unfair-disparity-in-elective-surgery-revealed/5090614.article#.VjIBumxOdd8
Rate of facet joint injections	Back pain	Personal communication Liz Lingard North East public health observatory
Rate of knee washout arthroscopies/ >35 population	Osteoarthritis	
% of adults with osteoarthritis who are overweight or obese who are offered support to lose weight. (15, 17, 134) (NICE QS87)	Osteoarthritis	https://www.nice.org.uk/guidance/QS87/chapter/Quality-statement-5-Weight-loss
% of adults with osteoarthritis referred for consideration of joint surgery whose referral is based on a scoring tool. ((14, 15, 130, 136) (17, 23) (NICE QS87)	Osteoarthritis	https://www.nice.org.uk/guidance/qs87/chapter/quality-statement-8-referral-for-consideration-of-joint-surgery
% of adults with OA and worsening symptoms having a radiograph (14, 15).	Osteoarthritis	Pencharz JN, MacLean CH. Measuring quality in arthritis care: the Arthritis Foundation's Quality Indicator set for osteoarthritis. Arthritis Rheum. 2004;51(4):538-48. MacLean CH, Saag KG, Solomon DH, Morton SC, Sampsel S, Klippel JH. Measuring quality in arthritis care: methods for developing the Arthritis Foundation's quality indicator set. Arthritis Rheum. 2004;51(2):193-202.
% of adults aged 45 years or over who have activity-related joint pain and in whom any morning joint stiffness lasts no longer than 30 minutes who are diagnosed with osteoarthritis clinically without investigations (14, 15, 134). (NICE QS87	Osteoarthritis	https://www.nice.org.uk/guidance/qs87/chapter/quality-statement-1-diagnosis
% of individuals with OA using the recommended dose of acetaminophen (15, 21, 136).	Osteoarthritis	See bibliography in the research report at the end of the 'Long List'
% of individuals with OA using paracetamol (acetaminophen) for pain relief as their first drug (14, 15, 17).	Osteoarthritis	See bibliography in the research report at the end of the 'Long List'

Percent of adults with osteoarthritis who receive advice on participating in muscle strengthening and aerobic exercise. Derived from % of adults with osteoarthritis who receive advice on participating in muscle strengthening and aerobic exercise at their review. (16, 17, 23, 130, 134) (NICE QS87)	Osteoarthritis	See bibliography in the research report at the end of the 'Long List'
% of adults with osteoarthritis referred for consideration of joint surgery who were supported with non-surgical core treatments for at least 3 months (134). (NICE QS87)	Osteoarthritis	https://www.nice.org.uk/guidance/qs87/chapter/quality-statement-7-core-treatments-before-referral-for-consideration-of-joint-surgery
% of professionals managing patients with OA at a primary health care centre, who receive continuous access to education on important preventative and therapeutic strategies in the management of OA. (EUMUSC HCQI OA No. 7) (130)	Osteoarthritis	EUMUSC Audit HCQI_OA_1-12.pdf page 8
% of patients diagnosed with OA seeing an orthopaedic surgeon within 3 months of referral (EUMUSC HCQI OA No. 9) (130)	Osteoarthritis	EUMUSC Audit HCQI_OA_1-12.pdf page 10
% of adults newly diagnosed with osteoarthritis who have an assessment that includes pain, impact on daily activities and quality of life. (14, 23, 130, 134, 136) (NICE QS87, Statement 2)	Osteoarthritis	NICE QS87, Statement 2
% of patients with OA treated with NSAID, whose notes contain a record that they have been advised of the gastrointestinal and renal risks associated with this drug (136, 149)	Osteoarthritis	Steel N et al Qis Older people Qual saf HC 2004
% of patients with OA regularly treated with an NSAID, whose notes contain a record that they have been asked about gastrointestinal symptoms within the previous 12 months (136, 149).	Osteoarthritis	Steel N et al Qis Older people Qual saf HC 2004
% of patients with OA treated with an NSAID, whose notes contain a record that ibuprofen (or a cox-2 inhibitor) has been considered for first-line treatment (unless contraindicated or intolerant) (136, 49).	Osteoarthritis	Steel N et al Qis Older people Qual saf HC 2004
% of adults with osteoarthritis with an agreed date for a review (17, 134) (NICE QS87)	Osteoarthritis	NICE QS87, Statement 6
% patients with a working diagnosis of OA taking an oral NSAID who are also prescribed PPI or alternative gastroprotective agent (Arthritis Federation Quality Indicator Set, Analgesic use No 4 (15)), (16)	Osteoarthritis	https://www.researchgate.net/publication/8378788_Measuring_quality_in_arthritis_care_The_Arthritis_Foundation's_Quality_Indicator_set_for_osteoarthritis
% OA patients with chronic kidney disease prescribed NSAIDs on repeat and patients on NSAIDs +diuretics+ ACE/ARB	Osteoarthritis	

% of patients with OA treated with NSAID, whose notes contain a record that they have been advised of the gastrointestinal and renal risks associated with this drug (136)	Osteoarthritis	From Rand set, so similar to Steel (149)
% of patients with OA regularly treated with an NSAID, whose notes contain a record that they have been asked about gastrointestinal symptoms within the previous 12 months (136).	Osteoarthritis	From Rand set, so similar to Steel (149)
Sentinel prescriptions for OA: 'Number of repeat prescriptions of co-codamol/tramadol or NSAIDs - gabapentin, Pregabalin	Osteoarthritis	
% of patients with OA treated with an NSAID, whose notes contain a record that ibuprofen (or a cox-2 inhibitor) has been considered for first-line treatment (unless contraindicated or intolerant) (136).	Osteoarthritis	From Rand set, so similar to Steel (149)
% of individuals with OA having difficulty walking to accomplish activities of daily living recorded as receiving referral or assessment for the need of ambulatory assistive devices (14-17, 130).	Osteoarthritis	
Rate of elective primary hip replacements per expected prevalence of severe hip osteoarthritis. Adaptation of: % of individuals with hip OA having primary hip replacement (Compendium). Also, see above.	Hip osteoarthritis, Joint replacements	
% of reoperation or revision, of joint replacements carried out (23) (ICHOM Compendium)	Osteoarthritis, Joint replacements	
Rate of elective primary knee replacements per expected prevalence of severe knee osteoarthritis Adaptation of: % of individuals with knee OA having primary knee replacement (Compendium)	Knee Osteoarthritis	
% people with suspected persistent synovitis (affecting the small joints of the hands or feet, or more than one joint), who are referred to a rheumatology service within 3 working days of presentation. (NICE quality standard QS33, Statement 1)	Rheumatoid arthritis	NICE QS33 Statement 1
Percent of patients with suspected rheumatoid arthritis seen in a rheumatology service for confirmation of diagnosis within three weeks of referral. Derived from: % people with suspected persistent synovitis, who are assessed in a rheumatology service within 3 weeks of referral. (NICE quality standard QS33, Statement 2)	Rheumatoid arthritis	NICE QS33 Statement 2
% of RA and early inflammatory arthritis patients with: 1. Treatment within 12 weeks	Rheumatoid arthritis	

of symptom onset; 2. Treatment within 9 weeks of GP presentation; 3. Treatment within 6 weeks of GP referral		
Number of people referred to an MSK-outpatient service (AHP, pain clinic, rheumatology)	All musculoskeletal	
Number of people referred for specialist (medical/AHP) care waiting more than 4 weeks for appointment/treatment (or median waiting time for first appointment)	All musculoskeletal	
Number of A&E presentations/unplanned hospital admissions due to a primary musculoskeletal problem	All musculoskeletal	
Total spend on procedures of low clinical value (if can get definitions from BOA)	All musculoskeletal	
Total spend on musculoskeletal-related drugs	All musculoskeletal	
Percent of people with a long-term musculoskeletal-related problem who state they have a written, personalised, specified, care plan which is reviewed regularly within a specified period.	All musculoskeletal	GP patient survey July 2015 List of report variables
% people with newly diagnosed rheumatoid arthritis, who are offered short-term glucocorticoids and a combination of disease-modifying anti-rheumatic drugs by a rheumatology service within 6 weeks of referral. (NICE quality standard QS33, Statement 3)	Rheumatoid arthritis	NICE QS33 Statement 3
% people with rheumatoid arthritis, who are offered educational and self-management activities within 1 month of diagnosis. (NICE quality standard QS33, Statement 4)	Rheumatoid arthritis	NICE QS33 Statement 4
a) % of people with active rheumatoid arthritis who receive monthly treatment escalation. b) % of people with previously active rheumatoid arthritis whose disease is currently controlled, who received monthly treatment escalation until the disease was controlled to an agreed low disease activity target. (NICE quality standard QS33, Statement 5)	Rheumatoid arthritis	NICE QS33 Statement 5
% people with rheumatoid arthritis and disease flares or possible drug related side effects, who receive advice within 1 working day of contacting the rheumatology service. (NICE quality standard QS33, Statement 6)	Rheumatoid arthritis	NICE QS33 Statement 6
% of people with rheumatoid arthritis diagnosed more than 1 year ago, whose last comprehensive review was within 12 months of diagnosis or the previous review. (NICE quality standard QS33, Statement 7)	Rheumatoid arthritis	NICE QS33 Statement 7

RA patients on prednisone should have Osteoporosis prophylaxis. Arthritis Foundation quality indicator set (15)	Rheumatoid arthritis	Mclean et al .pdf (15) Arthritis Foundation quality indicator set - Quality measures for rheumatoid arthritis rated as valid, no. 9 (Osteoporosis prophylaxis)
% RA patients with no contra-indication prescribed exercise programme. (Arthritis Foundation RA quality indicator set No 12 (15))	Rheumatoid arthritis	
% of patients having access to a multidisciplinary team. (NICE Rheumatoid arthritis)	Rheumatoid arthritis	
% of outpatients who saw the same nurse at least three times out of their six most recent visits (147 (= Link 3))	Rheumatoid arthritis	Link 3 http://www.uhb.nhs.uk/rheumatology-quality-indicators.htm
% patients prescribed DMARDs who have documented baseline studies (Arthritis Foundation RA quality indicator set No 18 (15)) Note also No 19	Rheumatoid arthritis	
Assistive devices (Arthritis Foundation RA quality indicator set Nos 13 to 15 (15))	Rheumatoid arthritis	
% of patient with RA and joint damage/soft tissue being assessed by an orthopaedic surgeon within 3 months (EUMUSC HCQI RA No. 5) (135).	Rheumatoid arthritis	EUMUSC Audit HCQI_RA_1-14.pdf RA 5 - p 6
% of patients with suspected rheumatoid arthritis seeing a specialist for confirmation of diagnosis within 6 weeks of the onset of symptoms. (EUMUSC HCQI RA No. 1) (135)	Rheumatoid arthritis	EUMUSC Audit HCQI_RA_1-14.pdf RA 5 - p 7
a) % of individuals with established diagnosis or RA and synovitis or RA and radiographic erosions being treated with DMARD b) % of individuals with RA being treated with DMARD and reporting symptoms worsening over 6-months period and with evidence of active disease having one of the following: dose changed, route of administration changed, type of DMARD changed, new additional DMARD added, glucocorticoids started or increased dose (Arthritis Foundation RA quality indicator set Nos 6 and 7. (15))	Rheumatoid arthritis	Arthritis Foundation RA quality indicator set
% of patients who have received IV cyclophosphamide and admitted with infection /sepsis within 6 months of treatment ('BSR dashboards for RA & rheumatology May 2015 sb.xls (146))	Rheumatoid arthritis	BSR dashboards for RA & rheumatology May 2015 sb.xls
% patients with MSK condition having an annual review	All musculoskeletal	
% of patients with rheumatoid arthritis, on GP register, who have had a face-to-face review in the preceding 12 months (QOF Indicators NM58) Same as NICE QS33	All musculoskeletal, Osteoarthritis, Rheumatoid arthritis	NICE QOF indicators for RA.pdf

Statement 7. People with rheumatoid arthritis have a comprehensive annual review that is coordinated by the rheumatology service. (139, 140)		
% of patients with rheumatoid arthritis aged 30-84 years in primary care who have had a cardiovascular risk assessment using a CVD risk assessment tool adjusted for RA in the preceding 15 months (QOF Indicators NM56)	Rheumatoid arthritis	NICE QOF indicators for RA.pdf
% of patients aged 50-90 years with rheumatoid arthritis who have had an assessment of fracture risk using a risk assessment tool adjusted for RA in the preceding 27 months (QOF Indicators NM57)	Rheumatoid arthritis	NICE QOF indicators for RA.pdf
% of individuals with RA being treated with methotrexate who are also receiving folate supplementation (15).	Rheumatoid arthritis	
a) % of individuals with diagnosis of RA having hands or feet radiograph within 3 months of the initials diagnosis. b) % of individuals with diagnosis of RA having hands or feet radiograph every 3 years. (15))	Rheumatoid arthritis	Arthritis Foundation Quality indicator set - Quality measures for rheumatoid arthritis No 4
% of individuals with documented characteristics within 3 months of RA diagnosis (Arthritis Federation Quality Indicator Set RA No 2 (15))	Rheumatoid arthritis	Arthritis Foundation Quality indicator set - Quality measures for rheumatoid arthritis No 2
% of individuals with RA (who have surgery requiring general anaesthesia) having their risk of atlantoaxial instability managed or documented (Arthritis Federation Quality Indicator Set RA No 2 (15)).	Rheumatoid arthritis	Arthritis Foundation Quality indicator set - Quality measures for rheumatoid arthritis No 5
% of SLE patients on rituximab who are registered on BILAGBR (British Isles Lupus Assessment Group Biologics Registry) (146))	Systemic Lupus Erythematosus	BSR dashboards for RA & rheumatology May 2015
% of individuals aged over 65 or older who reported 2 or more falls in the past year, or a single fall with injury requiring treatment, being offered multidisciplinary falls assessment (Steel et al. 2004 Quality Indicator set, *Falls and Mobility Disorders* 1E (149)).	Secondary falls prevention	N Steel, D Melzer, P Shekelle, N Wenger, D Forsyth, and B McWilliams. Developing quality indicators for older adults: transfer from the USA to the UK is feasible. Qual Saf Health Care. 2004 Aug; 13(4): 260–264
Conversion rate of referrals to OA surgery and appropriate RA leading to follow-up at one year. Are the appropriate patients being referred to specialist or to self-management?	Osteoarthritis and Rheumatoid Arthritis	
Spend on biologic therapies/drugs per expected prevalence of rheumatoid arthritis. Derived from: Prescribing rate and	Rheumatoid arthritis	

spend on biologicals compared to expected prevalence of RA		
% of individuals aged over 65 or older who reported 2 or more falls in the past year, or a single fall with injury requiring treatment, having their basic fall history taken by the physician (Steel et al. 2004 Quality Indicator set, Falls and Mobility Disorders 1H (149)).	Secondary falls prevention	N Steel, D Melzer, P Shekelle, N Wenger, D Forsyth, and B McWilliams. Developing quality indicators for older adults: transfer from the USA to the UK is feasible. Qual Saf Health Care. 2004 Aug; 13(4): 260–264

Administration quality: service level indicators (AQSL)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Number of meetings by joint commissioner/providers to discuss the NHF database reports examining the local acute and community hospital	Hip fracture	Derived from NHFD report 2015
Number of monthly clinical governance meetings for hip fracture programmes per year	Hip fracture	Derived from NHFD report 2015
% of clinical governance meetings for hip fracture programmes in the MSK network area which include representatives from community rehabilitation services	Hip fracture	Derived from NHFD report 2015
a) % of adults with OA with a record of having received written information about OA and its management b) % of adults diagnosed with OA who participate in developing a self-management plan c) % of adults with OA who participate in reviewing a self-management plan (16, 17, 23, 130, 136) (NICE QS87) In primary care.	Osteoarthritis	
% of individuals seen by the physician within 3 months for a new RA diagnosis (15, 135) (Arthritis Federation Quality Indicator Set RA No 1 (15)).	Rheumatoid arthritis	Ref 15 MacLean CH, et al. Measuring quality in arthritis care: methods for developing the Arthritis Foundation's quality indicator set.
The practice can produce a register of all patients aged 16 years and over with rheumatoid arthritis (QOF Indicators NM55)	Rheumatoid arthritis	NICE QOF indicators for RA.pdf (Link 4)
% of practices providing information (written or website) on how a patient can contact the practice for urgent consultations (in case of flares/worsening of the disease, serious side effects) (EUMUSC 2008) (135)	Rheumatoid arthritis	
Is there a joined-up IT or non-IT system of information on the patient's management?	All musculoskeletal	
Time from first MSK presentation to review by allied Health professionals	All musculoskeletal	

Time from referral (GP, self, or other health professional) to first allied health professional review for MSK patients	All musculoskeletal	
Mean time from receipt of initial GP referral to first attended dedicated specialist non-urgent OPD for patients with connective tissue disease and vasculitis ('BSR dashboards for RA & rheumatology May 2015 sb.xls) (146)	All musculoskeletal	BSR dashboards for RA & rheumatology May 2015
To what extent MSK services specifications of defined quality in each CCG area, are implemented	All musculoskeletal	

Patient clinical outcomes at patient level: Clinical Patient Reported Outcome Measures (ClinPROM)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Bournemouth Questionnaire Anglo-European College of Chiropractic (AECC)	Back pain	Bournemouth Questionnaire Back Px
Nottingham Hip Fracture Score	Hip Fractures	Maxwell MJ, Moran CG, Moppett IK. Development and validation of a preoperative scoring system to predict 30-day mortality in patients undergoing hip fracture surgery. Br J Anaesth 2008;101:511–7
HOOS-QOL Hip disability and Osteoarthritis Outcome Score the Quality of life subscales in patients with hip arthritis (12)	Hip osteoarthritis	
Intermittent and constant osteoarthritis pain (ICOAP) score (13)	Hip and knee osteoarthritis	
Total Hip Arthroplasty Outcome Evaluation Questionnaire (6)	Hip and knee replacement	p 44 in LSHTM PROMS report to DH (ref 6) 2005.doc
The *Mayo Scale* (6)	Hip and knee replacement	Chapter 5 Disease-specific PROMs in hip and knee replacement surgery p 40. LSHTM PROMS report to DH (ref 6) 2005.doc
The Lower Extremity Functional Scale (LEFS) (6, 8, 32, 79)	Hip and knee replacement; lower extremity disorders, including knee OA (8, 32). (6)	LSHTM PROMS report to DH (ref 6) 2005.doc p 37
Vigour Assessment Instrument (6)	Hip and knee replacement; other arthroplasties	Chapter 5 Disease-specific PROMs in hip and knee replacement surgery p 40. LSHTM PROMS report to DH (ref 6) 2005.doc

Harris Hip Score (6, 56)	Hip replacement	p 42. LSHTM PROMS report to DH (ref 6) 2005.doc
HOOS Hip disability and Osteoarthritis Outcome Score Physical Function Short-form (HOOS-PS) (23)	Hip replacement	
Hip Rating Scale (6)	Hip replacement	p 42. LSHTM PROMS report to DH (ref 6) 2005.doc
MSK Health Questionnaire	All musculoskeletal	http://www.arthritisresearchuk.org/policy-and-public-affairs/policy-priorities-and-projects/musculosketal-health-services/musculoskeletal-health-questionnaire.aspx
The Oxford Hip Score (OHS) (6, 56) LSHTM PROMS report to DH (ref 6) 2005.doc p 41	Hip replacement	BOA - orthopaedic dashboards - Slides.pdf slide 8 - OHS is part of National Joint Register dashboard patient improvement data
KOOS-QOL Quality of life subscales in patients with knee arthritis (12)	Knee Arthritis	
Knee Outcome Survey-Activities of Daily Living Scale (ADLS) (32)	Knee osteoarthritis	
McKnee System (6)	Knee replacement	p 46 et seq. in LSHTM PROMS report to DH (ref 6) 2005
Oxford Knee Score (OKS) (6) (ref-SPOT analysis)	Knee replacement	P45 et seq. in LSHTM PROMS report to DH (ref 6) 2005
KOOS-PS Knee injury and Osteoarthritis Outcome Score Physical Function Short-form (23)	Knee replacements	
Oswestry Disability Index (ODI) (26)	Low back pain (26)	ICHOM Low Back Pain Reference Guide 2.0
Numeric Pain Rating Scale (NPRS) (26)	Low back pain (26)	ICHOM Low Back Pain Reference Guide 2.0
Western Ontario and McMaster Osteoarthritis Index WOMAC TM (6, 32)	Osteoarthritis patients, hip and knee replacement patients (6)	p 33 et seq. in LSHTM PROMS report to DH (ref 6) 2005
Bournemouth Questionnaire General MSK pain	All musculoskeletal	Bournmouth Questionnaire General MSK Pain http://9564e6cf93ec0c618a68-4f22a039f96a487025fe8e71cbbe8130.r40.cf3.rackcdn.com/Research/Publications/BQ%20ONLY%20(MSK).pdf
DAS 28 Score (144)	Rheumatoid arthritis	Ref 144 (= Link 7 http://www.nras.org.uk/the-das28-score)
Arthritis Impact Measurement Scales 2-short form (AIMS2-SF) (98)	Rheumatoid arthritis, Osteoarthritis	http://www.rheumatology.org/Practice/Clinical/Clinicianresearchers/Outcomes_Instrumentation/Arthritis_Impact_Measurement_Scales_(AIMS/AIMS2)/

Arthritis Impact Measurement Scales 2 (AIMS2) (98). A short version is available - see AIMS2-SF	Rheumatoid arthritis, Osteoarthritis, psoriatic arthritis, undergoing joint replacement surgery (98).	
Bristol Rheumatoid Arthritis Fatigue scales (BRAFs)	Rheumatoid arthritis	
RA Impact of Disease questionnaire	Rheumatoid arthritis	RA ID questionnairehttp://www.ncbi.nlm.nih.gov/pubmed/21540201

Health Related Quality of Life Patient Reported Outcome Measures (HRQoLPROM)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Self-administered Comorbidity Questionnaire	Low back pain	ICHOM Low Back Pain Reference Guide 2.0
National Joint Register dashboard EQ-5D	Osteoarthritis	BOA - orthopaedic dashboards - Slides - slide 8
National Joint Register dashboard EQ-VAS	Osteoarthritis	BOA - orthopaedic dashboards - Slides - slide 9
EQ-5D-3L	All musculoskeletal	ICHOM Low Back Pain Reference Guide 2.0
EQ-5D* Enhancing quality of life for people with long-term conditions	All musculoskeletal	http://www.nice.org.uk/proxy/?sourceUrl=http%3A%2F%2Fwww.nice.org.uk%2Fmedia%2FD4A%2F06%2F2HealthRelatedQualityOfLifeForPeopleWithLongTermConditions.pdf
EQ-5D (7) (EQ-5D-3L in ref 26) and CCG-OIS c. 3.3	All musculoskeletal	Used as a PROM in the HSCIC series. Ref: HSCIC PROMS Guide v5 2014. Used in SPOT Quadrant Analysis. https://indicators.ic.nhs.uk/webview/
Spend and Outcomes: Tool EQ-5D (8)	All musculoskeletal; Hip and knee replacement, Rheumatoid arthritis, back pain (24, 54)	
SF-6D	All musculoskeletal	
Hospital Anxiety and Depression SCALE (HADS) (124)	All musculoskeletal - anxiety and depression	
Patient Health Questionnaire-9 (PHQ-9) (124)	All musculoskeletal - depression	
Health Related Quality of Life via VF-12 (See ICHOM OA indicator set)	All musculoskeletal; hip and knee osteoarthritis	ICHOM OA Reference Guide 2.0 Draft 3 (Ref 26) p6
SF-12 ICHOM (23)	All musculoskeletal; Patients with back pain (86). Osteoarthritis and rheumatoid arthritis (87)	ICHOM OA Reference Guide 2.0 2015

Health Assessment Questionnaire (HAQ) (6)	Rheumatoid arthritis; Back pain	LSHTM PROMS report to DH (ref 6) 2005.doc p 39

Clinician Reported Patient Outcome Measures (CRPOM)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
Australian Therapy Outcome Measure (AusTOM)	All musculoskeletal	Perry A Aus Toms Int J qual health care 2004
Therapy Outcome Measure (TOM)	All musculoskeletal	Therapy Outcomes Workshop Community Therapists Network 14th October 2009
Canadian occupational performance measure	All musculoskeletal	

Service reported outcome measures (SROM)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
% of people dying in hospital after a hip fracture (neck of femur) (Compendium, CCG IOS) (129) (151)	Hip Fractures	Ref 151 NICE. Clinical Commissioning Group Outcomes Indicator Set (CCG IOS) Indicator Rationale. http://www.nice.org.uk/Media/Default/standards-and-indicators/ccgois indicators key documents/NICE CCG OIS indicator rationale 2013.pdf.
% of people who die within specified period following hospital treatment: fractured proximal femur (132)	Hip Fractures	https://indicators.hscic.gov.uk/webview/
National Joint Register 90-day mortality	Joint replacements	BOA - orthopaedic dashboards - Slides.pdf slide 9
% of individuals having readmission within 28 days of discharge after fracturing proximal femur (ICHOM - ref 23) (Compendium of population health) (132, 133) https://indicators.ic.nhs.uk/download/NCHOD/Specification/Spec_32F_535ISP4FP_12_V1.pdf	Hip Fractures	ICHOM. Hip & Knee Osteoarthritis Reference Guide 2.0 2015.pdf'. There seems to be a newer version of this 2.1 but I couldn't download it.
Percent of patients who have non-elective readmission to hospital within 28 days of either elective primary hip or knee replacement. Derived from: Readmission within 28 days of an orthopaedic procedure	All conditions treated in an Orthopaedics specialty	
% of people returning to usual place of residence following hospital treatment:	Hip Fractures	

fractured proximal femur (from Compendium of outcome indicators)		
Percent of patients with hip fracture, admitted to hospital from own home, returning home within 30 days	Hip fractures	Derived from NHFD report 2015
Number of people requiring social care per MSK prevalence	All musculoskeletal	
Number of people who require social care (or total attributable social care spend) one year after fragility fracture/hip fracture	Fragility fracture	
% of patients recovering to their previous levels of mobility/walking ability at 30 days (CCG OIS, NHS Outcomes Framework)	Fractures	HSCIC Library_of_Quality_Assured_Indicators_08_12_14.xlsx IAP00122
% of patients with hip fracture recovering to their previous levels of mobility/walking ability at 120 days (CCG OIS 3.10, NHS Outcomes Framework)	Fractures	IAP00122
% of individuals with hip fracture developing pressure ulcers	Hip fractures	Ref 129 - NHFD National Report 2013
National Joint Register hip revision rate	Joint replacements	BOA - orthopaedic dashboards - Slides. slide 9
National Hip fracture database Outcome indicators for CCGs	Hip fractures	BOA - orthopaedic dashboards - Slides.pdf slide 14
Royal College Surgeons/London School of Hygiene and Tropical Medicine Clinical Effectiveness Unit Fragility Fractures Indicators (NHFD)	Fragility Fractures	
% of people dying after skull and intracranial injury (Compendium)	Fractures skull & intracranial	
% of individuals being readmitted within 28 days of discharge after having primary hip replacement surgery (Compendium) (132, 133)	Hip replacement	
% of individuals being readmitted within 30 days of discharge after having primary hip replacement surgery National Surgical Commissioning Centre	Hip replacement	http://rcs.methods.co.uk/pet.html
% of individuals with OA with 20% pain reduction within 3 months of a treatment initiation or change (EUMUSC HCQI OA No 11)	Osteoarthritis	Ref 130 - EUMUSC Audit HCQI_OA_1-12
% of people with a musculoskeletal problem who are physically active	All musculoskeletal	
% of individuals with OA with 20% of functional improvement within 3 months of a treatment initiation or change (EUMUSC HCQI OA No 10)	Osteoarthritis	Ref 130 - EUMUSC Audit HCQI_OA_1-12

% of people with a musculoskeletal problem who are obese (or number of people having joint replacement surgery who are obese, as a surrogate)	All musculoskeletal	

Service reported patient ADL/Work outcome measures (SRADL)		
Indicator description	**Musculoskeletal conditions covered**	**Reference**
% of individuals with OA being enabled to work (130) (ICHOM) (EUMUSC HCQI OA No 12)	Osteoarthritis	EUMUSC Audit HCQI_OA_1-12
Percent of people of working age locally who are receiving Employment Support Allowance due to a musculoskeletal problem. Derived from: number of people on Employment Support Allowance/Personal Independence Payment due to a musculoskeletal problem per population with MSK	All Musculoskeletal	
Number of working days lost/fit notes given due to a musculoskeletal problem	All musculoskeletal	
Activities of Daily Living in patients with MSK problems	All musculoskeletal	
The following potential indicators were suggested during the consultation period with experts: % of GPs with specialist training in MSK by General Practice Average length of stay for individuals with hip fracture [Ref please] [Better -use 'L' ratio - Av LOS for Fractured Neck of Femur /Av LOS of patients <65 yrs old (allows for hospital characteristic length of stay)] Expected cases/MSK programme budget spend -comparison between MSK systems Observed number of hip and knee replacements/Expected operation rates (using % prevalent cases estimated to require operation) Number of people on ESA/PIP due to a musculoskeletal problem DWP Number of working days lost/fit notes given due to a musculoskeletal problem % of people with a musculoskeletal problem who are physically active % of people with a musculoskeletal problem who are obese (or number of people having joint replacement surgery who are obese, as a surrogate) % of people with fragility fracture/hip fracture who die within one year Number of people who require social care (or total		

attributable social care spend) one year after fragility fracture/hip fracture Number of people referred to an MSK-outpatient service (AHP, pain clinic, rheumatology) Number of people referred for specialist (medical/AHP) care waiting more than 4 weeks for appointment/treatment (or median waiting time for first appointment) Number of A&E presentations/unplanned hospital admissions due to a primary musculoskeletal problem Total spend on procedures of low clinical value (if can get definitions from BOA) Spend on pain medications (excluding paracetamol, weak opiates) per CCG population. Number of people with a musculoskeletal related problem who state they have a care plan (data from GP Patient Survey) Number of people on a biologic drug for inflammatory arthritis (relevant b/c of very high cost - data should be available at local level) Number of individual funding requests made/granted for a musculoskeletal indication - No. of people at risk of falls who have undertaken an appropriate exercise programme (e.g. Stage or FaME/PSI) - Weighted per capita spend on MSK (this could be based on DH programme budget, general integrated care PREMs from the PIRU evaluation of the integrated care pioneer sites Participation index Number of people who have arthritis or back pain from the GP patient survey Rate of knee arthroscopy in patients aged 60 years and over Accident and Emergency attendances secondary to back pain, per population prevalence of back pain Change in health utility score from baseline to six-months Using Musculoskeletal Health Questionnaire (MSK-HQ)		

MSK Indicators: introduction and commentary

Samanta Adomaviciute, July 2015

MSK INDICATORS PROJECT

1. Introduction

Indicators are explicitly defined as measurable quantitative and qualitative data items, which act as building blocks in the assessment of care. They relate to the structure, process (interpersonal or clinical) or outcomes of care and are used to generate subsequent review criteria and standards which help to operationalize quality indicators (QIs) (1). Outcome indicators can measure mortality, morbidity, health status, health related quality of life, and patient satisfaction. Structural indicators give information on the practice organization (personnel, finances and availability of appointments) whereas process indicators describe actual medical care (diagnoses, treatment, referral, and prescribing) (1, 2). Quality assessment can be used for a variety of purposes, including public accountability, accreditation, quality improvement, and research (3, 4).

Differences in outcome may be due to case mix, data collection, chance or quality of care. In contrast, process measures are more sensitive to differences in the quality of care and they are direct measures of quality. The advantage of the outcome measures is that it can reflect all aspects of care, including the ones that are difficult to measure such as technical expertise and operator skill (5).

A Patient Reported Outcome Measure (PROM) is any measure of the outcome of treatment that is reported directly by patients. This includes post-operative complications, health or functional status, health-related quality of life (HRQL) and satisfaction with the outcome. Most importantly, as with all outcome measures used to evaluate health care, PROMs must be shown to be scientifically robust measuring instruments. This involves a rigorous and systematic assessment of psychometric properties (e.g. reliability, validity, responsiveness). For PROMS that have been shown to be psychometrically robust, practical/operational issues, such as patient burden, costs and clinicians' views about acceptability, then need to be considered (6). Self-reported QI questionnaires have an advantage of being more reliable as patient information and functional assessment might be more accurate compared to the medical records**.**

Generic instruments can be used to measure health-related quality of life (HR-QOL) across a wide spectrum of diseases and conditions (7). Condition-specific instruments clearly have and essential role in the measurement of the aspects most closely related to disease process. However, there is also a need for generic instruments, which capture the overall impact of disease as well as the beneficial and detrimental effects of treatment on the individual (7). Several generic measures have been applied to a variety of patients with lower-extremity musculoskeletal conditions, including the SF-36, the SF-12, the Functional Status Index, and the Musculoskeletal Functional Assessment Questionnaire. The EQ-5D is a two-part instrument. Part 1 records self-reported problems on each of five ‘domains’: mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each domain is divided into three levels of severity corresponding to no problem, some problem and extreme problem. Health measurement is problematic as the boundaries between health and disease are not clear as well as perception of health is highly affected by individual beliefs and attitudes, as well as by social and economic incentives and pressures (7).

It is critical that measures of health status be reliable, valid, and responsive to clinical change that occurs over time (8). **Responsiveness**, as defined by Kirshner and Guyatt, denotes the ability of a scale to detect change (8, 9). **Validity** is an ability of a measure to reflect the change in patients over time (10). The validity of a measure is concerned with whether a measure actually measures what it purports to measure (11). **Reliability** is an estimation of the consistency and stability of a measure. It includes analysis of the extent to which a measure is internally consistent (measured by the intercorrelation of all items) and free from measurement error. Cronbach's α is used to assess the internal consistency. The α values of at least 0.7 are recommended in order to demonstrate internal consistency (12). An intraclass correlation coefficient (ICC2,1) can be used to assess the test–retest reliability. Minimum ICC values of 0.7 are normally considered acceptable, although higher values are required for the use of the score applied at an individual level (11, 13). The minimal clinically important difference (MCID) is defined as the minimal amount of change on the scale required to be considered a clinically important change (8).

Some of the quality indicators assessing process measures were identified in Maclean et al. 2004 review (14, 15). A review on the 'Quality indicators for the primary care of osteoarthritis: a systematic review' identified well-developed, feasible indicators of quality of care for OA which could be implemented in primary care (16). The summary of the indicators from these sources is presented in the table below. Smith et al. (6) report to the Department of Health identified PROMs for hip and knee replacement surgery, which are listed in the table as well.

In 2004 the Arthritis Foundation Quality Indicator Project established a set of measures that could be used to assess the quality of care for patient with OA and RA. Potential quality indicators were constructed as IF-THEN-BECAUSE statements where the IF portion of the statement specified the clinical characteristics that describe persons eligible for the quality indicator, THEN defines the process of care that should or should not be performed; and BECAUSE describes the expected health impact of the process on the specified population. OA and RA identified and validated indicators are presented in the sections below (15).

1. Osteoarthritis

Osteoarthritis refers to a clinical syndrome of joint pain accompanied by varying functional limitation and reduced quality of life. It is the most common form of arthritis, and one of the main causes of pain and disability worldwide. The most commonly affected areas are peripheral joints: knees, hips and small hand joint. OA is characterized pathologically by localized loss of cartilage, remodelling of adjacent bone and associated inflammation (17). International recommendations and standards of care have been developed to improve OA management (3, 18-20). According to the guidelines from the National Institute for Health and Clinical Excellence (NICE) and American Academy of Orthopaedic Surgeons (AAOS) as well as OARSI, self-management, patient education and provision of information, exercise, and weight reduction represent core interventions, whereas other pharmacologic and nonpharmacologic treatments (acetaminophen, NSAIDs), functional assessments, assistive devices, and surgery, are considered adjunct treatments (3, 17, 21). Topical NSAIDs is recommended in NICE and OARSI guidelines as alternative or adjunctive therapy (21, 22). It is recommended that exercise, including local muscle strengthening and general aerobic fitness, should be a core treatment for people with OA. This should not be affected by age, comorbidity, pain severity or disability (17). ICHOM has developed a standard set for hip and knee OA working together with a group of leading physicians, measurement experts and

patients. It is encouraged to use their set outcomes to better understand how to improve the lives of patients. The purpose of these indicators is to monitor effectiveness and improve outcomes for patients through benchmarking and comparative learning. Indicators were assigned to three categories (disease control, acute complications of treatment and patient reported health status) (23, 24). Each category consists of several indicators:

- disease control
    - treatment progression and care utilization
    - need for surgery
    - reoperation or revision
- acute complications of treatment
    - mortality
    - readmissions
- patient reported health status
    - overall satisfaction with result
    - health-related quality of life. It is recommended to track using **EQ-5D-3L or the VR-12/SF-12**
    - work status
    - physical functioning. It is recommended to track via the Knee Injury Osteoarthritis Score – Physical Function Shortform **(KOOS-PS)** and the Hip Disability and Osteoarthritis Outcome Score – Physical Function Shortform **(HOOS-PS)**
    - hip and knee pain. It is recommended to track via the Numeric Pain Rating Scale

EULAR had developed evidence-based recommendations for the management of hip OA. Ten final recommendations were agreed using a Delphi consensus approach. The strength of recommendation was assessed using the traditional A-D grading scale and a visual analogue scale. The propositions are (20):

- Optimal management of hip OA required a combination of non-pharmacological and pharmacological treatment modalities.

- Treatment of hip OA should be tailored according to:

a) Hip risk factors (obesity, adverse mechanical factors, physical activity, dysplasia)
b) General risk factors (age, sex, comorbidity, co-medication)
c) Level of pain intensity, disability, and handicap
d) Location and degree of structural damage
e) Wishes and expectations of the patient

- Non-pharmacological treatment of hip OA should include regular education, exercise, appliances (stick, insoles), and weight reduction if obese or overweight
- Because of its efficacy and safety paracetamol (up to 4g/day) is the oral analgesic of first choice for mild-moderate pain and, if successful, is the preferred long term oral analgesic
- NSAIDs, at the lowest effective dose, should be added or substituted in patient who respond inadequately to paracetamol. In patients with increased gastrointestinal risk, non-selective NSAIDs plus a gastroprotective agent, or a selective COX-2 inhibitor (coxib) should be used.
- Opioid analgesics, with or without paracetamol, are useful alternatives in patients in whom NSAIDs including COX-2 selective inhibitors (coxibs), are contraindicated, ineffective, and/or poorly tolerated.
- SYSADOA (glucosamine suplhate, chondroitin suplhate, diacerhein, avocado soybean unsaponifiable, and hyaluronic acid) have a symptomatic effect and low

toxicity, but effect sizes are small, suitable patient are not well defined, and clinically relevant structure modification and pharmacoeconomic aspects are not well established.
- Intra-articular steroid injections (guided by ultrasound or x-ray) may be considered in patients with a flare that is unresponsive to analgesic and NSAIDs)
- Osteotomy and joint preserving surgical procedures should be considered in young adults with symptomatic hip OA, especially in the presence of dysplasia or varus/valgus deformity
- Joint replacement must be considered in patients with radiographic evidence of hip OA who have refractory pain and disability

2. Back pain

The ICHOM has developed Standard Set for Low Back Pain (LBP) as well (25). Indicators were assigned to three categories (acute complications, disease recurrence, patient reported health status) (25, 26). Each category consists of several indicators:

- Acute complications
    - Major surgical complications. It includes operative mortality, nerve root injury including cauda equina, deep wound infection, pulmonary embolus, wrong site procedure, vascular injury, dural tear, other, and need for re-hospitalisation.
- Disease reoccurrence
    - Need for operation
- Patient reported health status
    - Need for pain medications
    - Disability. It can be tracked via the Oswestry Disability Index (**ODI)**
    - Work status
    - Back and leg pain. It can be accessed via the Numeric Pain Rating Scale (**NPRS)**
    - Health-related quality of life. Similarly, as for OA this can be tracked using EuroQol-5D (**EQ-5D**)

3. Rheumatoid arthritis

Rheumatoid arthritis (RA) is a chronic, disabling auto-immune disease characterised by inflammation in the peripheral joints, which causes swelling, stiffness, pain and progressive joint destruction. Although the confirmation of diagnosis and initiation of treatment may take place in secondary care, primary care has an important role to play in the management of RA. This may include checking cardiovascular risk and blood pressure, checking the person's risk for osteoporosis and assessing for signs of low mood or depression. An annual face-to-face review in primary care is an opportunity to assess the effect of the disease upon the person’s life, for example side effects to medication and whether they would benefit from any referrals to the multi-disciplinary team (27).

Functional disability is an outcome in RA that is modifiable with good medical care and is therefore important QI (4). The Disability Index of the Health Assessment Questionnaire (**HAQ-DI**) or similar tools have been recommended as useful tools that are robust as composite measures (4). NICE guidance recommends to assess disease activity and damage, and measure functional ability (using, for example, the **Health Assessment Questionnaire [HAQ]**) (28).

Maclean et al. (2004) review identified the following process quality indicators for RA, which are presented in the table.

EULAR recommendations for patients with inflammatory arthritis, confined to RA, AS and psoriatic arthritis (PsA) (29) :

- Patient education as an integral part of standard care.
- Patient education throughout the course of the disease. Timely patient education is very important as the individual patient's needs vary depending on the disease stage, their physical and psychological condition.
- The content and deliver of patient education should be individually tailored and needs-based for people with inflammatory arthritis. Zangi et al. 2015 systematic review identified educational needs such as knowledge and management of the disease, knowledge of side effects and risk factors, nonpharmacological treatment, pain control and self-help methods, as well as activity regulation, physical exercises and behaviour change.
- Patient education in inflammatory arthritis should include individual and/or group sessions, which can be provided through face-to-face or online interactions, and supplemented by phone calls, written or multimedia material. A number of studies identified very positive effects such as improved adherence to medication, pain and self-management behaviours, levels of physical activity and many more.
- Patient education programmes in inflammatory arthritis should have a theoretical framework and be evidence-based, such as self-management, cognitive behavioural therapy or stress management.
- The effectiveness of patient education in inflammatory arthritis should be evaluated and outcomes used must reflect the objectives of the patient education programme.
- Patient education in inflammatory arthritis should be delivered by competent health professionals and/or by trained patient, if appropriate, in a multidisciplinary team.
- Providers of patient education in inflammatory arthritis should have access to and undertake specific training in order to obtain and maintain knowledge and skills.

4. Fractures

Fractures in people over the age of 65, especially pertrochanteric fractures of the fermur, present a growing medical problem. Patient mortality was used as an indicator of treatment quality in District of Orthopaedic and Trauma Surgery in Piekary Slaskei to compare mortality rates over 15 years (30). Mortality from accidental falls is measured at CCG level (HES online data) and published in the report 'SPOT Quadrant Analysis'.

5. Juvenile arthritis

A chronic illness, such as Juvenile Idiopathic Arthritis (JIA), has an impact on the whole family, especially on parents caring for the child. Haverman et al. 2014 web based survey identified that JIA parents showed worse HRQOL than parents of healthy children. Parents of children with active arthritis showed worse HRQOL regarding daily activities ($p<.05$), cognitive functioning ($p<.01$) and depressive emotions ($p<.05$) compared to parents of children without active arthritis. The only differences we found were that parents of a child with JIA scored worse on 'fine motor functioning' and better on 'social functioning'. These results are in line with some previous research regarding HRQOL of parents of a child with JIA. The normal levels of HRQOL might be explained by the multidisciplinary therapeutic approach in children with JIA and good education of the parents regarding the course and outcome of the illness. So, while caring for their child is the first priority, parent's

potential burden should be recognized, as well as their stress levels and reactions to the uncontrollable aspects of the illness. To improve the care for children with JIA, more attention should be paid to research on the parents (31).

Indicator	Description	MSK Clinical area	Usefulness in practice	Technical quality	Practical Quality
PROM: The Western Ontario and McMaster Osteoarthritis Index (WOMAC ™) (6, 32)	The *Western Ontario and McMaster Osteoarthritis Index (WOMAC ™)* consists of 24 items that reflect three areas of disability of the hip or knee (physical function, pain and stiffness). The measure is self-reported and was originally developed in Canadian English for use with osteoarthritis patients, but has subsequently been evaluated with hip and knee replacement patients (6). The pain category assesses pain elicited during activities of daily living (ADL), while the stiffness category assesses the amount of stiffness elicited after staying in certain positions and the time of day it is experienced. The physical function category measures the patients' ability to perform certain activities including; going from sit to stand, walking, stair negotiation, putting on socks, etc. WOMAC is scaled using either a 1-cm visual analogue scale (VAS), or 5 point Likert Scale (0-4). Higher scores represent greater problems with pain and function (6, 32).	Osteoarthritis patients, but has subsequently been evaluated with hip and knee replacement patients (6). It is the current standard in patient-reported measures of function in patient with knee OA (32).	The WOMAC index has been used as the main outcome in evaluation of pharmacological (33) and surgical trials (34, 35), as well as observational studies (36-38). OARSI response criteria for a trials are based largely on the WOMAC index (39).	Documented as reliable, valid and responsive to change in patients with hip and knee OA (32, 38, 40-43). **Reliability:** High internal consistency has been reported for hip and knee replacement patients (alpha >0.8 and item-total correlations >0.53 for knee replacement patients and >0.47 for hip replacement patients) (42, 44, 45). Test-retest was found to be acceptable amongst hip and knee replacement patients (ICC >0.7), except for the stiffness sub-scale (ICC 0.43) (6). **Validity:** Construct validity (within scales) has been demonstrated with knee replacement patients (mean inter-scale correlations = 0.71, compared with 0.50 for SF-36) and also with a combined sample of hip and knee replacement patients (inter-scale correlations 0.55-0.98) (45). Construct validity (convergent) has been evaluated with *WOMAC ™*. Several studies have compared *WOMAC ™* with clinical measures, including clinician-rated function, stiffness and pain (46), gait (47), knee movement (48, 49), walking (48, 49). Clinician rated function and pain are highly associated with *WOMAC ™* function and pain scales respectively (49) **Responsiveness** of *WOMAC ™* has been demonstrated for both hip and knee replacement patients (6).	**Usability:** WOMAC is the current standard disease specific instrument for knee and hip OA. WOMAC is the best validated and most widely used outcome measure in subjects with hip or knee OA (38, 40).
PROM:	The Vigour Assessment Instrument measures post-operative vigour in total joint	Hip and knee replacement (6)			

The Vigour Assessment Instrument (6)	arthroplasty patients, including hip and knee replacement (6).				
PROM: The Total Hip Arthroplasty Outcome Evaluation Questionnaire (6)	The *Total Hip Arthroplasty Outcome Evaluation Questionnaire* has separate versions for baseline (15 items administered pre-operatively), history (26 items administered both pre- and post-operatively) and post-operative (13 items administered after surgery) (6).	Hip and knee replacement (6).			
PROM: The Knee injury and Osteoarthritis Outcome Score Physical function Short-form (KOOS-PS (23)	The Knee Injury and Osteoarthritis Outcome Score (KOOS) is self-administered and assesses five outcomes: pain, symptoms, activities of daily living, sport and recreation function, and knee-related quality of life**.** **The KOOS-PS is parsimonious, valid and responsive for evaluating physical function in total knee replacements (50).**	Knee replacements	**Usefulness:** "The technical and practical quality of these indicators is high, they have gone through a robust literature review and Delphi process of experts,[1] methodologists and patients in the field in order to define, standardize and prioritize the tools, timing and definitions of each of the indicators selected. In addition, a set of case mix variables was also identified in order to allow for risk adjustment when comparing outcomes. All the tools are validated, sensitive and specific as these are clear criteria when choosing how to capture each outcome or risk factor. All the indicators can be modified and are practical to collect. All our indicators are public domain and I have attached both the full data dictionary and flyers for our outcome sets for you to review *(please note the OA guide is still being finalised and*	**Reliability:** It was assessed by ICCs as KOOS-PS, 0.66 (0.52, 0.77) (13). As assessed by Cronbach's alpha, the internal consistency of the KOOS-PS was 0.89 confirming that the measures represented a homogenous construct (for patients after knee replacement surgery) (50). **Validity:** The correlation coefficients for the tests of construct validity were highest with the WOMAC pain subscale, ranging from 0.73-0.80. In contrast, the correlations for all PF measures with fatigue, CPG and depression subscales are moderate ranging from 0.42-0.66. For anxiety, the correlation was lower 0.38. The PF measures correlated with the given constructs (i.e., each of WOMAC pain, fatigue, the CPG, anxiety and depression) within 0.10. (50)	

[1] https://en.wikipedia.org/wiki/Delphi_method

			is not for full public distribution at present), so that you are aware of how they were funded (Charitable non-industry donations) and who was involved in the research for each set." By Claude Pinnock from ICHOM (51). **Strengths:** ICHOM recommends to track physical functioning for individuals with knee OA using KOOS-PS (23). Recent efforts by two leading organizations, the Osteoarthritis Research Society International (OARSI) and Outcome Measures in Rheumatology Clinical Trials (OMERACT) (37, 52) have led to the development of new pain and function assessments for osteoarthritis (OA). These include the intermittent and constant osteoarthritis pain (ICOAP) score (53) and short forms of two validated function scales- the Hip disability and Osteoarthritis Outcome Score Physical function Short-form (HOOS-PS) and the Knee injury and Osteoarthritis Outcome Score Physical function Short-form (KOOS-PS) (50, 54, 55).		
PROM: The Hip disability and Osteoarthritis Outcome Score Physical function Short-form (HOOS-PS) (23)	HOOS consists of 5 subscales: pain, other symptoms, function in activities of daily living (ADL), and function in sport and recreation (Sport/Rec), and hip-related quality of life (QOL). The HOOS is an extension of the WOMAC and is suggested to be valuable for younger and more	Hip replacements	**Usability:** The HOOS has been used in subjects with hip disability with or without hip osteoarthritis, and in patients with hip OA pre- and postoperative total hip replacement (THR)(54, 56, 59, 60).	**Reliability:** HOOS has been used in patients ages 42– 89 years, including subjects with hip OA treated by medication only, subjects eligible for THR and postoperatively. The internal consistency ranged from 0.82 to 0.98 (Cronbach's alpha coefficient) in the different studies with the highest value in the ADL subscale	**Cost:** The HOOS can be obtained for no cost at: www.koos.nu. **Respondent burden:** The HOOS questionnaire takes _10–15 minutes to complete. **Administrative burden:** No administration burden; time to score by hand takes 10–15

	active people due to added subscales. The HOOS has been included in 2 systematic reviews concerning psychometric evaluations of questionnaires assessing hip OA and yielded positive findings. The HOOS needs further psychometric testing in different cultures and in different groups of patients with hip disabilities (56-58). **The HOOS-PS is parsimonious, valid and responsive for evaluating physical function in total hip replacements (50).**		**Strengths:** ICHOM recommends to track physical functioning for individuals with hip OA using HOOS-PS (23). Recent efforts by two leading organizations, the Osteoarthritis Research Society International (OARSI) and Outcome Measures in Rheumatology Clinical Trials (OMERACT) (37, 52, 56). have led to the development of new pain and function assessments for osteoarthritis (OA). These include the intermittent and constant osteoarthritis pain (ICOAP) score (53) and short forms of two validated function scales- the Hip disability and Osteoarthritis Outcome Score Physical function Short-form (HOOS-PS) and the Knee injury and Osteoarthritis Outcome Score Physical function Short-form (KOOS-PS) (50, 54, 55).	(0.94 – 0.98), which might indicate a redundancy of items. HOOS has high test–retest reproducibility, with the intra- class correlation coefficient ranging from 0.75 to 0.97 in the validation studies (56, 59, 61, 62). It was assessed by ICCs as HOOS-PS, 0.82 (0.66, 0.91) (13). As assessed by Cronbach's alpha, the internal consistency of the HOOS-PS was 0.79 confirming that the measures represented a homogenous construct (for patients after knee replacement surgery) (50). **Validity:** The correlation coefficients for the tests of construct validity were highest with the WOMAC pain subscale, ranging from 0.70-0.80. In contrast, the correlations for all PF measures with fatigue, CPG and depression subscales are moderate ranging from 0.33-0.62. For anxiety, the correlation was lower 0.19. The PF measures correlated with the given constructs (i.e., each of WOMAC pain, fatigue, the CPG, anxiety and depression) within 0.10. (50) HOOS has been validated in 2 slightly different versions, LK 1.1 and LK 2.0 (12,13). The LK 2.0 version is available on line at www.koos.nu. HOOS includes Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) LK 3.0 (14) in its complete and original format (with permission), and WOMAC scores can be calculated. In 2008, a 5-item measure of physical function, the HOOS-PS, was published derived from the HOOS questionnaire by	minutes. No training is necessary. Computer scoring by using the Excel file only takes 2 or 3 minutes (entering of data).

				item-response theory to elicit patients' opinions about difficulties experienced due to hip problems. HOOS construct validity has been tested by comparing it with the Short Form 36, the Oxford Hip Score, the Lequesne Index, and the visual analog scale for pain, and predetermined hypotheses were confirmed (56, 60-62). **Responsiveness:** HOOS responsiveness has been determined in 1 Swedish and in 1 French study (n _ 90 and n _ 30, respectively) after THR. The standardised response mean ranged from 1.29–3.24. Younger patients (age _66 years) showed larger responsiveness in all subscales compared with older subjects. In the French sample, the effect size ranged from 1.97 (QOL subscale) to 3.24 (pain subscale). The smallest detectable difference of the HOOS ranged from 9.6 for the ADL subscale to 16.2 for the QOL subscale. (56, 60, 62)	
PROM: The Oxford Knee Score (OKS) (6)(ref-spot analysis)	The *Oxford Knee Score (OKS)* consists of 12 items describing experience and problems associated with knee replacement. It is a self-administered measure that was developed in English for	Knee replacement	The Oxford Knee Score (OKS) is a widely-used patient-reported outcome measure (PROM), originally developed in 1998, to be used in clinical trials for assessing the patient-perceived	**Reliability:** The OKS has adequate internal consistency across multiple languages (63, 67). The original study reported adequate test–retest	**Respondent burden:** Reported to involve minimal respondent burden (63, 68). It takes approximately 5–10 minutes to complete the questionnaire. No training or

	use with total knee replacement patients (6). Each item is followed by 5 responses (scores ranging from 1–5), where 1 =best and 5 =worst outcomes. The modified version also has 5 responses to each item, but the scoring is from 0 – 4, where 0 =worst and 4 =best outcome (63). Likert responses are recommended to be scored from 0 to 4, which are summed to produce a summary score of 0 (worst) to 48 (best)(11) . **Usability:** Psychometric testing suggests that the OKS is sufficiently reliable for use in individuals with knee OA. The ease of administration and scoring makes it a useful tool for clinical use. However, clinicians should be aware that some patients may require explanation of individual items, which could introduce interviewer bias (63). OKS is a self-administered questionnaire developed to measure outcome following TKR. Due to simplicity and ease of administering, it has been used widely, especially in the UK, and is available in languages other than English. For the same reasons, it can be used as a cost-effective screening tool in short-term (less than 2 years) follow-up of TKR compared to physician administered instruments, such as the American Knee Society Score, as reported by 1 study (63) (64). **Weaknesses:** Although simple, some items are "double barrelled" and may be confusing to patients (e.g., trouble getting in and out of a car or using public transportation). Some response		outcomes of knee replacement surgery. In this form, it has proven to be reliable, valid and responsive. The remit of OKS was extended in 2009 when it was adopted by the National Health Service (NHS) PROMs Programme in England and Wales as a primary outcome measure for knee replacement surgery. (65). Thus, OKS data are now collected on all patients undergoing knee replacement surgery preoperatively and at 6 months' post-operation, in order to monitor and benchmark the performance of health providers (11, 66). Harris et al. 2013 study obtained evidence that supports the use of OKS and its pain and functional subscales in patients who are undergoing non-operative management for their knee. When used with patients in this context, OKS has demonstrated evidence of validity, reliability and responsiveness in measuring the state of health of individuals. The measure could be used in clinical practice to monitor disease progression in individual patients undergoing non-operative management for their knee OA or for hospital audit where the information from groups of patients is analysed to assess the effectiveness of current patient management pathways for treating OA in terms of health gain/deterioration (11).	reliability for use in groups and individuals (63, 68). **Validity:** *Face and content validity*. Extensive input from patients in the development of the OKS ensures content validity. *Construct validity.* The OKS shows good correlation with knee-specific and general health questionnaires, such as the Western Ontario and McMaster Universities Osteoarthritis Index, American Knee Society Score, Knee Outcome Survey Activities of Daily Living Scale, and pain and physical function components of the Short Form 36 and Health Assessment Questionnaire (63, 68). Convergent and divergent construct validity is demonstrated by higher correlations with the Short Form 12 physical than mental component (63, 69). **Responsiveness:** The OKS demonstrates good sensitivity and responsiveness to change. Large effect sizes have been reported 6–12 months after TKR (63, 67, 70). The OKS has also been found to be a good predictor of revision TKR within 6 months (63, 71) The minimum clinically important difference (MCID) and patient-acceptable symptom state have not been reported.	assistance is required since the questions are self-explanatory. **Administrative burden:** Scoring is simple and quick (63, 68). Calculation of the total score takes 1–5 minutes. No training is necessary.

	options potentially overlap with others, which may also cause confusion. The use of an aggregate score combining pain and function may mask changes in 1 domain, particularly given that only 1 of the 12 items relates solely to pain(63).				
PROM: The *Oxford Hip Score (OHS)* (6, 56)	The *Oxford Hip Score (OHS)* consists of 12 items describing symptoms related to hip replacement. It is a self-administered measure that was developed in English for use with total hip replacement patients (6). It is used to assess outcome after total hip replacement (THR) by measuring patients' perceptions in adjunction to surgery. The original version from 1996 (67) was updated in 2007 introducing a new scoring system (56, 72).	Hip OA	**Usability:** Designed for assessment of joint replacement and has been used in several countries in large registry studies. Has also been validated and used in revision hip replacement (56, 73, 74). **Strengths:** The OHS assesses pain and function out- comes in patients undergoing hip replacement. It has shown acceptable to excellent psychometric properties and has been reported to be a useful predictor of early revision after THR (56). **Weaknesses:** Like many of these questionnaires, the OHS has a few double-barreled questions that can be a problem to the patient. Questions have also been raised about the lack of items concerning activities requiring a large angle of hip flexion, as well as aids and medication; this information has to be addressed by other means. (56).	**Reliability.** Internal consistency was measured in patients pre- and post-surgery; Cronbach's alpha varied between 0.84 – 0.93 (3, 6, 12, and 24 months) (67, 75). Reproducibility was measured by the coefficient of repeat- ability according to the method of Bland and Altman, and found to be acceptable (56, 67). **Validity:** Developing the OHS, patients were asked to comment on and to include hip-related problems not ad- dressed by the questionnaire for content validity (67). No hypotheses prior to analysis were provided measuring construct validity. Higher correlations to measures of pain and function than to psychological measures have been established. High correlation (rs _ 0.7, *P* _ 0.001) was found between OHS and the HHS in THR patients (67). **Responsiveness:** OHS had greater responsiveness compared with generic measures (Short Form 36 and EuroQol 5-domain) and the disease-specific measures, the Western Ontario and McMaster Universities Osteoarthritis Index and the Arthritis Impact Measurement Scales. Effect size of the OHS varied between 2.38 –3.1	**Respondent burden.** The OHS takes between 2–15 minutes to complete. Based on patient interviews, there were issues raised concerning item clarity and double-barreled questions (77, 78). **Administrative burden.** The OHS is a patient-reported questionnaire. Time to score is short, just sum items up. No training to score is necessary (56).

				at 6 –24 months after THR and was 1.84 at 6 months after revision surgery (76). According to Murray et al, the minimum clinically important difference can be expected to be between 3–5 points concerning joint replacement, but work is in progress (56, 72).	
PROM: The McKnee System (6)	The *McKnee System* is an adaptation of the Health Utilities Index (HUI) (Feeny 1995) and consists of 8 dimensions (vision, hearing, speech, mobility, dexterity, emotion, cognition and pain). The measure was developed in English, is interviewer administered and was designed for use with knee replacement patients (6).				
PROM: The *Mayo Scale* (6)	The *Mayo Scale* consists of 7 items describing pain, function, mobility and strength. It is a self-report measure, developed in US English for use with hip and knee replacement patients, which was very widely used from 1969-1994 (6).				
PROM: The Lower Extremity Functional Scale (LEFS) (6, 8, 32, 79)	The Lower Extremity Functional Scale (LEFS) consists of 20 items describing lower limb function. LEFS is designed to assess the degree of 'difficulty' of specific functional tasks. It uses a 5-point Likert like scale (0 being extreme difficulty and 4 being no difficulty).	Patients with a variety of lower extremity disorders, including knee OA (8, 32). Patient undergoing hip		It has been found to be reliable, valid, and responsive in multiple populations with lower extremity dysfunction (8, 80) as well as in individuals with knee OA (32). **Reliability.** Test-retest reliability of the LEFS scores was excellent (R=0.94, lower 95% CI=0.89).	It is a self-reported measure that is reported to take 2 minutes to complete (6).

	Overall the higher LEFS score represents better function (32).	and knee replacement (6)		**Validity.** The LEFS is reliable, and construct validity was supported by comparison with the SF-36 (8).	
PROM: The *Hip Rating Scale* (6)	The *Hip Rating Scale* consists of 14 items, which describe hip function. It is a self-reported measure and was developed in US English for use with patients with arthritis of the hip, though it has been validated with hip replacement patients (6).	Hip OA and hip replacement (6)			
PROM: The Health Assessment Questionnaire (HAQ) (6)	The *Health Assessment Questionnaire (HAQ)* consists of 45 items that describe functional ability, pain and illness affect (6). Functional disability is an outcome in RA that is modifiable with good medical care and is therefore important QI (4). The Disability Index of the Health Assessment Questionnaire (**HAQ-DI**) or similar tools have been recommended as useful tools that are robust as composite measures (4).	Back pain, RA	**Strengths:** NICE guidance recommends to assess disease activity and damage, and measure functional ability (using, for example, the **Health Assessment Questionnaire [HAQ]**) (28). **Weaknesses:** There are several reasons why HAQ-DI has not become popular. Firstly, there is lack of understanding of the significance of its numerical value. Secondly, it has been mainly been used in clinical trials and other studies to measure change in functional capacity rather than status of functional capacity (4). In the report authors created disability 'growth curves'(4).		
PROM: The *Harris Hip Score* (6, 56).	The HHS was developed for the assessment of the results of hip surgery, and is intended to evaluate various hip disabilities and methods of treatment in an adult population. The original version was published 1969. The HHS is a clinician- based outcome measure administered by a qualified health care professional,	Hip replacements	**Strengths:** The HHS is widely used throughout the world for evaluating outcome after THR. The indication for THR is particularly pain and impaired physical function, which are the 2 dominating domains in HHS. The HHS has also been proven appropriate to measure outcome after interventions such as	**Reliability:** Cronbach's alpha coefficient showed high internal consistency reliability except for deformity, which could not be calculated. The test–retest interval was 3 to 4 weeks. The total score reliability was excellent for physicians (r=0.94) and physiotherapists (r =0.95). The interrater correlations were good to	**Administrative burden:** It takes 5 minutes to complete. No formal training is necessary. Data calculating can be performed automatically during data processing using computer-based algorithms (56).

	such as a physician or a physical therapist (56). The *Harris Hip Score* was originally developed as a clinician-reported measure, but has been modified for self-report. The self-report version consists of 7 items relating to pain, support for walking, limping, walking distance, climbing stairs, putting on shoes and socks and sitting (6).		physical therapy and femoral neck fractures (56). **Weaknesses:** There are unacceptable ceiling effects that severely limit its validity (56).	excellent (0.74 – 1.0) for the domain scores in So¨derman's study, as well as in study by Kirmit et al. (56, 81, 82) **Validity:** The HHS content validity has been tested by directly comparing HHS, the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), and the Short Form 36 (SF-36). No major differences between the scores were seen (56, 81) **Responsiveness:** HHS responsiveness has been determined in a study of 335 THRs. The effect size be- tween preoperative and 6-months postoperative was excellent for pain (2.80) and function (1.72), but weak in the 2-years follow-up, i.e., pain (0.15) and function (0.18) (56, 83).	
PROM: SF-6D		RA		The SF-6D has been shown to be capable of detecting some degree of change in RA patients (10, 84) (85)	SF-6D is more responsive to improvement in health. It did not respond well to deterioration in patients with established severe RA (Effect Size (ES) and Standardised Response Rate Mean (SEM) 0.08. Use of the SF-6D in patient with severe progressive disease may be inappropriate. It has only UK preference weights. The advantage of this instrument is that it can be calculated from both SF-36 and SF-12, which have been routinely

					collected in numerous studies (10)
PROM: SF-12 (23)		Patients with back pain (86). OA and RA (87)	**Strengths.** ICHOM recommends to track health-related quality of life for individuals with hip or knee OA using SF-12 (23). Because the SF-12 v2 is brief and measures various aspects of health status, it has become the instrument of choice in population health surveys and in clinical studies that combine it with disease-specific instruments (88). The short form 12-item survey demonstrated good internal consistency reliability, construct validity, and responsiveness in patients with back pain (86).	The SF-12 appears to be a psychometrically sound tool for the assessment of HRQoL in OA and RA patients (87). **Reliability:** The two summary scales of the short form 12-item survey, physical component summary and mental component summary, demonstrated internal consistency reliability, with Cronbach alpha for both scales exceeding the recommended level of 0.70 (86). **Validity:** Correlation of physical component summary and mental component summary with six other measures theoretically related or unrelated to these scales performed as expected without exception, demonstrating the construct validity of the short form 12-item survey (86). **Responsiveness:** It was supported by several pieces of evidence for patients with back pain. First, the changes in physical component summary and mental component summary scores were correlated with the changes in back pain intensity. Second, for patients whose back pain improved, there was a significant increase in the follow-up physical component summary and mental component summary scores as compared to the baseline. Third, small to moderate effect size was observed for patients whose back pain became improved or became worse (86) .	
PROM:			**Strengths**. The ICHOM has developed Standard Set for Low Back Pain (LBP) as well. It		

Oswestry Disability Index (ODI) (26)		Low back pain (26)	recommends to track disability using ODI (25).		
PROM: OA-QI questionnaire (3).	The OA-QI questionnaire for patient self-reported quality of OA care was developed by an expert group through a process of a literature search. The OA-QI questionnaire contains 17 items related to patient education and information, regular provider assessments, referrals and pharmacologic treatment. The questionnaire was developed in Norway using published QIs, expert panels and patient interviews, and was tested for reliability and validity in a Norwegian OA cohort. (3).	OA of hip and knee	**Usability:** It assesses both the pharmacological and non-pharmacological aspects of OA treatment. It was used to assess hip and knee OA management in primary healthcare in a Norwegian county. A cross-sectional survey in six general practices in the county of Nord-Trondelag in Norway was done. OA-QI summary pass rates were calculated, in which the numerator represents the number with indicators passed and the denominator represents the total number of eligible persons. Associations with summary pass rates were explored with demographic, disease related and health care related factors as independent variables (89).	**Validity.** Support for content validity was confirmed by two patient research partners and two expert panels. All ten predefined hypotheses relating to construct validity were confirmed. **Reliability.** Test-retest Kappa coefficients ranged from 0.20-0.80 and the percent of exact agreement from 62-90% (89).	
PROM: Numeric Pain Rating Scale (NPRS) (26)		Low back pain (26)	**Strengths**. The ICHOM has developed Standard Set for Low Back Pain (LBP) as well. It recommends to track back and leg pain using NPRS (25).		
PROM: Knee Outcome Survey-Activities of Daily Living Scale (ADLS) (32)	Knee Outcome Survey-Activities of Daily Living Scale (ADLS) is a 14-item knee specific patient-reported measure that can be used to assess functional status in patients with a variety of knee disorders, including knee OA (32, 90, 91). Questions are aimed at identifying limitations in daily activity imposed by symptoms such as pain, swelling, and instability (6 questions), and difficulty performing functional activities	Knee OA		It has been shown to be reliable, valid, and responsive in patients with a variety of knee conditions, including knee OA, (90, 92) as well as in individuals with knee OA (32).	

	such as walking, going up and down stairs and raising form a chair (8 questions). The range for ADLS score is 0-100 and higher scores represent better function (32).				
PROM: Intermittent and constant osteoarthritis pain (ICOAP) score (13)	Recent efforts by two leading organizations, the Osteoarthritis Research Society International (OARSI) and Outcome Measures in Rheumatology Clinical Trials (OMERACT) (37, 52) have led to the development of new pain and function assessments for osteoarthritis (OA). These include the intermittent and constant osteoarthritis pain (ICOAP) score (53) and short forms of two validated function scales- the Hip disability and Osteoarthritis Outcome Score Physical function Short-form (HOOS-PS) and the Knee injury and Osteoarthritis Outcome Score Physical function Short-form (KOOS-PS) (50, 54, 55).	Hip and knee OA (13)		**Reliability.** It was assessed by ICC as ICOAP pain scale, 0.63 (0.48, 0.74) in patients with knee arthritis, and 0.86 (0.73, 0.93) for hip arthritis (13).	
PROM: Health related quality of life (via VR-12) (ICHOM)	The Veterans RAND 12 Item Health Survey (VR-12) is a brief, generic, multi-use, self-administered health survey comprised of 12 items. The instrument is primarily used to measure health related quality of life, to estimate disease burden and to evaluate disease-specific benchmarks with other populations. The 12 items in the questionnaire correspond to eight principal physical and mental health domains including *general health perceptions; physical functioning; role limitations due to physical and emotional problems; bodily pain; energy-fatigue, social functioning and mental health.* The	Hip and knee OA	**Usability:** The VR-12 has been administered in national VA surveys in 1997 and 1998 to over 60,000 patients. Since 2002, the VA has administered the VR-12 to approximately 432,000 patients annually as part of its quality management program (Survey of Health Experiences of Patients, SHEP). As of spring 2006, the US Centres for Medicare and Medicaid Studies (CMS) has been administering the VR-12 to Medicare enrolees as part of the Medicare Health Outcomes Survey (Medicare HOS 2.0), designed to monitor the quality of care in Medicare Advantage		

	12 items are summarized into two scores, a “Physical Health Summary Measure PCS-physical component score” and a “Mental Health Summary Measure MCS-mental component score”. These provide an important contrast between physical and psychological health status. The VR-12 was developed using extensive research and normative data from the VR-36 in the VHA. It consists of the 12 most important items from the VR-36 for construction of the physical and mental component summary scales. The 12 items in the VR-12 explain a great deal of the variability in the VR-36. Such applications using the VR-12 have been widely published for medication studies in those diagnosed with hypertension, osteoarthritis, low back pain, depression, and schizophrenia (93).		Plans (MAP) (Kazis et al 2004 4). The VR-12 has been included in HEDIS 2007 (Health Plan Employer Data and Information Set), as part of the performance measurement data set most widely used and disseminated in the managed care industry. When administered to a patient population in time, the VR-12 provides a reliable and valid measure of health status and case mix adjustment. It has been an important source, for the office of Quality and Performance at the VHA, to monitor the process and outcomes of care at the program and system levels. Similarly, CMS uses the VR-12 to assess the physical and mental health functioning of its enrolees and to generate information for payment adjustments (93). **Strengths:** ICHOM recommends to track health-related quality of life for individuals with hip or knee OA using VR-12 (23, 24).		
PROM: EQ-5D	The EuroQol (EQ-5D) generic health index compromises a five-part questionnaire and a visual analogue self-rating scale (7). It is an instrument that allows interventions for a range of different diseases and specialties to be assessed on a standard scale.	Hip and knee replacement, RA, back pain (26, 94)	**Usefulness:** “The technical and practical quality of these indicators is high, they have gone through a robust literature review and Delphi process of experts,[2] methodologists and patients in the field in order to define, standardize and prioritize the tools, timing and definitions of each of the indicators selected. In addition, a set of case mix variables was also identified in order to allow for risk	The validity, reliability and responsiveness of EQ-5D were tested in 233 patient with RA stratified by functional class (7). **Validity.** It is one of the most extensively validated measures for use in patients with RA (10, 95). Validity has been observed for patients with low back pain as well. Pearson correlation coefficients between the EQ-5D and RMDQ, PDI, and NRS were calculated to test the criterion validity.	**Strengths.** The EQ-5D has a number of country-specific choice-based preference weights (eg. UK, USA). NICE currently suggests that it as the most appropriate measure but it might not be suitable in all circumstances (10). EQ-5D can be predicted from summary HAQ and pain scores. However, it is only appropriate if suitable statistical methods are

[2] https://en.wikipedia.org/wiki/Delphi_method

			adjustment when comparing outcomes. All the tools are validated, sensitive and specific as these are clear criteria when choosing how to capture each outcome or risk factor. All the indicators can be modified and are practical to collect. All our indicators are public domain and I have attached both the full data dictionary and flyers for our outcome sets for you to review *(please note the OA guide is still being finalised and is not for full public distribution at present), so that you are aware of how they were funded (Charitable non-industry donations) and who was involved in the research for each set."* By Claude Pinnock from ICHOM (51)	Correlations were interpreted based on predefined criteria. Correlations between EQ-5D and criterion measures ranged between 0.39 and 0.59 and were considered moderate to good (94). **Responsiveness.** The EQ-5D has been shown to detect some degree of change in RA patients (7, 10, 84). It is more responsive to deterioration (10). . Responsiveness of the EQ-5D for patients with chronic low back pain was calculated with area under the receiver operating characteristics (ROC) curve. Areas under the ROC curve ranged from 0.59 to 0.72 depending on the external criterion and EQ-5D subscale (94). **Reliability.** EQ-5D demonstrated moderate to high correlations with measures of impairment and high correlations with disability measures (7). Hurst et al. study provided good empirical evidence that the unweighted EQ-5D domains and cover dimensions of health which are regarded as relevant to patients with arthritis. This was demonstrated by a highly significant relationship between unweighted patient responses on three of the EQ-5D domains and their scores on relevant condition-specific measures. (7)	applied. Linear models underestimate the quality-adjusted life year benefits, cost-effectiveness of therapies. The bespoke mixture model approach outlined in Alava et al. (2013) overcomes this problem (96). ICHOM recommends to track health-related quality of life for hip and knee OA patients using EQ-5D (23, 24). Moreover, the ICHOM has developed Standard Set for Low Back Pain (LBP) as well and recommends to track health-related quality of life via EQ-5D (25). Prospective study carried out in a multi-specialist Spine Centre in the Netherlands found EQ-5D a valid and responsive QOL scale in patients with chronic low back pain (94). **Weaknesses.** However, some patients with severe long-standing disease had health states which attracted utility values below zero which from a societal perspective will be regarded as being in states 'worse than death''(7). With this caveat, EQ-5D is simple to use, valid, responsive to change and sufficiently reliable for group comparisons (7).
PROM: Bristol Rheumatoid Arthritis Fatigue scales (BRAFs)	Bristol Rheumatoid Arthritis Fatigue scales (BRAFs) which are used to capture the fatigue experience and were rigorously developed with input from patients (97). The Multi-Dimensional Questionnaire (BRAF-MDQ) is a 20-item questionnaire and has a global score and four subscales	RA		**Reliability** is when an instrument yields similar results on repeated applications when the concept being measured has not changed (97). The time between the two completions must be carefully chosen as it needs to be sufficiently long that participants wouldn't be able to simply recall their previous	**Strengths:** Dures et al. (2013) study showed that BRAFs are reliable when the patient's condition does not change, and sensitive, when it does (97). The BRAFs performance was well as three of the existing

	(Physical, Fatigue, Living with Fatigue, Cognitive Fatigue and Emotional Fatigue), while three numerical rating scales (BRAF-NRS measure fatigue Severity, Effect and Coping (2, 97)			answers, yet short enough to minimize the possibility that the concept being measured has meaningfully changed (97). **Sensitivity** to change is when a PROM is responsive or able to detect meaningful change over time in the concept being measured such as after an effective intervention (97). **A minimum clinically important difference (MCID)** is the smallest amount of change in a particular PROM that reflects a meaningful change for the patient (97). This can be calculated either by comparing the change in the PROM with the change determined by either the transition question that asks patients whether they consider their symptom to be better, the same or worse or with change in a related concept such as pain (97). A strong correlation between the first questionnaire pack and the second questionnaire pack for the BRAFs: BRAF-MDQ global (r=0.95), each of the four BRAF-MDQ subscales (r=0.89-0.94), BRAF-NRS Severity (r=0.92) and BRAF-NRS Effect (r-0.85) (97).	comparator fatigue PROMs and better than the SF-36 vitality subscale (97).
PROM: Arthritis Impact Measurement Scales 2 (AIMS2) (98). A short version is available as well.	The AIMS2 is an arthritis-specific health status measure that assesses physical functioning, pain, psychological status, social interactions and support, health perceptions, and demographic and treatment information. It has superseded the original AIMS and was revised in 1992 to have greater specificity and sensitivity, and incorporates client perceptions of performance. The	RA, OA, psoriatic arthritis, undergoing joint replacement surgery (98).	**Usability.** It has been used as an outcome examining the impact of clinical care in RA (99-102), OA (103), psoriatic arthritis (104, 105), ankylosing spondylitis (106), fibromyalgia (107, 108), carpal tunnel syndrome and Colles fracture (109), and in patients undergoing joint replacement surgery (110).	**Reliability.** Much of the psychometric work available on reliability has used the original AIMS. Internal consistency using Cronbach's alpha coefficients ranges from 0.72-0.91 for patients with RA (n=299) and 0.74-0.96 for patient with OA (n=109) across the entire 12 scales. Test-retest interclass correlation coefficients range from 0.78-0.94 over a 2-week period (98, 111). Other	It is self-administered and takes approximately 20-25 minutes to complete (98). **Strengths.** The AIMS2 has been widely used across different types of arthritis diagnoses and exhibits good psychometric properties. **Weaknesses.** The length and time needed to complete the AIMS2 may hinder it use

	physical function component compromises 6 domains: mobility, walking and bending, hand and finger function, arm function, self-care tasks and household tasks. Other domains are symptoms (pain), role (work), social interaction (social activity, family support), and affect (tension, mood). There are 78 questions (98).			studies have found comparable results for internal consistency and test-retest reliability (98, 112, 113). **Validity.** The content of the AIMS2 focuses mainly on function and basic task of daily living. Much of the psychometric work available related to criterion or construct validity has used the original AIMS. The AIMS scales measuring physical functioning were correlated as expected with other measures of function (e.g. HAQ and with disease activity (swollen joint count, pain etc.) (98). AIMS2 scale scores were significantly associated with areas patients identified as problematic; moderate to high correlations ranging from 0.75-0.89 were also found with other measures of disability and low to moderate correlations (0.3-0.5) with measures of disease activity among patients with ankylosing spondylitis and psoriatic arthritis (98). **Responsiveness.** AIMS2 was designed to be sensitive to improvements produced by arthritis therapy (114). Physical function scores were found to provide somewhat greater sensitivity to change than the modified HAQ in one study (115) and similar responsiveness in 2 others (99, 116).	in clinical, community, and population health research (98)
PROM: Arthritis Impact Measurement Scales 2-short form (AIMS2-SF) (98)	The AIMS2-SF, first published in 1997, is a shortened version of the AIMS2 and is aimed at measuring health status in people with arthritis. The measure asks about physical functioning, pain, psychological status, and social interactions. Items assessing health perceptions, demographics, and treatment information from the AIMS2 were not included. Items	Different arthritis diagnoses (RA, OA) (98)	Scoring is similar to the AIMS2. Some items are reverse scaled and require recoding prior to scoring. Scores for the different domains are summed and can then be converted to a range of 0–10. Higher scores indicate poorer health. No cut off or normative values are available. It takes approximately10 minutes to complete. The questions are	**Reliability.** Using the AIMS2-SF in samples of RA and OA, internal consistency using Cronbach's alpha co-efficient has been good, often ranging from 0.75–0.87. Exceptions have been the social interaction subscale (ranging from 0.32–0.67) and some studies using the role subscale (85, 114, 120, 121). Test–retest correlations also have been favourable with	**Strengths.** The AIMS2-SF is easy and relatively quick to complete. In general, missing data are not reported as a problem with the exception of the role subscale (e.g., in samples with unemployed, disabled, or retired participants) (98). The AIMS2-SF has been identified for potential inclusion as a

	tapping 5 core domains of the AIMS2 were included (i.e., physical functioning, symptoms, social interaction, role, and affect). There are 26 items, including upper- extremity, lower-extremity functioning, affect, symptoms, social inter- action, and role (98).		not burdensome in terms of the reading level required or their emotional content. Scoring by hand takes approximately 10 minutes; computerized scoring can be completed in seconds. Minimal training required (98). **Usability.** The AIMS2-SF has been used as an outcome measure in intervention studies, including exercise and self-management interventions among patients with RA and osteoarthritis (OA) (98, 117-119).	intraclass correlations over 2 days to 1 month exceeding 0.80, although lower correlations have been found for the affect and social interaction subscales (85, 114, 120, 121). **Validity.** Similar to the AIMS2, the content of the AIMS2-SF, focuses mainly on function and basic tasks of daily living. Little attention is given to disability with instrumental activities or social roles. In general, the AIMS2-SF and AIMS2 had comparable criterion validity with other measures of disability and health status (e.g., modified Health Assessment Questionnaire [MHAQ], Short Form 36 [SF-36], Western Ontario and McMaster Universities OA Index, Disease Activity Score in 28 joints). The physical function subscales of the AIMS2-SF also demonstrate reasonable construct validity and has been found to be significantly associated with greater pain, medication use, lost work days, disease symptoms like joint stiffness, tender joint count, and swollen joint count, and patient and physician global health assessments (98, 114, 120, 121) Inconsistent factor structures point to the need for additional testing of subscales in samples with RA and OA (114). **Responsiveness.** Additional research is needed using the AIMS2-SF, although preliminary indications suggest no differences between the AIMS2 and AIMS2-SF in responsiveness and comparability to the SF-36 and MHAQ (114, 122).	core set measure for OA (123) and has been used in several European interventions studies (98). **Weaknesses.** Depending on the joints affected, some floor and ceiling effects have been found, especially in the physical function subscales (i.e., upper- and lower-extremity functioning) (85, 120). As a disease-specific measure, the AIMS2-SF is limited in its potential for use in comparative disease studies (98).

PROM: Hospital Anxiety and Depression SCALE (HADS) (124)	Its purpose is to assess anxiety and depressive symptoms in a general medical population. There are 7 depression items measuring cognitive and emotional aspects of depression, predominantly anhedonia, intermingled with 7 anxiety items that focus on cognitive and emotional aspects of anxiety. Somatic items relating to emotional and physical disorders are excluded. Anxiety subscale (HADS-A) and depression subscale (HADS-D). The scale is a 4-point Likert scale, ranging from 0–3. *Score ranges between* 0 – 42 for the total score; 0-21 for the HADS-A and HADS-D. Higher scores indicate greater severity (124).		**Usability:** Used extensively, primarily with psychiatric and medical patients, including the following patient populations: cancer, traumatic brain injury, cardiac, stroke, intellectual disabilities, hepatitis, diabetes mellitus, epilepsy, chronic obstructive pulmonary disease, Parkinson's disease, postpartum women, chronic pain, patients with amputations, and spinal cord injury. Used with rheumatology patients (e.g., lupus, arthritis, fibromyalgia, Sjo¨gren's syndrome), as well as the general population, students, nonpatients, and subjects with chronic medical conditions (124).	**Reliability:** *Internal consistency.* Cronbach's' ranges from 0.78 – 0.93 for the HADS-A and from 0.82– 0.90 for the HADS-D . *Test–retest.* High test–retest correlations (r _ _0.80) were found after _2 weeks and gradually decrease as time lapses (2– 6 weeks _ 0.73–0.76 and _6 weeks _ 0.70). **Validity.** *Content.* The HADS relies on anhedonia, not on somatic symptoms, and is sensitive to mild distress as it excludes symptoms of severe mental illness. *Concurrent.* Correlations with corresponding measures of the same theoretical construct (i.e., anxiety or depression) were adequate. **Responsiveness:** Designed to identify probable "cases" of anxiety or depression, the HADS is not a diagnostic tool and is a poor predictor of making a specific diagnosis. Average sensitivities and specificities are =>0.80, similar to other self-rating screening tools. Sensitivity estimates ranged from 56–100%, and specificity estimates ranged from 73–94%. Positive predictive values ranged from 19–70%. These estimates favourably compare to studies using the BDI/BDI-II, Centre for Epidemiologic Studies Depression Scale, and PHQ/PHQ-9. Scores have also been found responsive to pharmacologic and psycho-therapeutic interventions (124).	**Easy to obtain:** Copyrighted and available from: GL As-assessment, The Chiswick Centre, 414 Chiswick High Road, London, W4 5TF, UK. Order via web site: http://www. GI-assessment.co.uk/health_and_psychology/resources/hospital_anxiety_scale/hospital_anxiety_scale.asp?css_1. **Administration:** Paper and pencil self- administered questionnaire. Administration time is less than 5 minutes. No training is needed to administer HADS as it is easy and short. (124) **Strengths:** Time efficient, widely used with many different populations, and many translations available. The HADS is a reliable valid method for assessing emotional distress in medical populations. It has been noted in the survey by Ailsa Bosworth from NRAS (51). **Weaknesses:** A recent review of use in rheumatoid arthritis patients found much larger effect sizes when the HADS was used compared to other measures of depression (124).
PROM: Patient Health Questionnaire-9 (PHQ-9) (124)	Its purpose is to detect and measure depression and severity in medical populations in clinical settings. The PHQ (and subsequent variants, which		**Usability:** It has demonstrated utility in efficiently identifying depressive disorders and quantifying depression severity in the medical populations,	**Reliability:** *Internal consistency.* Cronbach's was reported by developers to be 0.89 and 0.86 in the validation studies of the PHQ-9 (124).	**Administration:** It takes <3 minutes to complete the questionnaire. There is minimal training required for the administration.

	include the Brief PHQ, PHQ-9, PHQ-8, and PHQ-2) was developed from the historical Primary Care Evaluation of Mental Disorders (PRIME-MD), which was shortened to maximize clinical usefulness by combining the 2 original components into a 3-page (or 4-page, depending on administrator preference) self-administered version called the PRIME-MD Patient Health Questionnaire (PHQ). The PHQ-9 and the shorter PHQ-2 are the depression modules of the PHQ and currently the most widely used versions in clinical settings. There are 9 items in the PHQ-9 and 2 in the PHQ-2. A 4-point scale indicates degree of severity; items are rated from 0 (not at all) to 3 (nearly every day). *Severity.* The developers report the following interpretive guidelines for the PHQ-9 as a severity measure: 1–4 =no depression, 5–9 =mild depression, 10–14= moderate depression, 15–19 =moderately severe depression, and 20–27 =severe depression.		including rheumatology populations. Studies utilizing the PHQ-9 have been conducted in a variety of settings using medical populations (e.g., arthritis, fibromyalgia, cancer, cardiac patients, chronic pain, primary care, postpartum women, diabetes mellitus, epilepsy, substance abuse, human immunodeficiency virus), persons with disabilities (e.g., spinal cord injury, cognitive impairment), older adults, college students, adolescents, persons of diversity, and in the non-medical general population (124).	*Test–retest.* Correlations between patient self- administered results and telephone reassessment within 48 hours ranged from 0.84 – 0.95 and from 0.81– 0.96 at 7-day reassessment (124-126). **Validity:** *Content.* Items developed directly from DSM- III-R criteria, now updated to DSM-IV, thereby a diagnostic tool. *Construct.* Interviews with mental health providers revealed a positive predictive value ranging from 31% for a PHQ-9 cutoff of 9 to 51% for a cutoff of 15 in a sample with a 7% prevalence of MDD (124, 125). *Criterion.* Severity of depression as measured by the PHQ-9 was found to be highly correlated with scores on the BDI in the general population (r=0.73) (124). Strong associations were also found between the PHQ-9 and 20- item Short Form Health Survey (SF-20) scores, particularly those scales most strongly related to depression (e.g., mental health), as well as with self-reported disability days, clinic visits, and the amount of difficulty self-attributed to symptoms (124, 125). **Responsiveness:** Utilizing a decline in PHQ-9 score of =>5 points as an indicator of significant response to treatment or reduction in depression is recommended (124, 126).	**Strengths:** PHQ-9 is 1 of 3 instruments (Beck Depression Inventory-II [BDI-II], Hospital Anxiety and Depression Scale, PHQ-9) endorsed by the National Institute for Health and Clinical Excellence for use in primary care in measuring baseline depression severity and responsiveness to treatment. Time efficient, strong psychometric properties, widely used with many different populations, sensitive to treatment, can be used for both depressive disorders diagnostic and depression severity purposes, and available in the public domain. It has been noted in the survey by Ailsa Bosworth from NRAS (51).
PROM: Enhancing quality of life for people with long-term conditions	Average health status (EQ-5D*) scores for individuals aged 18 and over reporting that they have a long-term condition. It assesses whether health-related quality of life is increasing over time for the population with long-term				

	conditions, while controlling for measurable confounders (age, gender, disease mix etc.). The overarching indicator (together with complementary improvement indicators) provides a picture of the NHS contribution to improving the quality of life for those affected by long-term conditions. **Numerator**: the sum of the weighted EQ-5D values for all responses from people identified as having a long-term condition. **Denominator**: The sum of all weighted responses from people identified as having a long-term condition **Data source:** GP Patient Survey.				
Self-administered Comorbidity Questionnaire	**Reference:** ICHOM Low Back Pain Reference Guide 2.0				
EQ5D-3L	**Reference:** ICHOM Low Back Pain Reference Guide 2.0.				
Outcome: PREM (patient reported experience) (127, 128)	To date there have been no specific patient reported experience measures (PREMs) in rheumatology. This would be a method of ascertaining that the patient has an optimum experience when attending for their care. Focus groups were held with RA patients to identify key elements of the patient experience. These were mapped against the UK Department of Health Patient Experience Framework and a PREM questionnaire developed with questions specifically relating to RA and rheumatology services.	RA		Cronbach's alpha was chosen to measure construct validity. It is commonly used over ordinal scales to measure internal consistency within a domain or how closely the individual questions are related. A value of at least 0.7 is regarded as satisfactory. The percentage agreement with overall care over the 5-point scale for each question within a domain was also calculated. Additionally, for each question the percentage agreement with the overall assessment on the five point scale was calculated (128).	

	The RA PREM was piloted and Cronbach's alpha used to assess internal consistency. The PREM was modified to capture experience of patients with other rheumatic conditions and further validated (127, 128). **Strengths:** The RA PREM is currently being used in a UK National Clinical Audit of Rheumatoid and Early Inflammatory Arthritis (since 2014). The use of a standardised questionnaire also facilitates international bench- marking of units as well as national and regional comparison of patient experience. The current CQRA study has several strengths. Firstly, the PREMs were developed through a rigorous process including several revisions and refinements in consultation with patients with RA, ensuring the relevance of the final PREM questionnaire. Secondly, the survey and validation of the PREMs tools involved a large number of participants (over 600 for both PREMs) and included participation of 10–11 units across England. Furthermore, whilst the current PREMs pilots have been employed in the secondary care setting, there is potential for their use within the primary care setting, providing an opportunity for patient experience to be captured and monitored across the entire care pathway. However, there are some limitations as well. There might be a bias in current PREMs results as focus group participants were all female NRAS members, therefore, the results might not be			Ten UK sites and 524 patients were included in the RA PREM pilot and validation analysis. The RA PREM **reliably** captured RA patient experience and had good construct **validity**. Cronbach's alpha within the multi-question domains ranged from 0.61 to 0.90 and the percentage agreement ranged from 22.5% to 70.4% with overall care. The modified PREM was evaluated in 11 UK sites and 110 patients with a range of rheumatic conditions. Cronbach's alpha ranged from 0.76 to 0.91 and the percentage agreement similarly ranged from 70% to 90% with the question on overall care. Analysis using Cronbach's alpha demonstrated that the RA PREM has good construct validity, achieving a value of 0.7 or above in all but one domain (daily living, 0.61) and is a valid tool for measuring RA patient experience. In summary, the PREM has good construct validity and is a valid tool for measuring RA patient experience (127).	

	fully generalizable. Also, not all the ethnic groups were present in the sample which might and the findings might not be generalizable to all groups (127).				
Outcome: % of people dying after a hip fracture (neck of femur) (Compendium, CCG IOS)	Hip fracture is the most common reason for admission to an orthopaedic trauma ward, and incidence is projected to rise. Mortality is high – about 1 in 10 people with a hip fracture die within one month and about 1 in 3 within 12 months. Most of the deaths are a result of associated comorbidities and not the fracture itself, reflecting the high prevalence of comorbidity in people with hip fracture. A fall and fracture often signals underlying ill health. The indicator will support local understanding of hip fracture incidence, and should lead to action that will result in improved outcomes. **Numerator:** number of patients with hip fracture that died during their stay in the hospital (number of admission spell records where the first episode contains a primary diagnosis of hip fracture in people e.g. aged 60 and over). **Denominator:** all patients with hip fracture admitted to a hospital.		**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care. HES could be an option too. **Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Outcome: % of people dying after skull and intracranial injury (Compendium of population health indicators)	**Numerator:** Deaths from fracture of the skull and intracranial injury, classified by nature of injuries ICD-10 S02, S06, T90.2, T90.5) registered in the respective calendar years. **Denominator:** 2001 Census based mid-year population estimates for the calendar years	Fractures			

	1995-2001. 2011 Census rebased mid-year population estimates for the calendar years 2002-2010. 2011 Census based mid-year population estimates for calendar years 2011 onwards. **Data source:** Hospital Episode Statistics (HES). **HSCIC Source of numerator data:** Office for National Statistics (ONS), original cause of death data. **HSCIC Source of denominator data:** ONS.				
Outcome: % of people returning to usual place of residence following hospital treatment: fractured proximal femur (Compendium)		Fractures			
Outcome: % of individuals with OA with 20% pain reduction within 3 months of a treatment initiation or change (130)	A 20% reduction in pain within 3 months of a treatment initiation or change. HCQI OA #11 by EUMUSC covers it as well (130). **Numerator:** The number of individuals with OA with a 20% pain reduction within 3 months of treatment initiation or change. **Denominator:** The number of individuals with OA with treatment initiation or change.	OA			
Outcome: % of individuals with OA with 20% of functional improvement	A 20% functional improvement within 3 months of a treatment initiation or change HCQI OA #10 by EUMUSC covers it as well (130).				

within 3 months of a treatment initiation or change (130)	**Numerator:** The number of individuals with OA with a 20% of functional improvement within 3 months of treatment initiation or change. **Denominator:** The number of individuals with OA with treatment initiation or change.(131)				
Outcome: % of individuals with OA being enabled to work (130) (ICHOM)	Enablement of workforce participation for people of working age. HCQI OA #12 by EUMUSC covers it as well (130). **Numerator:** The number of individuals with OA that are enabled to work. **Denominator:** The number of individuals with OA.	OA	**Usefulness:** "The technical and practical quality of these indicators is high, they have gone through a robust literature review and Delphi process of experts,[3] methodologists and patients in the field in order to define, standardize and prioritize the tools, timing and definitions of each of the indicators selected. In addition, a set of case mix variables was also identified in order to allow for risk adjustment when comparing outcomes. All the tools are validated, sensitive and specific as these are clear criteria when choosing how to capture each outcome or risk factor. All the indicators can be modified and are practical to collect. All our indicators are public domain and I have attached both the full data dictionary and flyers for our outcome sets for you to review *(please note the OA guide is still being 52inalized and is not for full public distribution at present), so that you are aware of how they were funded (Charitable non-industry donations) and who was involved in the research for each set."* By		

[3] https://en.wikipedia.org/wiki/Delphi_method

			Claude Pinnock from ICHOM as recorded in Indicator Survey (51).		
Outcome: % of individuals with hip fracture developing pressure ulcers	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129). **Numerator:** number of patients with hip fracture developing pressure ulcers. **Denominator:** all patients with hip fracture admitted to a hospital.			**Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care. **Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Outcome: % of individuals dying within 30 days of emergency admission to hospital (fractured proximal femur) (The indicator is indirectly standardised by age and sex) (Compendium of	Fractured proximal femur can accelerate death. Variations in death rates for fractured proximal femur between 'like' populations suggest that some of these deaths are potentially avoidable. The National Health Service (NHS) may be helped to prevent some of these deaths by seeing comparative figures and learning lessons from follow-up investigations. **Definition of indicator and its variants:** Deaths occurring in hospital and after discharge between 0 and 29		**Usability:** This indicator is among those recommended by a Working Group on Outcome Indicators for fractured proximal femur, set up to advise the Department of Health on new indicators. The indicator has been used by the Department of Health in NHS Performance Indicators between 1999 and 2002. It has also been used for international comparisons.		

population health indicators) (132)	days (inclusive) of an emergency admission to hospital with fractured proximal femur. **Numerator:** The number of denominator continuous inpatient (CIP) spells i.e. spells following emergency admission for patients of all ages with a primary diagnosis on admission of fractured proximal femur (ICD 10 codes S72.0, S72.1, S72.2), where the patient dies in hospital or after discharge between 0-29 days (inclusive) of admission in the respective financial year. Deaths that occur outside hospital following discharge but between 0-29 days of admission are included. This was achieved through linkage of HES data with deaths data from the Office for National Statistics (ONS). Records of all deaths which occurred in England during the period of analysis for each indicator plus 30 days after were obtained from ONS. Linkage was undertaken using the most recent CIP denominator spell for each person discharged alive. **Denominator:** The number of finished continuous inpatient spells following an emergency admission for patients of all ages with a primary diagnosis on admission of fractured proximal femur (ICD 10 codes S72.0, S72.1, S72.2) (Compendium of population health indicators) **Source of numerator data***:* Hospital Episode Statistics (HES) for CIP spells intersecting the respective financial year, plus those up to 30 days in the next financial year, England, Health				

	and Social Care Information Centre; and the Office for National Statistics. **Source of denominator data:** Hospital Episode Statistics (HES) for CIP spells intersecting the respective financial year, England, Health and Social Care Information Centre. (Compendium of population health indicators).				
Outcome: % of individuals being readmitted within 28 days of discharge after having primary hip replacement surgery (Compendium of population health - (132) (133).	This is a generic, cross-sectional annual comparative indicator of outcome. In the absence of an absolute standard, comparative data are useful for monitoring in relation to rates achieved in comparable organisations (133). Emergency readmissions to hospital within 28 days of discharge: primary hip replacement surgery. **Numerator:** (readmissions) consists of CIP spells that include both finished and unfinished (i.e. finished episodes from following years) episodes i.e. readmissions can be finished and unfinished CIP spells. Where there is more than one readmission within 28 days, each readmission is counted once, in relation to the previous discharge. Readmissions that end in death are included in the numerator. **Denominator** consists of CIP spells that cover all continuous, consultant episodes for the same patient, including those following a transfer to another hospital. Denominator CIP spells must start with an admission episode and finish with a (live) discharge episode in the year of analysis.	Hip replacements	**Usability:** This indicator was previously published on the Compendium of Clinical and Health Indicators and are now published on the Health and Social Care Information Centre's (HSCIC) Indicator Portal as part of the continuing release of this indicator set. It is intended to help monitor National Health Service (NHS) success in avoiding (or reducing to a minimum) readmission following discharge from hospital, when readmission was not part of the originally planned treatment. The indicators present indirectly standardised rates (percentages). Indirect standardisation involves applying the age-specific rates of the standard population to the age structure of the subject population. This gives an expected number of events against which the observed number of events may be compared. The expected number of events (readmissions), the percentage change in rates from a previous year (or previous set of pooled		

	CIP spells with a discharge code of death are excluded from the denominator because readmission is not possible. **Data source:** Hospital Episode Statistics (HES) data. Explicitly, the 'Emergency readmissions within 28 days' indicators report the number of finished and unfinished continuous inpatient (CIP) spells that are emergency admissions within 0-27 days (inclusive) of the last, previous discharge from hospital in the respective financial year.		years), plus the statistical significance of this change, have also been calculated. For all indicators, a positive percentage change represents improvement and a negative percentage change represents deterioration.		
Outcome: % of acute complications of treatment: readmissions (23)(Compendium of population health) (132, 133)	This is a generic, cross-sectional annual comparative indicator of outcome. In the absence of an absolute standard, comparative data are useful for monitoring in relation to rates achieved in comparable organisations.(133). Emergency readmissions to hospital within 28 days of discharge: fractured proximal femur. **Numerator:** (readmissions) consists of CIP spells that include both finished and unfinished (i.e. finished episodes from following years) episodes i.e. readmissions can be finished and unfinished CIP spells. Where there is more than one readmission within 28 days, each readmission is counted once, in relation to the previous discharge. Readmissions that end in death are included in the numerator. **Denominator** consists of CIP spells that cover all continuous, consultant episodes for the same patient, including those following a transfer to another hospital.	Fractures	**Usability:** This indicator was previously published on the Compendium of Clinical and Health Indicators and are now published on the Health and Social Care Information Centre's (HSCIC) Indicator Portal as part of the continuing release of this indicator set. It is intended to help monitor National Health Service (NHS) success in avoiding (or reducing to a minimum) readmission following discharge from hospital, when readmission was not part of the originally planned treatment. The indicators present indirectly 56standardized rates (percentages). Indirect 56standardization involves applying the age-specific rates of the standard population to the age structure of the subject population. This gives an expected number of events against which the observed number of events may be compared.	**Data source:** Hospital Episode Statistics (HES) data. Explicitly, the 'Emergency readmissions within 28 days' indicators report the number of finished and unfinished continuous inpatient (CIP) spells that are emergency admissions within 0-27 days (inclusive) of the last, previous discharge from hospital in the respective financial year.	

	Denominator CIP spells must start with an admission episode and finish with a (live) discharge episode in the year of analysis. CIP spells with a discharge code of death are excluded from the denominator because readmission is not possible.		The expected number of events (readmissions), the percentage change in rates from a previous year (or previous set of pooled years), plus the statistical significance of this change, have also been calculated. For all indicators, a positive percentage change represents improvement and a negative percentage change represents deterioration.		
Outcome: Friends and Family Test		All areas	**Usability:** It is captured at Newcastle Gateshead CCG Alliance **(Quality Account 2013-14).**		
Process: Weight loss to prevent incident knee or hip OA. % of adults with osteoarthritis who are overweight or obese who are offered support to lose weight. (15, 17, 134) (NICE QS87)	Adults with osteoarthritis who are overweight or obese are offered support to lose weight. Weight loss is a core treatment for osteoarthritis that will improve joint pain and function. Adults with osteoarthritis who are overweight or obese should be offered support to help them to lose weight, which may include weight-loss programmes tailored to their individual needs. It is important that support and encouragement to lose weight are ongoing and reinforced at every opportunity. Ongoing weight management support may be needed to ensure that a lower weight is maintained. *IF and individual is overweight (as defined by body mass index of=>27 kg/m2), THEN the individual should be advised to lose weight annually (15)* *IF a patient has symptomatic OA of the knee or hip and is overweight) as defined by body mass index of =>27kg/m2), THEN the patient should be advised to lose weight at least annually AND*	Hip and knee OA			

	the benefit of weight loss on the symptoms of OA should be explained to the patient (15) *IF a patient has symptomatic OA of the knee or hip and has been overweight (as defined by body mass index of =>27kg/m2) for >3 years, THEN the patient should receive referral to a weight loss program (15)* **Numerator:** The number in the denominator who are offered support to lose weight. **Denominator:** The number of adults with osteoarthritis who are overweight or obese. **Data source:** Local data collection. Data on BMI values and dietary advice are included in the 'care.data' extract for the Health and Social Care Information Centre (not specific to people with osteoarthritis).				
% of patient with RA and join damage/soft tissue being assessed by an orthopaedic surgeon within 3 months (15, 135).	EUMUSC recommends HCQI RA5 as 'if a patient is diagnosed with RA and there are joint damage/soft tissue problems that may be solved by surgery then the patient should be assessed by an orthopaedic surgeon within 3 months' (135). **Numerator:** Number of patients with RA and joint damage/soft tissue problems that may be solved by surgery seeing an orthopaedic surgeon within 3 months. **Denominator:** Number of patients with RA and joint damage/soft tissue problems that may be solved				

	If a patient with RA has severe pain of the hip and knees, which significantly limits activities despite nonpharmacologic and pharmacologic interventions, THEN the patient should be offered a referral to an orthopaedic surgeon unless contraindication to surgery is documented. IF a patient with RA has joint pain, joint instability, or tendon rupture affecting the upper extremity or the foot or the ankle, which significantly limits activities despite nonpharmacologic and pharmacologic interventions, THEN the patient should be offered referral to a surgeon, unless contraindication to surgery is documented (15).				
Process: Referral for surgical assessment. % of adults with osteoarthritis referred for consideration of joint surgery whose referral is based on a scoring tool. (14, 15, 130, 136) (17, 23) (NICE QS87)	HCQI OA #8 by EUMUSC covers it as well. There is currently considerable variation in the criteria used to decide whether an adult with osteoarthritis is eligible for referral for consideration of joint surgery in England, with no evidence to support the range of scoring tools used and the decisions made. The person with osteoarthritis should be given support and advice by their healthcare professional to reach a shared decision on whether surgery is likely to be beneficial, based on the severity of their symptoms, their general health, their expectations of lifestyle and activity, and the effectiveness of any non-surgical treatments. Ensuring that inappropriate scoring tools are not used will improve equality of access to surgery.	OA	**Usability:** It is RAND health indicator adapted for the UK (136).	**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient records from 18 practices in Norfolk (136).	

	IF a patient with severe symptomatic OA of the knee or hip has failed to respond to nonpharmacologic and pharmacologic therapy, THEN the patient should be offered referral to an orthopaedic surgeon (15) **Numerator:** The number in the denominator for whom the referral decision is based on a scoring tool. **Denominator:** The number of adults with osteoarthritis referred for consideration of joint surgery. **Data source:** Local data collection.				
Process: Rate of hospital admissions for fractured neck of femur in the elderly (expressed as indirectly standardised rate) (Compendium - (132, 137)	**Numerator:** Hospital Episode Statistics (HES) Admitted Patient Care (APC), provided by the Health and Social Care Information Centre (HSCIC). Hospital Episode Statistics (HES) Continuous Inpatient Spells (CIP), provided by the Health and Social Care Information Centre (HSCIC). Please refer to the HSCIC Indicator Portal's Compendium of Population Health Indicators > Statistical methods and disclosure control > Methods > Annex 13 for a detailed explanation of CIP Spell construction.4 Final annual HES data are released in the November following the financial year-end. Please see the HES website for further details (137). **Denominator:** Mid-year population estimates for England published by the Office for National Statistics (ONS).	Hip Fractures	**Usability:** The purpose of this indicator is to help monitor NHS success in prevention of fractured proximal femur. In 2014, NHS England set a target to reduce total emergency admissions by 3.5%, 'as a clear indicator of the effectiveness of local health and care services in working better together to support people's health and independence in the community'. Emergency admissions to hospital can be avoided if local systems are put in place firstly to identify those at risk prior to attendance and target primary care services and risk management; and secondly to aim interventions at whole populations to reduce smoking rates and promote better nutrition and higher levels of physical activity. (Compendium- (132, 137) **Strengths:** recommended by HSCIC		

	England population estimates are released in the summer following year end (137) **Data:** HES data and Mid-year population estimates for England published by the Office for National Statistics (ONS) (137).				
Process: Radiographs. % of adults with OA and worsening symptoms having a radiograph (14, 15).	IF a patient has hip or knee OA AND has worsening complaints accompanied by a progressive decrease in activities AND no previous radiograph during the preceding 3 months, THEN a knee or hip radiograph should be performed within 3 months (15). **Numerator:** The number of adults with hip or knee OA having a radiograph. **Denominator:** The number of adults with OA having worsening symptoms.	Hip and knee OA			
Process: Proportion of patients with hip fractures having a surgery within 36 hours (129) (NICE QS 16, CCG OIS)	**Numerator:** number of patients with a hip fracture that had a surgery within 36 hours **Denominator:** all patients with a hip fracture that were admitted to a hospital **Data source:** Local data collection. a) The Health and Social Care Information Centre's Compendium of Clinical and Health Indicators records emergency hospital admissions and timely surgery: fractured proximal femur. b) The National Hip Fracture Database records data on patients with hip fracture who are medically fit who have surgery within 48 hours of admission, and during normal working hours.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	

	National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.				
Process: Proportion of patients recovering to their previous levels of mobility/walking ability at 120 days (CCG OIS, NHS Outcomes Framework)	**Numerator:** Number of patients recovering to their previous levels of mobility/walking ability at 120 days. **Denominator:** Number of people with fractures	Fractures			
Process: Pre-operative assessment by an orthogeriatrician (129).	**Numerator:** Number of patients with a hip fracture that had a pre-operative assessment by an ortho-geriatrician. **Denominator:** Number of patients with a hip fracture that had a surgery Data source: National Hip Fracture Database (129). **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: Physical examination for diagnosis.	Adults aged 45 or over are diagnosed with osteoarthritis clinically without investigations if they have activity-related joint pain and any morning joint stiffness lasts no longer than 30 minutes.	OA			

% of adults aged 45 years or over who have activity-related joint pain and in whom any morning joint stiffness lasts no longer than 30 minutes who are diagnosed with osteoarthritis clinically without investigations (14, 15, 134). (NICE QS87)	**Numerator:** The number in the denominator who are diagnosed with osteoarthritis clinically without investigations. **Denominator:** The number of adults aged 45 years or over who have activity-related joint pain and in whom any morning joint stiffness lasts no longer than 30 minutes who are diagnosed with osteoarthritis. **Data source:** Local data collection.				
Process: People with hip fracture being offered a formal Hip Fracture Programme from admission (NICE QS16)	People admitted to hospital with hip fracture are offered a programme of care, called a Hip Fracture Programme, from admission that includes regular assessment and continued rehabilitation from a range of healthcare professionals with different skills. **Numerator:** the number of people in the denominator who receive a formal Hip Fracture Programme from admission. **Denominator:** the number of people with hip fracture. **Source:** Local data collection. The National Hip Fracture Database contains an important but partial audit standard for this measure based on the following from the 2007 British Orthopaedic Association and British Geriatrics Society 'The care of patients with fragility fracture ('blue book')': Standard 4 All patients presenting with a fragility fracture should be managed on an orthopaedic ward	Hip fractures			

	with routine access to acute orthogeriatric medical support from the time of admission.				
Process: Patient education and self-management. a) % of adults with OA with a record of having received written information about OA and its management b) % of adults diagnosed with OA who participate in developing a self-management plan c) % of adults with OA who participate in reviewing a self-management plan (16, 17, 23, 130, 136) (NICE QS87)	HCQI OA #4 by EUMUSC covers it as well (130). The principle of ''shared decision making' allowing patients and their providers to make healthcare decisions together, based on the best scientific evidence available, as well as the patient's values and preferences, is increasingly accepted. The scope of patient education has expanded from only the knowledge transfer and disease control to enabling patients to manage their illness, adjust to their condition and maintain quality of life. New possibilities for patient education via communication and delivery of information will be available via e-health and mobile telehealth platforms (29). Self-management principles empower the person by enhancing their understanding and knowledge of osteoarthritis and its management, and by enabling them to identify their own priorities and goals for their treatment. This may include developing skills such as problem solving, goal setting, coping strategies and managing relationships. Self-management can improve patient experience and health outcomes, as well as increasing adherence with the treatment plan and reducing reliance on healthcare interventions (134). IF a patient has had a diagnosis of symptomatic OA of the knee or hip for >3months, THEN education	OA		**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient records from 18 practices in Norfolk (136).	

	about the natural history, treatment, and self-management of OA should be given or at least recommended at least once a) **Numerator:** The number in the denominator with a record of having received written information about osteoarthritis and its management. **Denominator**: The number of adults newly diagnosed with osteoarthritis. b) **Numerator:** The number in the denominator who participate in developing a self-management plan. **Denominator:** The number of adults newly diagnosed with osteoarthritis. c) **Numerator:** The number in the denominator who participate in reviewing a self-management plan. **Denominator:** The number of adults with osteoarthritis attending for a scheduled review of their care. **Data source:** a) Local data collection b) Local data collection. Data on self-management plans are included in the 'care.data' extract for the Health and Social Care Information Centre (not specific to people with osteoarthritis) c) Local data collection.				
Process: Osteoporosis prophylaxis.(15)	IF a patient with RA is started on prednisone =>10mg daily (or other steroid equivalent) and continues on prednisone for >3 months, THEN 1,500 mg/day of Ca should	RA			

	be prescribed, and 400 IU/day of vitamin D should be prescribed, and antiresorptive therapy should be discussed with the patient. IF a patient with RA and osteoporosis is treated with oral and parenteral steroids, THEN antiresorptive therapy should be prescribed.				
Process Organisational: The practice can produce a register of all patients aged 16 years and over with rheumatoid arthritis (QOF Indicators NM55)	There is a need of regular monitoring to determine disease status, assess severity, efficacy and toxicity of drug therapy and identify co-morbidities or complications as RA has a variable course over a long period of time (27). **Acceptability:** The overwhelming majority – 83% – of pilot practices were in favour of the creation of a register of rheumatoid arthritis patients. There was a small degree of ambivalence – 17% – but no specific objections. This was generally seen as a necessary and logical first step if further rheumatoid arthritis indicators were to be included. There is a high degree of confidence that there are no major barriers/ risks/ issues/ uncertainties identified from the pilot in terms of acceptability that would preclude this indicator from being implemented. (from Development feedback report on piloted indicator(s)).	RA	**Usability: I**t is regarded as straightforward because is it administrative.	**Feasibility:** It was scored 1 – 'No problems to implement in live with other indicators (from Development feedback report on piloted indicator(s)). **Reliability:** It was scored ½ - Minor re-work before it can go live with other indicators (from Development feedback report on piloted indicator(s)). **Implementation:** It was scored 1 – 'No problems to implement in live with other indicators (from Development feedback report on piloted indicator(s)).	**Difficulty and cost of collection:** None. There may be some initial costs to establish an RA register, such as software amendment to GP clinical information systems and initial identification of people with a diagnosis of RA, but these are not expected to be significant. The cost of maintaining the register is estimated to be negligible (138).
Process: Maximum dosage of acetaminophen. % of individuals with OA using	Acetaminophen, in doses of up to 4g/day, is currently a core recommendation for use as an analgesic in the OARSI guidelines, the recently published NICE and AAOS guidelines as well as other guidelines for the management of	OA			**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient

the recommended dose of acetaminophen (15, 21, 136).	hip or knee OA in 2006. European League Against Rheumatism (EULAR) recommendations for the management of hip and knee OA suggested that doses of up to 4g/day should be the oral analgesic of first choice for mild-moderate pain because of its relative safety and efficacy and, if successful, should be used as the preferred long-term oral analgesic. However, because of additional concerns about the acetaminophen's narrow therapeutic margin for hepatotoxicity, an advisory committee of the US Food Drug Administration (FDA) recently recommended that the maximum adult daily dose of acetaminophen should be less than 4g/day (21). **Numerator:** The number of individuals with OA using the recommended dose of acetaminophen. **Denominator:** The number of individuals with OA using acetaminophen.				records from 18 practices in Norfolk (136)
Process: Initial pharmacologic therapy. % of individuals with OA using paracetamol (acetaminophen) for pain relief as their first drug (14, 15, 17).	IF a nonnarcotic pharmacologic therapy is initiated to treat OA pain of mild or moderate severity, THEN acetaminophen should be the first drug used, unless there is a documented contraindication to use (15). **Numerator:** The number of individuals with OA using paracetamol to relieve pain as their first drug. **Denominator:** The number of individuals using their first drug to relieve pain.	OA, RA (5)		**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient records from 18 practices in Norfolk (136).	

Process: improving follow up for individuals with hip fracture	**Numerator:** number of patients with hip fracture having a follow up within 30 days **Denominator:** all patients with hip fracture admitted to a hospital.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care. **Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. However, follow-up data remains disappointing in some areas and 30-day follow-up data is only complete in 37.4% of cases. T present the incompleteness of follow-up data for the patients who are offered additional rehabilitation means that the overall rate of new care home placement following hip fracture cannot be estimated. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: Glucocorticoids (15)	IF a patient is receiving >10mg qD prednisone (or equivalent) for >6months and there is no documentation of worsening disease, THEN there should be documentation at some point during the treatment course that a steroid taper was attempted or a DMARD dose was increased	RA			
Process:	Adults with osteoarthritis are advised to participate in muscle strengthening and aerobic	Hip and knee OA			

Exercise for patients with knee and hip OA. A) % of adults diagnosed with osteoarthritis who receive advice on participating in muscle strengthening exercise. b) % adults diagnosed with osteoarthritis who receive advice on participating in aerobic exercise. c) % of adults with osteoarthritis who receive advice on participating in muscle strengthening and aerobic exercise at their review. (16, 17, 23, 130, 134) (NICE QS87)	exercise. Exercise is a core treatment for osteoarthritis that will improve joint pain and function. It is important that people are advised to undertake specific exercise that is relevant for their condition, including muscle strengthening that targets affected joints and general aerobic exercise. HCQI OA #5 by EUMUSC covers it as well. IF an ambulatory patient has had a diagnosis of symptomatic OA of the knee or hip for >3months AND has no contraindication to exercise and is physically and mentally able to exercise, THEN a directed or supervised muscle strengthening or aerobic exercise program should have been prescribed at least once and reviewed at least once per year. It has been found that both strengthening and aerobic exercise are associated with relief of pain in knee OA. It has been also observed that water-based exercise resulted in relief of pain, and improvement in function in both knee and hip OA. Class-based exercise may be more economically efficient than home-based exercise as suggested by direct comparisons within study (21) . a) **Numerator**: The number in the denominator who receive advice on participating in muscle strengthening exercise. **Denominator**: The number of adults newly diagnosed with osteoarthritis.				

	b) **Numerator:** The number in the denominator who receive advice on participating in aerobic exercise. **Denominator:** The number of adults newly diagnosed with osteoarthritis. c) **Numerator:** The number in the denominator who receive advice on participating in muscle strengthening and aerobic exercise. **Denominator:** The number of adults with osteoarthritis attending for a scheduled review of care. a-c) **Data source:** Local data collection. Data on exercise advice are included in the 'care.data' extract from the Health and Social Care Information Centre (not specific to people with osteoarthritis).				
Process: Exercise (15)	IF a patient has a diagnosis of RA and has no contraindications to exercise and is physically and mentally able to exercise, THEN a directed or supervised muscle strengthening or aerobic exercise program should have been prescribed at least once and reviewed at least once per year.	RA			
Process: Core treatments before referral for consideration of joint surgery. % of adults with osteoarthritis referred for consideration of joint surgery who were supported	Adults with osteoarthritis are supported with non-surgical core treatments for at least 3 months before any referral for consideration of joint surgery. Core treatments for adults with osteoarthritis are: verbal and written information to support a better understanding of the condition, activity and exercise, and weight loss if the person is overweight or obese. Core				

with non-surgical core treatments for at least 3 months (134). (NICE QS87)	treatments support the person to self-manage their condition and help to relieve symptoms. It is therefore important that these treatments are tried before a surgical solution is explored. **Numerator:** The number in the denominator who were supported with non-surgical core treatments for at least 3 months. **Denominator:** The number of adults with osteoarthritis referred for consideration of joint surgery. **Data source:** Local data collection.				
Process: Baseline and follow up studies (15)	IF a patient with RA is newly prescribed a DMARD, THEN appropriate baseline studies should be documented within appropriate period of time form the original prescription. IF a patient has established treatment with DMARD or glucocorticoids, THEN monitoring for drug toxicity should be performed.	RA			
Process: average length of stay for individuals with hip fracture [Better: 'L' ratio - Av LOS FnF/Av LOS of <65s]	Length of stay (LOS) is the main component of the overall cost of hip fracture care. Potential reductions in LOS were key to the improved cost-effectiveness achieved by Hip Fracture Programmes that were identified by the economic model of the NICE Guideline3 (CG124) on hip fracture. **Numerator:** sum of total number of days of LOS **Denominator:** sum of total number of individuals having an inpatient hospital stay.		**Usefulness:** this super-spell data at last addresses the difficulty of describing the overall patient experience when different stages of care are provided in different organisations. Figures from different hospitals, Trusts, and other NHS organisations are being linked to define how long it takes a patient to return home, or to be settled in their placement.		

	Data source: Health Episode Statistics (HES) in England, Patient Episode Database Wales (PEDW) in Wales, and Fracture Research Database (FORD) in Northern Ireland.				
Process: Assistive devices (15)	IF a patient has a diagnosis of RA and reports having difficulty with walking either because of stiffness, pain, or instability, THEN patient's walking ability should be assessed for need ambulatory assistive devices including a cane, insoles, and orthotics. IF a patient has a diagnosis of RA, and reports having difficulties with activities of daily living either because of stiffness of pain, THEN the patient's functional ability with the compliant tasks should be assessed for need of assistive devices to aid with compliant tasks. IF a patient has a diagnosis of RA and reports having difficulties performing tasks involving use of their hands and wrists either because of stiffness or pain, THEN the patient's functional ability with their hands and wrists should be assessed for need of hand or wrist splints.	RA			
Process: Assessment at diagnosis. % of adults newly diagnosed with osteoarthritis who have an assessment that includes pain, impact on daily	Adults newly diagnosed with osteoarthritis have an assessment that includes pain, impact on daily activities and quality of life. Adults who have been diagnosed with osteoarthritis have an assessment in which they are asked about their pain, how they are managing on a day-to-day basis and how the condition is affecting their life overall, including their mood. This will help when deciding the best				**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient records from 18 practices in Norfolk (136).

activities and quality of life. (14, 23, 130, 134, 136) (NICE QS87)	way to try to improve their symptoms and quality of life. HCQI OA #1 by EUMUSC covers it as well (130). **Numerator:** The number in the denominator who have an assessment that includes pain, impact on daily activities and quality of life. **Denominator:** The number of adults newly diagnosed with osteoarthritis. **Data source:** local data collection (NICE QS87).				
Process: Ambulatory assistive devices. % of individuals with OA having difficulty walking to accomplish activities of daily living recorded as receiving referral or assessment for the need of ambulatory assistive devices (14-17, 130).	HCQI OA #6 by EUMUSC covers it as well. IF a patient has had symptomatic OA of the hip or knee and reports difficulty walking to accomplish activities of daily living for >3months, THEN the patient's walking ability should be assessed for need of ambulatory assistive devices (15). **Numerator:** The number of adults with symptomatic OA and difficulty in walking having been assessed for the need of ambulatory assistive devices over the past 12 months **Denominator:** The number of adults with OA having difficulty walking over the past 12 months.	RA, OA (17)			
Process: a) % of individuals with established diagnosis or RA and synovitis or RA and radiographic erosions being	**DMARDs (15)** a) IF a patient has an established diagnosis of seropositive RA, OR RA and has synovitis, OR RA and has radiographic erosions, THEN the patient should be treated with a DMARD unless contraindication to DMARD is documented	RA			

treated with DMARD b) % of individuals with RA being treated with DMARD and reporting symptoms worsening over 6-months period and t=with evidence of active disease having one of the following: dose changed, route of administration changed, type of DMARD changed, new additional DMARD added, glucocorticoids started or increased dose (15).	b) IF a patient has RA and is being treated with a DMARD and reports worsening of symptoms over 6-month period of time and there is evidence of active disease (synovitis), THEN one of the following should be done: change DMARD dose or route of administration, change DMARD, add an additional DMARD, or start or increase dose of glucocorticoids				
Process: % of people with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2) receiving extramedullary implants such as sliding hip screw in preference to an intramedullary	**Numerator:** the number of people in the denominator who receive extramedullary implants such as a sliding hip screw. **Denominator:** the number of people with trochanteric fractures above and including the lesser trochanter (AO classification types A1 and A2**).** **Source:** Local data collection. The National Hip Fracture Database records procedure type for intertrochanteric fracture.	Hip fractures			

nail (NICE QS16)					
Process: % of people with intracapsular fracture receiving cemented arthroplasty (NICE QS16)	People with displaced intracapsular fracture receive cemented arthroplasty, with the offer of total hip replacement if clinically eligible. **Numerator:** the number of people in the denominator who receive cemented arthroplasty. **Denominator:** the number of people with displaced intracapsular fracture **Data Source:** The National Hip Fracture Database records procedure type for intracapsular displaced fracture and cementing of arthroplasties. It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures			
Process: **%** of people with hip fracture who receive early supported discharge (if they are eligible), led by the Hip Fracture Programme team. (NICE QS16)	People with hip fracture are offered early supported discharge (if they are eligible), led by the Hip Fracture Programme team. **Numerator:** the number of people in the denominator who receive early supported discharge led by the Hip Fracture Programme team. **Denominator:** the number of people with hip fracture who are eligible for early supported discharge. **Data source:** Local data collection. The Royal College of Physicians National audit of falls and bone health records whether the patient had rehabilitation or support at home from a specialist early supported discharge team. The Health and Social Care	Hip fracture			

	Information Centre's Compendium of clinical and health indicators contains annual hospital episode statistics-based indicators plus trends on timely return to usual place of residence.				
Process: % of people with hip fracture being offered a multifactorial risk assessment (NICE QS16, CCG OIS)	People with hip fracture are offered a multifactorial risk assessment to identify and address future falls risk, and are offered 76obilization76d intervention if appropriate. **Numerator:** the number of people in the denominator who receive a multifactorial risk assessment of future falls risk. **Denominator:** the number of people with hip fracture. **Source:** The National Hip Fracture Database records specialist falls assessment criteria based on standard 4 in the 2007 British Orthopaedic Association and British Geriatrics Society Care of patients with fragility fracture ('blue book'): Standard 4: All patients presenting with a fragility fracture following a fall should be offered multidisciplinary assessment and intervention to prevent future falls.	Hip fractures			
Process: % of patients with rheumatoid arthritis, on the register, who have had a face-to-face review in the preceding 12 months (15) (QOF Indicators NM58)	The RA register includes patients aged 16 or over with established and recent-onset disease and in whom there is a definite diagnosis of RA, irrespective of evidence of positive serology and current disease activity status. The register is restricted to patients aged 16 or over, to conform to international standards for differentiating RA from juvenile idiopathic arthritis.	RA	**Usability:** Currently, the Newcastle Upon Tyne Hospitals NHS Foundation Trust provides an annual review service, which is available for all patients with RA. The service is a 40-minute consultation with a Rheumatology Specialist Nurse and allows the patient the opportunity to discuss any problems or concerns that they may have about their condition.	**Cost:** The feedback from the pilot suggested that a specific chronic disease clinic would be created and run by practice nurses to cover indicators NM56, NM57 and NM58 with 1 double appointment. The cost of a double appointment with a practice nurse is estimated at £25. The cost impact is estimated at £7.9 million. For indicator NM58 varying the annual review numbers between 80% and 95% gives a cost	

	(27). Annual review is important to ensure that all aspects of the disease are under control. It provides a regular opportunity to holistically assess the patient in terms of the current management of the disease, and any further support they may need in the future, in order to enable them to 77obiliza their quality of life. **Numerator**: The number of people in the denominator whose most recent comprehensive review was within 12 months of diagnosis or the previous review. **Denominator**: The number of people with rheumatoid arthritis diagnosed more than 1 year ago (139). In terms of quantitative benefits of the Annual Review clinic, looking over the last quarter of the year: - 3% of patients have had a new diagnosis of osteoporosis and have been started on treatment as a result of Annual Review. - 17% of people were found to have an increased risk of cardiovascular disease (as based on QRISK2 modelling) and have been referred back to their GP for further investigation / management as appropriate (we picked up 2 new cases of diabetes and we referred 1 patient direct to cardiology for exercise tolerance testing / angiogram as appropriate due to cardiac sounding chest pain). - Other referrals include 1 patient referred directly to gastroenterology, 1 to the deaf		During the clinic appointment, a number of assessments are carried out including the QRISK2 score for cardiovascular disease and FRAX score for bone health. The assessment also looks at any functional problems the patient may have (such as issues with activities of daily living), the effects of RA on the patient's quality of life and mental health and the possible need for referral to other health care professionals. The clinic also provides an opportunity for the patient's medication to be reviewed and a disease activity score to be completed. During the consultation, patients can be educated about their condition and a plan of care can be agreed. These aspects of the consultation can be tailored to the individual needs of the patient (141).	range between £7 million and £8.3 million. (138). **Difficulty of collection:** There was some concern about the time that this indicator would take, though a third of the pilot practices had developed a strategy to manage this (in the form of a specialist clinic).	

	society and 3 patients have been referred to community Occupational Therapy. We have recently audited our AR service and the consensus from patients was that they really valued the time spent in clinic. They felt that they were given the opportunity to discuss matters that they had not previously discussed with their primary care physician or Rheumatologist (140).				
Process: % of patients with rheumatoid arthritis aged 30-84 years who have had a cardiovascular risk assessment using a CVD risk assessment tool adjusted for RA in the preceding 15 months (QOF Indicators NM56)	**Numerator:** Number of patients with rheumatoid arthritis aged 30-84 years who have had a cardiovascular risk assessment using a CVD risk assessment tool adjusted for RA in the preceding 15 months. Denominator: Number of patients with rheumatoid arthritis aged 30-84 years**.**	RA		**Cost:** We have assumed that the CVD risk assessment will be carried out opportunistically as part of the annual RA annual review. We anticipate that the review will identify a number of people who need statin therapy. The indicator pilot health economic report assumed that that around 35% of people with RA would need satin therapy. The annual cost of satin therapy is estimated at £12 per person per year. The cost impact of this indicator is therefore calculated at £1.3 million. For indicator NM56 varying the CVD risk between 25% and 45% gives a cost range between £900,000 and £1.7 million (138).	
Process: % of patients recovering to their previous levels of mobility/walking ability at 30 days (CCG OIS, NHS Outcomes Framework)	**Numerator:** Number of patients recovering to their previous levels of mobility/walking ability at 30 days. **Denominator:** Number of people with fractures.	Fractures			
Process:	**Numerator:** Number of patients recovering to their previous levels	RA		**Cost:** We have assumed that the fracture risk assessment is carried	

% of patients aged 50-90 years with rheumatoid arthritis who have had an assessment of fracture risk using a risk assessment tool adjusted for RA in the preceding 27 months (QOF Indicators NM57)	of mobility/walking ability at 120 days. **Denominator:** Number of people with fractures.			out opportunistically as part of the annual RA annual review. There are no data to identify further costs associated with this indicator; however, there may be some overlap with QOF osteoporosis indicators. NM57: No direct costs of this indicator can be estimated (138).	
Process: % of individuals with RA being treated with methotrexate and receiving folate supplementation (15).	**Numerator:** number of individuals with RA being treated with methotrexate and receiving folate supplementation **Denominator:** number of individuals with RA being treated with methotrexate **Folic acid (15)** IF a patient is being treated with methotrexate, THEN folate supplementation should be given.	RA			
Process: % of individuals with knee OA having primary knee replacement (Compendium)	**Numerator**: Individuals that had primary hip replacement. **Denominator:** Individuals with hip OA. In the 2014/15 national tariff was introduced the first currency based on patient outcomes. The purpose of the BPT for primary hip and knee replacements is to link payment to the outcomes that are important from the patient's perspective. The aim of these BPTs is to reduce the unexplained variation between providers in the outcomes reported by patients.	Knee OA		**Data source:** The numerator should be taken from the National Joint Registry (NJR) or Hospital Episode Statistics (HES) data. The denominator should be taken from the population estimates, which are published on the ARUK website.	

	Payment of the BPT for primary hip and knee replacement surgery is conditional on criteria linked to data collected through the National Joint Registry (NJR) and Patient Reported Outcome Measures (PROMS). Payment of the BPT for primary hip and knee replacement surgery is conditional on criteria linked to data collected through the National Joint Registry (NJR) and Patient Reported Outcome Measures (PROMS). The thresholds for payment of the BPT in 2014/15 are: □ a minimum NJR compliance rate of 75% □ an NJR known consent rate of 75% (where patient consent was recorded as a 'yes' or 'no') □ pre-operative PROMs response rate of 50% or more **2)** the provider achieving an average health gain that is not significantly below the national average (131).				
Process: % of individuals with hip fracture with pre-and post-operative abbreviated mental test score assessment (NICE QS 16)	People with hip fracture have their cognitive status assessed, measured and recorded from admission. **Numerator:** number of patients with hip fracture having pre- and post-operative mental score test. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source: a)** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care. Local data collection. The National Hip Fracture Database records the	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	

	Abbreviated Mental Test score. Also, contained in NICE audit support for delirium (NICE clinical guideline 103), criteria 1 and 2. **b)** The Royal College of Physicians' National audit of falls and bone health records whether a formal assessment of cognitive function was performed within 72 hours of surgery (NICE QS 16).		standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).		
Process: % of individuals with hip fracture with care protocol agreed by geriatrician, surgeon and anaesthetist (CCG OIS)	**Numerator:** number of patients with hip fracture having a care protocol agreed by geriatrician, surgeon and anaesthetist. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	C**ompleteness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: % of individuals with hip fracture that had shared care by surgeon and geriatrician (CCG OIS)	**Numerator:** number of patients with a hip fracture that had shared care by surgeon and geriatrician **Denominator:** all patients with a hip fracture that were admitted to a hospital **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip	

	prevention. Its aim is to improve hip fracture care.		successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: % of individuals with hip fracture receiving a falls assessment prior to discharge	**Numerator:** number of patients with hip fracture receiving a falls assessment prior to discharge. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: % of individuals with hip fracture meeting the Best Practice Tariff (BPT) set standards (129).	BPT is rewarded upon the achievement of specified standards: -surgery within 36 hours - shared care by surgeon and geriatrician - care protocol agreed by geriatrician, surgeon and anaesthetist - assessment by geriatrician within 72 hours	Hip fractures		**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures	

	- pre- and post-operative abbreviated mental test score assessment - geriatrician-led multi-disciplinary rehabilitation - secondary prevention of falls - bone health assessment **Numerator:** number of people with hip fracture meeting the BPT set standards **Denominator:** all patients with hip fracture admitted to a hospital (129). **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.			for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: % of individuals with hip fracture having surgery within 48 hours and during working hours	**Numerator:** number of patients with hip fracture having surgery within 48 hours and during working hours. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	

Process: % of individuals with hip fracture having secondary prevention of falls	**Numerator:** number of patients with hip fracture having secondary prevention of falls. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: % of individuals with hip fracture having geriatrician-led multi-disciplinary rehabilitation (CCG OIS)	**Numerator:** number of patients with hip fracture having geriatrician-led multidisciplinary rehabilitation. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	

Process: % of individuals with hip fracture having an assessment by geriatrician within 72 hours	**Numerator:** number of patients with hip fracture having an assessment by geriatrician within 72 hours **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: % of individuals with hip fracture having bone health assessment	**Numerator:** number of patients with hip fracture having bone health assessment. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	

Process: % of individuals with hip fracture being admitted to orthopaedic ward within 4 hours (CCG OIS)	**Numerator:** number of patients with hip fracture being admitted to orthopaedic ward within 4 hours. **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process: Regular reviews to all people with symptomatic OA. % of adults with osteoarthritis with an agreed date for a review (17, 134) (NICE QS87)	Adults with osteoarthritis discuss and agree the timing of their next review with their primary healthcare team. Adults with osteoarthritis should be offered regular reviews to assess the progress of the condition and its impact on their quality of life, provide support for self-management and review treatments to reduce further deterioration and the need for additional medication and/or referral for surgery. Evidence of local arrangements to ensure that adults with osteoarthritis discuss and agree the timing of their next review with their primary healthcare team. **Numerator:** The number in the denominator who have an agreed date for a review.	OA			

	Denominator: The number of adults with osteoarthritis. **Data source:** Local data collection.				
Process: Rate of hospital admissions for fractured neck of femur in the elderly (Compendium)	Hip fracture is a major cause of disability and the leading cause of mortality due to injury in older people aged 75 and over. Hospital admissions for fracture neck of femur are a good proxy measure of the incidence of hip fracture in older people. Falls prevention programmes aim to reduce the incidence of fracture neck of femur in the community. Hip fracture is the most common injury related to falls in older people. More than 95% of hip fractures is adults aged 65 and older are caused by a fall. Hip fractures in the elderly and frail can lead to loss of mobility and loss of independence. For many older people, it is the event that forces them to leave their homes and move into residential care. Mortality after hip fracture is high: around 30% at one year. Standard 6 of the National Service Framework for Older People aims to "reduce the number of falls which result in serious injury and ensure effective treatment and rehabilitation for those who have fallen". A New Ambition for Old Age (DH 2006) which outlines the next steps in implementing the NSF lists falls and bone health as one of its 10 programmes and outlines the components of integrated falls services. There is NICE guidance on the assessment and prevention of falls in older people. Studies have also indicated that falls prevention services can reduce falls.	Fractures			

	Numerator: Hospital admissions for primary diagnosis of fractured neck of femur in 65 and over age group. Diagnosis of fracture neck of femur classified by primary diagnosis (ICD- 10 S720, S721 and S722) admitted in the respective financial year. **Denominator:** Mid-year population estimates for persons aged 65+. **Strengths:** recommended by HSCIC. **Numerator data source:** Hospital Episode Statistics (HES) for the respective financial year, Health and Social Care Information Centre. **Denominator data source:** Office for National Statistics.				
Process: Organisational a) % of individuals with diagnosis of RA having hands or feet radiograph within 3 months of the initials diagnosis. b) % of individuals with diagnosis of RA having hands or feet radiograph every 3 years (15).	**Radiographs of hands and feet** (15) IF a patient has an established diagnosis of RA, THEN baseline radiographs of the hands or feet should be performed within 3 months of the initial diagnosis and every 3 years.	RA			
Process: % of individuals with documented characteristics within 3 months	**History and examination** (15). IF a patient has a diagnosis of RA, THEN each of the following should be documented within 3 months of diagnosis and at appropriate time	RA			

of RA diagnosis (15).	intervals thereafter: a joint exam of 3 or more joint areas, functional status, disease activity (presence/absence of synovitis), acute phase reactant (define by ESR or CRP (and pain (by visual analog scale or other mechanism). **Numerator:** number of individuals with documented characteristics within 3 months of RA diagnosis. **Denominator:** number of individuals with RA diagnosis**.**				
Process: a) %of people who receive a physiotherapist assessment the day after surgery unless contraindicated. b) % of people who receive physiotherapist-led daily 89obilization from the day after surgery unless contraindicated. (NICE QS16)	People with hip fracture are offered a physiotherapist assessment the day after surgery and 89obilization at least once a day unless contraindicated. **2) Numerator:** the number of people in the denominator who receive a physiotherapist assessment the day after surgery. **Denominator:** the number of people with hip fracture who have undergone surgery and have no contraindications for physiotherapy. b) **Numerator:** the number of people in the denominator who receive physiotherapist-led daily 89obilization from the day after surgery. **Denominator:** the number of people with hip fracture who have undergone surgery and have no contraindications for physiotherapy. **Data source:** a) Local data collection. Contained in NICE audit support for hip fracture (NICE clinical guideline 124):	Hip fractures			

	90obilization, criterion 1. b) Local data collection. The Royal College of Physicians National audit of falls and bone health records whether an attempt was made within 24 hours of surgery to mobilise the patient. Contained in NICE audit support for hip fracture: 90obilization, criteria 2 and 3.				
Process: a) % of people with hip fracture who receive surgery on a planned trauma list. b) % of people with hip fracture having surgery who receive surgery with consultant or senior staff supervision. (NICE QS16)	2) **Numerator:** the number of people in the denominator who receive surgery on a planned trauma list. **Denominator:** the number of people with hip fracture having surgery. b) **Numerator:** the number of people in the denominator who receive surgery with consultant or senior staff supervision. **Denominator:** the number of people with hip fracture having surgery. **Data source:** a) The National Hip Fracture Database records the proportion of patients having surgery within 48 hours and during normal working hours. b) The Royal College of Physicians' National audit of falls and bone health records the percentage of patients operated on by consultant surgeons.	Hip fractures			
Process: a) % of people with hip fracture who receive a formal, recorded pain assessment immediately on admission to the	People with hip fracture receive prompt and effective pain management, in a manner that takes into account the hierarchy of pain management drugs, throughout their hospital stay. 2) **Numerator:** the number of people in the denominator	Hip fractures			

emergency department and within 30 minutes of initial analgesic administration. b) % of people with hip fracture who are offered paracetamol as first-line analgesia on admission to the emergency department and every 6 hours preoperatively, unless contraindicated. c) % of people with hip fracture who are offered paracetamol every 6 hours postoperatively. (NICE QS16)	who receive a formal, recorded pain assessment immediately on presentation to the emergency department and within 30 minutes of initial analgesic administration. **Denominator:** the number of people with hip fracture. b) **Numerator:** the number of people in the denominator who are offered paracetamol as first-line analgesia on admission to the emergency department and every 6 hours preoperatively. **Denominator:** the number of people with hip fracture and without contraindications to paracetamol. c) **Numerator:** the number of people in the denominator who are offered paracetamol every 6 hours postoperatively. **Denominator:** the number of people with hip fracture who have undergone surgery. **Data source (based on NICE QS16):** **2)** Local data collection. The Royal College of Physicians' National audit of falls and bone health records whether there was a documented assessment of pain severity (for example, a pain score) within the place of first presentation. Also, contained in NICE audit support for hip fracture (NICE clinical guideline 124): analgesia, criterion 1. b) Local data collection. Contained in NICE audit support for hip				

	fracture (NICE clinical guideline 124): analgesia, criteria 2 and 4. c) Local data collection. Contained in NICE audit support for hip fracture (NICE clinical guideline 124): analgesia, criterion 9.				
Process: Gastroprotection. % patients with a working diagnosis of OA taking an oral NSAID who are also prescribed PPI or alternative gastroprotective agent (16).	**Numerator:** The number of individuals with OA taking and oral NSAID who are also prescribed PPI or alternative gastroprotective agent. **Denominator:** The number of individuals with OA taking oral NSAID.	OA			
Process: % of people with hip fracture transferred from hospital for early supported discharge or intermediate care for whom the Hip Fracture Programme team makes (and documents the reasons for) the decision to transfer (NICE QS16).	The Hip Fracture Programme team retains a comprehensive and continuing clinical and service governance lead for all stages of the pathway of care, including the policies and criteria for both intermediate care and early supported discharge. **Numerator:** the number of people in the denominator for whom the Hip Fracture Programme team makes (and documents the reasons for) the decision to transfer. **Denominator:** the number of people transferred from hospital for early supported discharge or intermediate care. **Data source:** local data collection (NICE QS16)	Hip fractures			
Process: % of individuals with RA that has surgery requiring	IF a patient with RA has surgery requiring general anaesthesia, THEN there should be management or documentation of	RA			

general anaesthesia having their risk of atlantoaxial instability managed or documented (15).	the risk of atlantoaxial instability (15). **Numerator:** number of individuals with RA that has surgery requiring general anaesthesia having their risk of atlantoaxial instability managed or documented. **Denominator:** number of individuals with RA that has surgery requiring general anaesthesia.				
Process: % of individuals with hip fracture being offered a bone health assessment (NICE QS 16)	People with hip fracture are offered a bone health assessment to identify future fracture risk and offered pharmacological intervention as needed before discharge from hospital. **Numerator:** the number of people in the denominator who receive a bone health assessment before discharge from hospital. **Denominator:** the number of people with hip fracture. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures			
Process: % of individuals with hip fracture being discharged on bone protection medication	**Numerator:** number of patients with hip fracture being discharged on bone medication **Denominator:** all patients with hip fracture admitted to a hospital. **Data source:** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care.	Hip fractures	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first	**Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while	

			four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129).	this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Outcome: % of reoperation or revision (23)(Compendium)	ICHOM has developed a standard set for hip and knee OA working together with a group of leading physicians, measurement experts and patients. It is encouraged to use their set outcomes to better understand how to improve the lives of patients. Indicators were assigned to three categories (disease control, acute complications of treatment and patient reported health status) Reoperation or revision indicator is within the disease control category (23, 24). **Numerator:** number of patients with reoperation. **Denominator: t**otal number of replacements (for hip/knee/ankle/shoulder/elbow). **Data source:** The numerator should be taken form the National Joint Registry (NJR). The denominator should be taken form the HES data as NJR might not captured the primary replacement as it might have started after the first replacement (data collection began in 2003).	Joint replacements	**Usability:** A recent article (published in 2015 by Kandala et al. team) used National Joint Registry data to obtain revision rates for hip replacements and set the benchmark for the revision rates**.** The National Joint Registry for England and Wales represents a valuable resource providing statistical power and comprehensiveness. Study findings suggest that continuation of a benchmark of 10% at 10 years might allow patients to have inferior total hip replacement devices implanted. It was considered that a satisfactory benchmark could be set as a 4% revision rate at 10 years, although a 5% rate would allow for continuing innovation while ensuring that poorly performing devices can be phased out. NICE has now published its revised benchmark and recommends that the current benchmark at 10 years is reduced from 10% to 5%, which is supported by the data from the study above (142). The National Joint Registry (NJR) is an organization. The National Joint Registry is managed by the Healthcare Quality Improvement Partnership (HQIP). The National Joint Registry for England,	**Compliance:** The compliance rate is the proportion of procedure records submitted to the NJR compared with the levy returns for the number of implants sold.1 It is impossible to establish a one to one link between a single levy and the use of the implant and this comparison is subject to a number of factors, such as variation in the procurement cycle throughout the year. For individual NHS Trusts, compliance can also be measured against data held in the Hospital Episodes Statistics (HES) service and the Patient Episode Database for Wales (PEDW) service, though there are likely to be minor variations between the two because of coding differences. This comparison does not include privately funded procedures that take place in the independent sector in England and Wales as this data is not submitted to either HES or PEDW. **The overall compliance rate from 1 April 2003 to 31 March 2013 was 86.8%.** **Consent:** The consent rate compares the number of records submitted where the patient has agreed to their personal data being stored on the NJR database with the number of procedures recorded on the NJR. It is a requirement in	The ICHOM indicator audience would be applicable to all your categories, but in particular they have been used by commissioners, patients and providers as well as in national registries both in the UK and internationally (as per response from Survey of Indicators by Claude Pinnock). (51)

			Wales and Northern Ireland collects information on Joint Replacement Surgery and monitors the performance of joint replacement implants. Whilst NHS hospitals in England and Wales have always been 'expected' to submit data to the NJR, it has always been mandatory for independent sector units in England and Wales since the registry started. However, the Standard NHS Contract for Acute Services was amended in April 2011 (Section 12.1.2) and now states that all providers shall participate in audits, relevant to the service they provide within NCAPOP, of which the NJR is part. The submission of complete data to the NJR is, therefore, now mandatory for all NHS Trusts and Foundation Trusts within England. The Welsh Government has agreed that the NJR is mandatory for all NHS Wales hospitals and the Northern Ireland Health and Social Care Board has written NJR data entry into NHS Trust contracts, this includes all NHS-funded procedures. (143). All applications for a research project, external and internal, are managed by the NJR Research Sub-committee through a single portal of entry and management pathway.	England, Wales, and Northern Ireland that patients 'opt in' to have their personal data held by the NJR. Patient details are essential for linking patient procedures in order to monitor joint replacement procedure outcomes. The consent rate for 2012/13 was 91.0%. **Linkability:** The linkability rate compares the number of records submitted with the patient's NHS number with the number of procedures recorded on the NJR. The ability to link all operations relating to a single patient is vital in determining clinical outcomes. **The linkability rate for 2012/13 was 95.6% (143).**	
Process: % of individuals with hip OA having primary	**Numerator**: Individuals that had primary hip replacement. **Denominator:** Individuals with hip OA. In the 2014/15 national tariff was introduced the first currency based				

hip replacement (Compendium)	on patient outcomes. The purpose of the BPT for primary hip and knee replacements is to link payment to the outcomes that are important from the patient's perspective. The aim of these BPTs is to reduce the unexplained variation between providers in the outcomes reported by patients. Payment of the BPT for primary hip and knee replacement surgery is conditional on criteria linked to data collected through the National Joint Registry (NJR) and Patient Reported Outcome Measures (PROMS). Payment of the BPT for primary hip and knee replacement surgery is conditional on criteria linked to data collected through the National Joint Registry (NJR) and Patient Reported Outcome Measures (PROMS). The thresholds for payment of the BPT in 2014/15 are: a minimum NJR compliance rate of 75% an NJR known consent rate of 75% (where patient consent was recorded as a 'yes' or 'no') pre-operative PROMs response rate of 50% or more - the provider achieving an average health gain that is not significantly below the national average (131). **Data source:** The numerator should be taken from the National Joint Registry (NJR) or Hospital Episode Statistics (HES) data. The denominator should be taken from the population estimates, which are published on the ARUK website.				

Process: Proportion of individuals aged over 65 or older who reported 2 or more falls in the past year, or a single fall with injury requiring treatment, being offered multidisciplinary falls assessment (Steel et al. 2004).	IF a person aged 65 or older reported 2 or more falls in the past year, or a single fall with injury requiring treatment, THEN the patient should be offered a multidisciplinary falls assessment.	Falls			
Process: Proportion of individuals aged over 65 or older who reported 2 or more falls in the past year, or a single fall with injury requiring treatment, having their basic fall history taken by the physician (Steel et al. 2004).	IF a person aged 65 or older reported 2 or more falls in the past year, or a single fall with injury requiring treatment, THEN the physician should take a basic fall history.	Falls			
Process: DAS 28 score (144)	The DAS28 is a measure of disease activity in rheumatoid arthritis (RA). DAS stands for 'disease activity score' and the number 28 refers to the 28 joints that are examined in this assessment. The DAS28 is a composite score derived from 4 of these measures. This '28' version is a simplification of the original DAS score, which requires 44 joints to be counted. Other versions of the DAS28 allow the CRP to be used instead of the	RA	**Strengths:** Nevertheless as the DAS28 score is one of the best measures we have of RA disease activity, it is very likely that your rheumatology department will measure your DAS28 routinely, and use this as one of the reasons to recommend a change in treatment (144). **Weaknesses:** The DAS28 score has not been adopted in day-to-day (non-anti-TNF) practice by all rheumatologists in the UK.	**Reliability:** It has been identified as reasonable with Cronbach's alpha of 0.654 (145).	

	ESR, or the omission of either. A DAS28 of greater than 5.1 implies active disease, less than 3.2 low disease activity, and less than 2.6 remission (144).		This is in part because there are some pitfalls in the interpretation of the score. For example, if you never have a very high ESR blood result (even during a flare), or if your RA particularly affects the feet (these are not included in the 28 joint count) the score may be misleadingly low. Alternatively if you always have many tender joints when all other markers of inflammation and RA disease activity are quiet the score may be misleadingly high (144).		
Process: % of patients with SLE who received rituximab and are registered on BILAGBR (British Isles Lupus Assessment Group Biologics Registry) (146)	**Numerator:** From denominator, total number who received rituximab and are registered on BILAGBR. **Denominator:** Number of patients with SLE who received rituximab.	RA	**Usability:** It is used in Specialised Rheumatology (Adult) Quality Dashboard 2014/15 and presented in British Society for Rheumatology (BSR) Dashboard Development presentation.		
Process: Proportion of patients who have received IV cyclophosphamide and admitted with infection / sepsis within 6 months of treatment (146)	**Numerator:** From denominator, number of patients who are admitted with infection / sepsis within 6 months of treatment. **Denominator:** Number of patients who have received IV cyclophosphamide.	RA	**Usability:** It is used in Specialised Rheumatology (Adult) Quality Dashboard 2014/15 and presented in British Society for Rheumatology (BSR) Dashboard Development presentation.		
Process: % of patients with OA treated with NSAID, whose notes contain a record that they have	**Usability:** It is RAND health indicator adapted for the UK (136).			**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient	

been advised of the gastrointestinal and renal risks associated with this drug (136).				records from 18 practices in Norfolk (136).	
Process: % of patients with OA regularly treated with an NSAID, whose notes contain a record that they have been asked about gastrointestinal symptoms within the previous 12 months (136).	**Usability:** It is RAND health indicator adapted for the UK (136).			**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient records from 18 practices in Norfolk (136).	
Process: % of patients with OA treated with an NSAID, whose notes contain a record that ibuprofen (or a cox-2 inhibitor) has been considered for first-line treatment (unless contraindicated or intolerant) (136).	**Usability:** It has originated from NICE and Quality Indicators for General Practice (QIGP) (136).			**Feasibility:** Broadbent et al. (2008) study demonstrated the feasibility of using existing robust QIs to measure the quality of primary care for osteoarthritis. The study involved a total of 320 patient records from 18 practices in Norfolk (136).	
Process: % of individuals with hip fracture with pre-and post-operative abbreviated mental test score assessment (NICE QS 16)	**Usefulness:** the NHFD is the largest and fastest-growing national hip fracture audit in the world. Over a quarter of a million cases recorded since its launch in 2007 to 2013. In 2009 the NHFD was recognized by the National Clinical Audit Advisory Group for central funding, and the programme secured Healthcare			**Data source: a)** National Hip Fracture Database (NHFD). It is a clinically led, web-based audit of hip fracture care and secondary prevention. Its aim is to improve hip fracture care. Local data collection. The National Hip Fracture Database records the Abbreviated Mental Test score. Also, contained in NICE audit support for delirium	

	Improvement Partnership (HQIP) funding. In England, the NHFD has successfully supported the first four years of the Department of Health's Best Practice Tariff (BPT) initiative, which rewards the achievement of specified standards. The NHFD serves as a vital means of auditing the management of hip fractures (129). People with hip fracture have their cognitive status assessed, measured and recorded from admission. **Numerator:** number of patients with hip fracture having pre- and post-operative mental score test. **Denominator:** all patients with hip fracture admitted to a hospital.			(NICE clinical guideline 103), criteria 1 and 2. **b)** The Royal College of Physicians' National audit of falls and bone health records whether a formal assessment of cognitive function was performed within 72 hours of surgery (NICE QS 16). **Completeness:** All 186 eligible hospitals in England, Wales and Northern Ireland are now regularly uploading data. 95% of all cases occurring annually being documented by the NHFD as it was compared to HES for example HES showed 59,344 hip admissions in England whereas NHFD – 58,638. **Difficulty:** Technical and practical difficulties inherent in attempting to identify 60,000 patients with hip fracture in HES mean that while this report features NHFD figures for 2012–13, we report super-spell figures for 2011–12. (129)	
Process Organisational: % of individuals seen by the physician within 3 months for a new RA diagnosis (13).	**Time to referral** (15) IF a patient is referred to a physician for a new diagnosis of RA, THEN the patient should be seen by the physician within 3 months.				
Structure: % of patients having access to a multidisciplinary team.	People with RA should have ongoing access to a multidisciplinary team. This should provide the opportunity for periodic assessments **Numerator:** Number of people having ongoing access to a multidisciplinary team **Denominator:** Total number of people with RA in the GP practice.				

Structure: Proportion of outpatients who saw the same nurse at least three times out of their six most recent visits (147).	Patients with long term health conditions may need to be seen regularly by a specialist hospital department. Continuity of care refers to the interactions a patient has with health professionals in a particular specialty such as Rheumatology. This regular contact between the same individuals is called continuity of care, or more precisely 'relationship continuity'. With certain rheumatic diseases, doctors and nurses provide care in the Rheumatology Clinic and some tasks are done mainly by nurses, others by doctors. Regular contact between a patient and the same carer (relationship continuity) improves patient satisfaction, improves health outcome and reduces unnecessary tests. We judged that if a patient was able to see the same person at least three times out of every six visits (50% of the time) to the clinic, this was sufficient good practice. **Usability:** University Hospitals Birmingham are capturing the continuity of care by identifying the percentage of rheumatology outpatients who saw the same clinician or nurse at least three times out of their six most recent visits (147).			**Data collection:** The information about clinic appointments is recorded in the **Trust's Outpatient Management System (OPTIMS)**. Nurses: the indicator looks back at the last six appointments each patient had with a nurse and calculates how many times the patient saw the same nurse Doctors: the indicator looks back at the last six appointments each patient had with a doctor and calculates how many times the patient saw the same doctor.	
Structure: % of practices providing information□ (written or website) on how a patient can contact the practice for	**Numerator:** Number of practice that have information (written or website) on how a patient can contact the practice for urgent consultations (in case of flares/worsening of the disease, serious side effects). **Denominator:** Total number of practices. **Strengths:** It is				RA

urgent consultations (in case of flares/worsening of the disease, serious side effects (135)	recommended as a health quality indicator for RA by EUMUSC (139).				
Structure: Number of rheumatologists and orthopaedic specialists per 100,000 population (148)	This might be a candidate indicator for the UK as it was considered in Australia during the shortlisting process. However, it was not included in the final indicator set. **Strengths:** This indicator was developed by the Australian Institute of Health and Welfare and the Data Working Group of the National Arthritis and Musculoskeletal Conditions Advisory Group, in consultation with various experts and stakeholders. **Weaknesses:** The indicator was not included in the final indicator list. There were few reasons for this. Although the labour force issue was important, it was generally considered that the relevant workforce was very broad, including GPs, specialist nurses and allied health professionals as well as the identified specialists. Community programs also provided assistance. There was also a perception that many people with osteoarthritis were treated by their GP and never in fact visited a specialist. Conversely, the identified specialists do not only treat people with arthritis and musculoskeletal conditions so the indicator would not provide an accurate picture of the available workforce. Some measure of the work time				

	assigned to arthritis would be required, however this may be difficult and expensive to collect. It may be more practical to focus the indicator on rheumatologists as the labour force for treatment of rheumatoid arthritis. In order to be able to interpret the indicator, there needs to be some idea of the optimal number of specialists required. There was also a concern that it may be difficult to interpret changes in the workforce numbers (148).				
Structure: % of professionals managing patients with OA at a primary health care centre and receiving continuous access to education on important preventative and therapeutic strategies in the management of OA (130).	**Strengths: EUMUSC recommends: HCQI OA 7:** All professionals managing patients with OA at a primary health care centre should have continuous access to education on important preventive and therapeutic strategies in the management of OA (130). **Numerator:** Number of professionals managing patients with OA at a primary health care centre should have continuous access to education on important preventive and therapeutic strategies in the management of OA. **Denominator:** Number of professionals managing patients with OA at a primary health care centre				
Structure: % of patients diagnosed with OA seeing an orthopaedic surgeon within 3 months of referral (130).	**HCQI OA 9:** If a patient is diagnosed with OA and has been referred to an orthopaedic surgeon, then the waiting time from first referral should not exceed three months (130). **Numerator:** Number of patients diagnosed with OA seeing an				OA

	orthopaedic surgeon within 3 months of referral **Denominator:** Number of patients diagnosed with OA waiting so see an orthopaedic surgeon **Strengths:** Recommended by EUMUSC.				
Structure: % of patients with suspected rheumatoid arthritis seeing a specialist for confirmation of diagnosis within 6 weeks of the onset of symptoms (135).	**HCQI RA1**: If a patient presents with suspected rheumatoid arthritis (RA) then he/she should be referred to and seen by a specialist (preferably a rheumatologist) for confirmation of diagnosis within 6 weeks after the onset of symptoms. **Numerator:** Number of patients with suspected rheumatoid arthritis seeing a specialist for confirmation of diagnosis within 6 weeks of the onset of symptoms. **Denominator:** Number of patients with suspected rheumatoid arthritis (135). **Strengths:** Recommended by EUMUSC.				RA
Structure: Mean time from receipt of initial GP referral to first attended dedicated specialist non-urgent OPD for patients with connective tissue disease and vasculitis (146)	**Numerator:** Total time to first attended appointments (days) **Denominator:** Total number of GP referrals	RA	**Usability:** It is used in Specialised Rheumatology (Adult) Quality Dashboard 2014/15 and presented in British Society for Rheumatology (BSR) Dashboard Development presentation.		

6. Bibliography

1. Campbell SM, Braspenning J, Hutchinson A, Marshall M. Research methods used in developing and applying quality indicators in primary care. Qual Saf Health Care. 2002;11(4):358-64.

2. PHAST. Project Proposal for MSK Indicators Project. 2014-2015.

3. Osteras N, Garratt A, Grotle M, Natvig B, Kjeken I, Kvien TK, et al. Patient-reported quality of care for osteoarthritis: development and testing of the osteoarthritis quality indicator questionnaire. Arthritis Care Res (Hoboken). 2013;65(7):1043-51.

4. Krishnan E, Tugwell P, Fries JF. Percentile benchmarks in patients with rheumatoid arthritis: Health Assessment Questionnaire as a quality indicator (QI). Arthritis Res Ther. 2004;6(6):R505-13.

5. Mant J. Process versus outcome indicators in the assessment of quality of health care. Int J Qual Health Care. 2001;13(6):475-80.

6. Sarah C Smith SC, Donna L Lamping, Sophie Staniszewska1, , John Browne JL, Jan van der Meulen, John Cairns, Nick Black. Patient-Reported Outcome Measures (PROMs)

for routine use in Treatment Centres:

recommendations based on a review of the scientific evidence

. 2005.

7. Hurst NP, Kind P, Ruta D, Hunter M, Stubbings A. Measuring health-related quality of life in rheumatoid arthritis: validity, responsiveness and reliability of EuroQol (EQ-5D). Br J Rheumatol. 1997;36(5):551-9.

8. Binkley JM, Stratford PW, Lott SA, Riddle DL. The Lower Extremity Functional Scale (LEFS): scale development, measurement properties, and clinical application. North American Orthopaedic Rehabilitation Research Network. Phys Ther. 1999;79(4):371-83.

9. Kirshner B, Guyatt G. A methodological framework for assessing health indices. J Chronic Dis. 1985;38(1):27-36.

10. Harrison MJ, Davies LM, Bansback NJ, McCoy MJ, Verstappen SM, Watson K, et al. The comparative responsiveness of the EQ-5D and SF-6D to change in patients with inflammatory arthritis. Qual Life Res. 2009;18(9):1195-205.

11. Harris KK, Dawson J, Jones LD, Beard DJ, Price AJ. Extending the use of PROMs in the NHS--using the Oxford Knee Score in patients undergoing non-operative management for knee osteoarthritis: a validation study. BMJ Open. 2013;3(8):e003365.

12. Harris K, Dawson J, Doll H, Field RE, Murray DW, Fitzpatrick R, et al. Can pain and function be distinguished in the Oxford Knee Score in a meaningful way? An exploratory and confirmatory factor analysis. Qual Life Res. 2013;22(9):2561-8.

13. Singh A, Gnanalingham K, Casey A, Crockard A. Quality of life assessment using the Short Form-12 (SF-12) questionnaire in patients with cervical spondylotic myelopathy: comparison with SF-36. Spine (Phila Pa 1976). 2006;31(6):639-43.

14. Pencharz JN, MacLean CH. Measuring quality in arthritis care: the Arthritis Foundation's Quality Indicator set for osteoarthritis. Arthritis Rheum. 2004;51(4):538-48.

15. MacLean CH, Saag KG, Solomon DH, Morton SC, Sampsel S, Klippel JH. Measuring quality in arthritis care: methods for developing the Arthritis Foundation's quality indicator set. Arthritis Rheum. 2004;51(2):193-202.

16. Edwards JJ, Khanna M, Jordan KP, Jordan JL, Bedson J, Dziedzic KS. Quality indicators for the primary care of osteoarthritis: a systematic review. Ann Rheum Dis. 2015;74(3):490-8.

17. NICE. Osteoarthritis. Care and management in adults. 2014.

18. Zhang W, Doherty M, Peat G, Bierma-Zeinstra MA, Arden NK, Bresnihan B, et al. EULAR evidence-based recommendations for the diagnosis of knee osteoarthritis. Ann Rheum Dis. 2010;69(3):483-9.

19. Zhang W, Doherty M, Leeb BF, Alekseeva L, Arden NK, Bijlsma JW, et al. EULAR evidence based recommendations for the management of hand osteoarthritis: report of a Task Force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics (ESCISIT). Ann Rheum Dis. 2007;66(3):377-88.

20. Zhang W, Doherty M, Arden N, Bannwarth B, Bijlsma J, Gunther KP, et al. EULAR evidence based recommendations for the management of hip osteoarthritis: report of a task force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics (ESCISIT). Ann Rheum Dis. 2005;64(5):669-81.

21. Zhang W, Nuki G, Moskowitz RW, Abramson S, Altman RD, Arden NK, et al. OARSI recommendations for the management of hip and knee osteoarthritis: part III: Changes in evidence following systematic cumulative update of research published through January 2009. Osteoarthritis Cartilage. 2010;18(4):476-99.

22. Zhang W, Moskowitz RW, Nuki G, Abramson S, Altman RD, Arden N, et al. OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. Osteoarthritis Cartilage. 2008;16(2):137-62.

23. ICHOM. Standard set for hip and knee OA. 2015.

24. ICHOM. HIP & KNEE OSTEOARTHRITIS DATA COLLECTION REFERENCE GUIDE. 2015.

25. ICHOM. Standard set for low back pain. 2015.

26. ICHOM. Low Back Pain Reference guide. 2015.

27. NICE. 2015/16 General Medical Services (GMS) contract Quality and Outcomes Framework (QOF). 2015.

28. NICE. Rheumatoid arthritis

The management of rheumatoid arthritis in adults. 2009.

29. Zangi HA, Ndosi M, Adams J, Andersen L, Bode C, Bostrom C, et al. EULAR recommendations for patient education for people with inflammatory arthritis. Ann Rheum Dis. 2015;74(6):954-62.

30. Koczy B, Semenowicz J, Majewski J, Wasik J. Mortality as an indicator of treatment quality after pertrochanteric fractures in the elderly. Pol Orthop Traumatol. 2013;78:65-9.

31. Haverman L, van Oers HA, Maurice-Stam H, Kuijpers TW, Grootenhuis MA, van Rossum MA. Health related quality of life and parental perceptions of child vulnerability among parents of a child with juvenile idiopathic arthritis: results from a web-based survey. Pediatr Rheumatol Online J. 2014;12:34.

32. Williams VJ, Piva SR, Irrgang JJ, Crossley C, Fitzgerald GK. Comparison of reliability and responsiveness of patient-reported clinical outcome measures in knee osteoarthritis rehabilitation. J Orthop Sports Phys Ther. 2012;42(8):716-23.

33. Bellamy N, Bensen WG, Ford PM, Huang SH, Lang JY. Double-blind randomized controlled trial of flurbiprofen-SR (ANSAID-SR) and diclofenac sodium-SR (Voltaren-SR) in the treatment of osteoarthritis. Clin Invest Med. 1992;15(5):427-33.

34. Nilsdotter AK, Petersson IF, Roos EM, Lohmander LS. Predictors of patient relevant outcome after total hip replacement for osteoarthritis: a prospective study. Ann Rheum Dis. 2003;62(10):923-30.

35. Laupacis A, Bourne R, Rorabeck C, Feeny D, Tugwell P, Wong C. Comparison of total hip arthroplasty performed with and without cement : a randomized trial. J Bone Joint Surg Am. 2002;84-A(10):1823-8.

36. Fortin PR, Penrod JR, Clarke AE, St-Pierre Y, Joseph L, Belisle P, et al. Timing of total joint replacement affects clinical outcomes among patients with osteoarthritis of the hip or knee. Arthritis Rheum. 2002;46(12):3327-30.

37. Lingard EA, Katz JN, Wright RJ, Wright EA, Sledge CB, Kinemax Outcomes G. Validity and responsiveness of the Knee Society Clinical Rating System in comparison with the SF-36 and WOMAC. J Bone Joint Surg Am. 2001;83-A(12):1856-64.

38. Bischoff-Ferrari HA, Vondechend M, Bellamy N, Theiler R. Validation and patient acceptance of a computer touch screen version of the WOMAC 3.1 osteoarthritis index. Ann Rheum Dis. 2005;64(1):80-4.

39. Pham T, Van Der Heijde D, Lassere M, Altman RD, Anderson JJ, Bellamy N, et al. Outcome variables for osteoarthritis clinical trials: The OMERACT-OARSI set of responder criteria. J Rheumatol. 2003;30(7):1648-54.

40. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. J Rheumatol. 1988;15(12):1833-40.

41. Davies GM, Watson DJ, Bellamy N. Comparison of the responsiveness and relative effect size of the western Ontario and McMaster Universities Osteoarthritis Index and the short-form Medical Outcomes Study Survey in a randomized, clinical trial of osteoarthritis patients. Arthritis Care Res. 1999;12(3):172-9.

42. Stucki G, Sangha O, Stucki S, Michel BA, Tyndall A, Dick W, et al. Comparison of the WOMAC (Western Ontario and McMaster Universities) osteoarthritis index and a self-report format of the self-administered Lequesne-Algofunctional index in patients with knee and hip osteoarthritis. Osteoarthritis Cartilage. 1998;6(2):79-86.

43. Theiler R, Sangha O, Schaeren S, Michel BA, Tyndall A, Dick W, et al. Superior responsiveness of the pain and function sections of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) as compared to the Lequesne-Algofunctional Index in patients with osteoarthritis of the lower extremities. Osteoarthritis Cartilage. 1999;7(6):515-9.

44. Bombardier C, Melfi CA, Paul J, Green R, Hawker G, Wright J, et al. Comparison of a generic and a disease-specific measure of pain and physical function after knee replacement surgery. Med Care. 1995;33(4 Suppl):AS131-44.

45. Kennedy D, Stratford PW, Pagura SMC, Wessel J, Gollish JD, Woodhouse LJ. Exploring the factorial validity and clinical interpretability of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). Physiotherapy Canada. 2003;55(3):160-8.

46. McGrory BJ, Harris WH. Can the western Ontario and McMaster Universities (WOMAC) osteoarthritis index be used to evaluate different hip joints in the same patient? J Arthroplasty. 1996.

47. Boardman DL, Dorey F, Thomas BJ, Lieberman JR. The accuracy of assessing total hip arthroplasty outcomes: a prospective correlation study of walking ability and 2 validated measurement devices. J Arthroplasty. 2000;15(2):200-4.

48. Witvrouw E, Victor J, Bellemans J, Rock B, Van Lummel R, Van Der Slikke R, et al. A correlation study of objective functionality and WOMAC in total knee arthroplasty. Knee Surg Sports Traumatol Arthrosc. 2002;10(6):347-51.

49. Finch E, Walsh M, Thomas SG, Woodhouse LJ. Functional ability perceived by individuals following total knee arthroplasty compared to age-matched individuals without knee disability. J Orthop Sports Phys Ther. 1998;27(4):255-63.

50. Davis AM, Perruccio AV, Canizares M, Hawker GA, Roos EM, Maillefert JF, et al. Comparative, validity and responsiveness of the HOOS-PS and KOOS-PS to the WOMAC physical function subscale in total joint replacement for osteoarthritis. Osteoarthritis Cartilage. 2009;17(7):843-7.

51. PHAST. Indicators Advisory Group (IAG) survey of indicators report of responses. 2015.

52. Gossec L, Hawker G, Davis AM, Maillefert JF, Lohmander LS, Altman R, et al. OMERACT/OARSI initiative to define states of severity and indication for joint replacement in hip and knee osteoarthritis. J Rheumatol. 2007;34(6):1432-5.

53. Hawker GA, Davis AM, French MR, Cibere J, Jordan JM, March L, et al. Development and preliminary psychometric testing of a new OA pain measure--an OARSI/OMERACT initiative. Osteoarthritis Cartilage. 2008;16(4):409-14.

54. Davis AM, Perruccio AV, Canizares M, Tennant A, Hawker GA, Conaghan PG, et al. The development of a short measure of physical function for hip OA HOOS-Physical Function Shortform (HOOS-PS): an OARSI/OMERACT initiative. Osteoarthritis Cartilage. 2008;16(5):551-9.

55. Perruccio AV, Stefan Lohmander L, Canizares M, Tennant A, Hawker GA, Conaghan PG, et al. The development of a short measure of physical function for knee OA KOOS-Physical Function Shortform (KOOS-PS) - an OARSI/OMERACT initiative. Osteoarthritis Cartilage. 2008;16(5):542-50.

56. Nilsdotter A, Bremander A. Measures of hip function and symptoms: Harris Hip Score (HHS), Hip Disability and Osteoarthritis Outcome Score (HOOS), Oxford Hip Score (OHS), Lequesne Index of Severity for Osteoarthritis of the Hip (LISOH), and American Academy of Orthopedic Surgeons (AAOS) Hip and Knee Questionnaire. Arthritis Care Res (Hoboken). 2011;63 Suppl 11:S200-7.

57. Thorborg K, Roos EM, Bartels EM, Petersen J, Holmich P. Validity, reliability and responsiveness of patient-reported outcome questionnaires when assessing hip and groin disability: a systematic review. Br J Sports Med. 2010;44(16):1186-96.

58. Veenhof C, Bijlsma JW, van den Ende CH, van Dijk GM, Pisters MF, Dekker J. Psychometric evaluation of osteoarthritis questionnaires: a systematic review of the literature. Arthritis Rheum. 2006;55(3):480-92.

59. Klassbo M, Larsson E, Mannevik E. Hip disability and osteoarthritis outcome score. An extension of the Western Ontario and McMaster Universities Osteoarthritis Index. Scand J Rheumatol. 2003;32(1):46-51.

60. Nilsdotter AK, Lohmander LS, Klassbo M, Roos EM. Hip disability and osteoarthritis outcome score (HOOS)--validity and responsiveness in total hip replacement. BMC Musculoskelet Disord. 2003;4:10.

61. de Groot IB, Reijman M, Terwee CB, Bierma-Zeinstra S, Favejee MM, Roos E, et al. Validation of the Dutch version of the Hip disability and Osteoarthritis Outcome Score. Osteoarthritis Cartilage. 2009;17(1):132.

62. Ornetti P, Parratte S, Gossec L, Tavernier C, Argenson JN, Roos EM, et al. Cross-cultural adaptation and validation of the French version of the Hip disability and Osteoarthritis Outcome Score (HOOS) in hip osteoarthritis patients. Osteoarthritis Cartilage. 2010;18(4):522-9.

63. Collins NJ, Misra D, Felson DT, Crossley KM, Roos EM. Measures of knee function: International Knee Documentation Committee (IKDC) Subjective Knee Evaluation Form, Knee Injury and Osteoarthritis Outcome Score (KOOS), Knee Injury and Osteoarthritis Outcome Score Physical Function Short Form (KOOS-PS), Knee Outcome Survey Activities of Daily Living Scale (KOS-ADL), Lysholm Knee Scoring Scale, Oxford Knee Score (OKS), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Activity Rating Scale (ARS), and Tegner Activity Score (TAS). Arthritis Care Res (Hoboken). 2011;63 Suppl 11:S208-28.

64. Medalla GA, Moonot P, Peel T, Kalairajah Y, Field RE. Cost-benefit comparison of the Oxford Knee score and the American Knee Society score in measuring outcome of total knee arthroplasty. J Arthroplasty. 2009;24(4):652-6.

65. Choices N. Patient Reported Outcome Measures (PROMs) [15 July 2015]. Available from: http://www.nhs.uk/NHSEngland/thenhs/records/proms/Pages/aboutproms.aspx.

66. Health Do. Patient Reported Outcome Measures (PROMs) in England: identifying potential outliers. 2011.

67. Dawson J, Fitzpatrick R, Murray D, Carr A. Questionnaire on the perceptions of patients about total knee replacement. J Bone Joint Surg Br. 1998;80(1):63-9.

68. Dawson J, Fitzpatrick R, Carr A. Questionnaire on the perceptions of patients about shoulder surgery. J Bone Joint Surg Br. 1996;78(4):593-600.

69. Impellizzeri FM, Mannion AF, Leunig M, Bizzini M, Naal FD. Comparison of the reliability, responsiveness, and construct validity of 4 different questionnaires for evaluating outcomes after total knee arthroplasty. J Arthroplasty. 2011;26(6):861-9.

70. Garratt AM, Brealey S, Gillespie WJ, Team DT. Patient-assessed health instruments for the knee: a structured review. Rheumatology (Oxford). 2004;43(11):1414-23.

71. Moonot P, Medalla GA, Matthews D, Kalairajah Y, Field RE. Correlation between the Oxford Knee and American Knee Society scores at mid-term follow-up. J Knee Surg. 2009;22(3):226-30.

72. Murray DW, Fitzpatrick R, Rogers K, Pandit H, Beard DJ, Carr AJ, et al. The use of the Oxford hip and knee scores. J Bone Joint Surg Br. 2007;89(8):1010-4.

73. Dawson J, Fitzpatrick R, Frost S, Gundle R, McLardy-Smith P, Murray D. Evidence for the validity of a patient-based instrument for assessment of outcome after revision hip replacement. J Bone Joint Surg Br. 2001;83(8):1125-9.

74. Field RE, Cronin MD, Singh PJ. The Oxford hip scores for primary and revision hip replacement. J Bone Joint Surg Br. 2005;87(5):618-22.

75. Fitzpatrick R, Morris R, Hajat S, Reeves B, Murray DW, Hannen D, et al. The value of short and simple measures to assess outcomes for patients of total hip replacement surgery. Qual Health Care. 2000;9(3):146-50.

76. Dawson J, Fitzpatrick R, Murray D, Carr A. Comparison of measures to assess outcomes in total hip replacement surgery. Qual Health Care. 1996;5(2):81-8.

77. McMurray R, Heaton J, Sloper P, Nettleton S. Measurement of patient perceptions of pain and disability in relation to total hip replacement: the place of the Oxford hip score in mixed methods. Qual Health Care. 1999;8(4):228-33.

78. Wylde V, Learmonth ID, Cavendish VJ. The Oxford hip score: the patient's perspective. Health Qual Life Outcomes. 2005;3:66.

79. Yeung TS, Wessel J, Stratford P, Macdermid J. Reliability, validity, and responsiveness of the lower extremity functional scale for inpatients of an orthopaedic rehabilitation ward. J Orthop Sports Phys Ther. 2009;39(6):468-77.

80. Watson CJ, Propps M, Ratner J, Zeigler DL, Horton P, Smith SS. Reliability and responsiveness of the lower extremity functional scale and the anterior knee pain scale in patients with anterior knee pain. J Orthop Sports Phys Ther. 2005;35(3):136-46.

81. Soderman P, Malchau H. Is the Harris hip score system useful to study the outcome of total hip replacement? Clin Orthop Relat Res. 2001(384):189-97.

82. Kirmit L, Karatosun V, Unver B, Bakirhan S, Sen A, Gocen Z. The reliability of hip scoring systems for total hip arthroplasty candidates: assessment by physical therapists. Clin Rehabil. 2005;19(6):659-61.

83. Shi HY, Mau LW, Chang JK, Wang JW, Chiu HC. Responsiveness of the Harris Hip Score and the SF-36: five years after total hip arthroplasty. Qual Life Res. 2009;18(8):1053-60.

84. Marra CA, Rashidi AA, Guh D, Kopec JA, Abrahamowicz M, Esdaile JM, et al. Are indirect utility measures reliable and responsive in rheumatoid arthritis patients? Qual Life Res. 2005;14(5):1333-44.

85. Rosemann T, Korner T, Wensing M, Schneider A, Szecsenyi J. Evaluation and cultural adaptation of a German version of the AIMS2-SF questionnaire (German AIMS2-SF). Rheumatology (Oxford). 2005;44(9):1190-5.

86. Luo X, George ML, Kakouras I, Edwards CL, Pietrobon R, Richardson W, et al. Reliability, validity, and responsiveness of the short form 12-item survey (SF-12) in patients with back pain. Spine (Phila Pa 1976). 2003;28(15):1739-45.

87. Gandhi SK, Salmon JW, Zhao SZ, Lambert BL, Gore PR, Conrad K. Psychometric evaluation of the 12-item short-form health survey (SF-12) in osteoarthritis and rheumatoid arthritis clinical trials. Clin Ther. 2001;23(7):1080-98.

88. Kim SH, Jo MW, Ahn J, Ock M, Shin S, Park J. Assessment of psychometric properties of the Korean SF-12 v2 in the general population. BMC Public Health. 2014;14:1086.

89. Gronhaug G, Osteras N, Hagen KB. Quality of hip and knee osteoarthritis management in primary health care in a Norwegian county: a cross-sectional survey. BMC Health Serv Res. 2014;14(1):598.

90. Irrgang JJ, Snyder-Mackler L, Wainner RS, Fu FH, Harner CD. Development of a patient-reported measure of function of the knee. J Bone Joint Surg Am. 1998;80(8):1132-45.

91. Piva SR, Gil AB, Moore CG, Fitzgerald GK. Responsiveness of the activities of daily living scale of the knee outcome survey and numeric pain rating scale in patients with patellofemoral pain. J Rehabil Med. 2009;41(3):129-35.

92. Marx RG, Jones EC, Allen AA, Altchek DW, O'Brien SJ, Rodeo SA, et al. Reliability, validity, and responsiveness of four knee outcome scales for athletic patients. J Bone Joint Surg Am. 2001;83-A(10):1459-69.

93. Iqbal S U RW, Selim A, Qian S, Lee A, Ren X S, Rothendler J, Miller D, Kazis L E. The Veterans Rand 12 Item Health Survey (VR-12): what is is and how it is used. 2007.

94. Soer R, Reneman MF, Speijer BL, Coppes MH, Vroomen PC. Clinimetric properties of the EuroQol-5D in patients with chronic low back pain. Spine J. 2012;12(11):1035-9.

95. Harrison MJ, Davies LM, Bansback NJ, Ingram M, Anis AH, Symmons DP. The validity and responsiveness of generic utility measures in rheumatoid arthritis: a review. J Rheumatol. 2008;35(4):592-602.

96. Hernandez Alava M, Wailoo A, Wolfe F, Michaud K. The relationship between EQ-5D, HAQ and pain in patients with rheumatoid arthritis. Rheumatology (Oxford). 2013;52(5):944-50.

97. Dures EK, Hewlett SE, Cramp FA, Greenwood R, Nicklin JK, Urban M, et al. Reliability and sensitivity to change of the Bristol Rheumatoid Arthritis Fatigue scales. Rheumatology (Oxford). 2013;52(10):1832-9.

98. Gignac MA, Cao X, McAlpine J, Badley EM. Measures of disability: Arthritis Impact Measurement Scales 2 (AIMS2), Arthritis Impact Measurement Scales 2-Short Form (AIMS2-SF), The Organization for Economic Cooperation and Development (OECD) Long-Term Disability (LTD) Questionnaire, EQ-5D, World Health Organization Disability Assessment Schedule II (WHODASII), Late-Life Function and Disability Instrument (LLFDI), and Late-Life Function and Disability Instrument-Abbreviated Version (LLFDI-Abbreviated). Arthritis Care Res (Hoboken). 2011;63 Suppl 11:S308-24.

99. Hagen KB, Smedstad LM, Uhlig T, Kvien TK. The responsiveness of health status measures in patients with rheumatoid arthritis: comparison of disease-specific and generic instruments. J Rheumatol. 1999;26(7):1474-80.

100. Hakala M, Nieminen P, Manelius J. Joint impairment is strongly correlated with disability measured by self-report questionnaires. Functional status assessment of individuals with rheumatoid arthritis in a population based series. J Rheumatol. 1994;21(1):64-9.

101. Salaffi F, Stancati A, Carotti M. Responsiveness of health status measures and utility-based methods in patients with rheumatoid arthritis. Clin Rheumatol. 2002;21(6):478-87.

102. ten Klooster PM, Veehof MM, Taal E, van Riel PL, van de Laar MA. Changes in priorities for improvement in patients with rheumatoid arthritis during 1 year of anti-tumour necrosis factor treatment. Ann Rheum Dis. 2007;66(11):1485-90.

103. Rosemann T, Joos S, Laux G, Gensichen J, Szecsenyi J. Case management of arthritis patients in primary care: a cluster-randomized controlled trial. Arthritis Rheum. 2007;57(8):1390-7.

104. Husted J, Gladman DD, Farewell VT, Long JA. Validation of the revised and expanded version of the Arthritis Impact Measurement Scales for patients with psoriatic Arthritis. J Rheumatol. 1996;23(6):1015-9.

105. Taccari E, Spadaro A, Rinaldi T, Riccieri V, Sensi F. Comparison of the Health Assessment Questionnaire and Arthritis Impact Measurement Scale in patients with psoriatic arthritis. Rev Rhum Engl Ed. 1998;65(12):751-8.

106. Guillemin F, Challier B, Urlacher F, Vancon G, Pourel J. Quality of life in ankylosing spondylitis: validation of the ankylosing spondylitis Arthritis Impact Measurement Scales 2, a modified Arthritis Impact Measurement Scales Questionnaire. Arthritis Care Res. 1999;12(3):157-62.

107. Lukaczer D, Darland G, Tripp M, Liska D, Lerman RH, Schiltz B, et al. A pilot trial evaluating Meta050, a proprietary combination of reduced iso-alpha acids, rosemary extract and oleanolic acid in patients with arthritis and fibromyalgia. Phytother Res. 2005;19(10):864-9.

108. Neumann L, Dudnik Y, Bolotin A, Buskila D. Evaluation of a Hebrew version of the revised and expanded Arthritis Impact Measurement Scales (AIMS2) in patients with fibromyalgia. J Rheumatol. 1999;26(8):1816-21.

109. Amadio PC, Silverstein MD, Ilstrup DM, Schleck CD, Jensen LM. Outcome after Colles fracture: the relative responsiveness of three questionnaires and physical examination measures. J Hand Surg Am. 1996;21(5):781-7.

110. Poiraudeau S, Dougados M, Ait-Hadad H, Pion-Graff J, Ayral X, Listrat V, et al. [Evaluation of a quality of life scale (AIMS2) in rheumatology]. Rev Rhum Ed Fr. 1993;60(9):561-7.

111. Meenan RF, Mason JH, Anderson JJ, Guccione AA, Kazis LE. AIMS2. The content and properties of a revised and expanded Arthritis Impact Measurement Scales Health Status Questionnaire. Arthritis Rheum. 1992;35(1):1-10.

112. Rosemann T, Szecsenyi J. Cultural adaptation and validation of a German version of the Arthritis Impact Measurement Scales (AIMS2). Osteoarthritis Cartilage. 2007;15(10):1128-33.

113. Atamaz F, Hepguler S, Oncu J. Translation and validation of the Turkish version of the arthritis impact measurement scales 2 in patients with knee osteoarthritis. J Rheumatol. 2005;32(7):1331-6.

114. Guillemin F, Coste J, Pouchot J, Ghezail M, Bregeon C, Sany J. The AIMS2-SF: a short form of the Arthritis Impact Measurement Scales 2. French Quality of Life in Rheumatology Group. Arthritis Rheum. 1997;40(7):1267-74.

115. Taal E, Rasker JJ, Riemsma RP. Sensitivity to change of AIMS2 and AIMS2-SF components in comparison to M-HAQ and VAS-pain. Ann Rheum Dis. 2004;63(12):1655-8.

116. Husted JA, Gladman DD, Cook RJ, Farewell VT. Responsiveness of health status instruments to changes in articular status and perceived health in patients with psoriatic arthritis. J Rheumatol. 1998;25(11):2146-55.

117. Baillet A, Payraud E, Niderprim VA, Nissen MJ, Allenet B, Francois P, et al. A dynamic exercise programme to improve patients' disability in rheumatoid arthritis: a prospective randomized controlled trial. Rheumatology (Oxford). 2009;48(4):410-5.

118. Taylor LF, Kee CC, King SV, Ford TA. Evaluating the effects of an educational symposium on knowledge, impact, and self-management of older african americans living with osteoarthritis. J Community Health Nurs. 2004;21(4):229-38.

119. Wetzels R, van Weel C, Grol R, Wensing M. Family practice nurses supporting self-management in older patients with mild osteoarthritis: a randomized trial. BMC Fam Pract. 2008;9:7.

120. Taal E, Rasker JJ, Riemsma RP. Psychometric properties of a Dutch short form of the Arthritis Impact Measurement Scales 2 (Dutch-AIMS2-SF). Rheumatology (Oxford). 2003;42(3):427-34.

121. Askary-Ashtiani AR, Mousavi SJ, Parnianpour M, Montazeri A. Translation and validation of the Persian version of the Arthritis Impact Measurement Scales 2-Short Form (AIMS2-SF) in patients with rheumatoid arthritis. Clin Rheumatol. 2009;28(5):521-7.

122. Haavardsholm EA, Kvien TK, Uhlig T, Smedstad LM, Guillemin F. A comparison of agreement and sensitivity to change between AIMS2 and a short form of AIMS2 (AIMS2-SF) in more than 1,000 rheumatoid arthritis patients. J Rheumatol. 2000;27(12):2810-6.

123. Rat AC, Guillemin F, Pouchot J. Mapping the osteoarthritis knee and hip quality of life (OAKHQOL) instrument to the international classification of functioning, disability and health and comparison to five health status instruments used in osteoarthritis. Rheumatology (Oxford). 2008;47(11):1719-25.

124. Smarr KL, Keefer AL. Measures of depression and depressive symptoms: Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). Arthritis Care Res (Hoboken). 2011;63 Suppl 11:S454-66.

125. Pinto-Meza A, Serrano-Blanco A, Penarrubia MT, Blanco E, Haro JM. Assessing depression in primary care with the PHQ-9: can it be carried out over the telephone? J Gen Intern Med. 2005;20(8):738-42.

126. Lowe B, Unutzer J, Callahan CM, Perkins AJ, Kroenke K. Monitoring depression treatment outcomes with the patient health questionnaire-9. Med Care. 2004;42(12):1194-201.

127. Bosworth A, Cox M, O'Brien A, Jones P, Sargeant I, Elliott A, et al. Development and validation of a Patient Reported Experience Measure (PREM) for patients with rheumatoid arthritis (RA) and other rheumatic conditions. Current rheumatology reviews. 2015.

128. CQRA. Bukhari M JP, Sargeant I, Cox M, Elliott A, Bullock S, O'Brien A, Bosworth A. Validation of a patient reported experience measure in patients with rheumatoid arthritis 2013. Available from: http://www.nras.org.uk/data/files/For professionals/CQRA /CQRA PREMS RA ACR 2013 POSTER.pdf.

129. (NHFD) NHFD. National report 2013. 2013.

130. EUMUSC. Health care quality indicators for OA. 2008.

131. England N. 2015/16 National Tariff Payment System: Engagement on national prices.

132. HSCIC. Indicator Portal.

133. HSCIC. Hospital Episode Statistics, Emergency readmissions to hospital within 28 days of discharge . Financial year 2011/12. 2013.

134. NICE. Osteoarthritis. Quality Standards 87. 2015.

135. EUMUSC. Health care quality indicators for RA. 2008.

136. Broadbent J, Maisey S, Holland R, Steel N. Recorded quality of primary care for osteoarthritis: an observational study. Br J Gen Pract. 2008;58(557):839-43.

137. HSCIC. Emergency hospital admissions: Fractured proximal femur. 2015.

138. NICE. Quality Standards and Indicators.

139. NICE. QS33. Rheumatoid arthritis. 2013.

140. NICE. Developing an Annual Review Clinic for People with Rheumatoid Arthritis. 2015.

141. (NRAS) NRAS. The Annual Review Clinic for Rheumatoid Arthritis – A View from Newcastle. Available from: http://www.nras.org.uk/the-annual-review-clinic-for-rheumatoid-arthritis-a-view-from-newcastle.

142. Kandala NB, Connock M, Pulikottil-Jacob R, Sutcliffe P, Crowther MJ, Grove A, et al. Setting benchmark revision rates for total hip replacement: analysis of registry evidence. BMJ. 2015;350:h756.

143. Registry NJ. 10th Annual Report.

144. (NRAS) NRAS. The DAS28 Score 2007 [updated 05/05/2014]. Available from: http://www.nras.org.uk/the-das28-score.

145. Leeb BF, Andel I, Sautner J, Bogdan M, Maktari A, Nothnagl T, et al. Disease activity measurement of rheumatoid arthritis: Comparison of the simplified disease activity index (SDAI) and the disease activity score including 28 joints (DAS28) in daily routine. Arthritis Rheum. 2005;53(1):56-60.

146. Rheumatology BSf. Specialised Rheumatology (Adult) Quality Dashboard 2014/15.

147. Birmingham QEH. Rheumatology quality indicators. Available from: http://www.uhb.nhs.uk/rheumatology-quality-indicators.htm.

148. Conditions NCfMAaM. National indicators for monitoring osteoarthritis, rheumatoid arthritis and osteoporosis (Australian). 2006.

Include: NICE QS33

Link1: http://www.nras.org.uk/the-annual-review-clinic-for-rheumatoid-arthritis-a-view-from-newcastle

Link2: https://www.nice.org.uk/sharedlearning/developing-an-annual-review-clinic-for-people-with-rheumatoid-arthritis

Link3: http://www.uhb.nhs.uk/rheumatology-quality-indicators.htm

Link4: http://www.nice.org.uk/Media/Default/standards-and-indicators/qof%20indicator%20key%20documents/60214.pdf

Link5: https://indicators.ic.nhs.uk/webview/

Link6: https://indicators.ic.nhs.uk/download/NCHOD/Specification/Spec_32A_020ISR7DF_13.pdf

Link7: http://www.nras.org.uk/the-das28-score

Link8: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216651/dh_128447.pdf