

A QUALITY STANDARD AND QUALITY INDICATORS FOR SYMPTOMATIC KNEE OSTEOARTHRITIS CARE



A QUALITY STANDARD AND QUALITY INDICATORS FOR SYMPTOMATIC KNEE OSTEOARTHRITIS CARE

VICKY JESPERS, CÉCILE CAMBERLIN, ANS VAN GINCKEL, JUSTIEN CORNELIS, ROOS LEROY



Title:	A quality standard and quality indicators for symptomatic knee osteoarthritis care
Authors:	Vicky Jespers (KCE), Cécile Camberlin (KCE), Ans Van Ginckel (KCE), Justien Cornelis (KCE), Roos Leroy (KCE)
Project Facilitator:	Els Van Bruystegem (KCE)
Data extraction, transformation & loading:	Cécile Camberlin (KCE)
Reviewers:	Mats De Jaeger (KCE), Leen Verleye (KCE), Marijke Eyssen (KCE)
External experts:	Olivier Bruyère (Uliège), Pierre Burton (SORBCOT – Société royale belge de chirurgie orthopédique et de traumatologie), Axel de Aguirre (Huisartspraktijk Axel de Aguirre), Anita De Backer (RIZIV – INAMI, Unité Audit des Hôpitaux), Liesbet De Baets (VUB - Vrije Universiteit Brussel), Isabel De Boosere (ReumaNET vzw), Svin Deneckere (VIKZ), Jolien De Rijck (AZ Sint Blasius Dendermonde), Dirk De Wachter (VIKZ), Claire Gazotti (RIZIV – INAMI), Yves Henrotin (Fondation Arthrose, ULiège), Sigrid Janssens (KU Leuven), Marlies Kaerts (UZ Leuven), Kirsten Kerremans (AZ Sint Blasius), Céline Labie (KU Leuven), Natacha Laeremans (ReumaNET vzw), Frank Luyten (KU Leuven, UZ Leuven), Céline Mathy (Fondation Arthrose), Jo Nijs (VUB, UZ Brussel), Nils Runge (VUB), Quentin Schoonvaere (PAQS asbl), Emmanuel Thienpont (Cliniques universitaires Saint Luc Bruxelles), Johan Vanlauwe (UZ Brussel), Philippe Van Overschelde (Belgian Knee Society), Peter Verdonk (BVOT - Belgische Vereniging voor Orthopedie en Traumatologie), Frank Verheyden (Heilig Hart Ziekenhuis Lier), Jan Victor (UZ Gent, U Gent)
External validators:	Nina Østerås (Center for treatment of Rheumatic and Musculoskeletal Diseases (REMEDY), Diakonhjemmet Hospital, Oslo, Norway), Lies Grypdonck (RIZIV – INAMI), Paul Baker (South Tees Hospitals NHS Foundation Trust, United Kingdom)
Acknowledgements:	We want to thank Cécile Oury (ULiège, BSTH) and Andrée Mangin (KCE) for their support.
Reported interests KCE members:	KCE is a federal institution funded by INAMI/RIZIV, by the Federal Public Service of Health, Food chain Safety and Environment, and by the Federal Public Service of Social Security. KCE's mission is to advise policymakers on decisions relating to health care and health insurance on the basis of scientific and objective research. It is expected to identify and shed light on the best possible solutions, in the context of an accessible, high quality health care system with due regard for growing demand and budgetary constraints. , KCE has no interest in companies (commercial or non-commercial, i.e. hospitals and universities), associations (e.g. professional associations, unions), individuals or organisations (e.g. lobby groups) that could be positively or negatively affected (financially or in any other way) by the implementation of the recommendations. All experts involved in the writing of the report or the peer-review process completed a declaration of interest form. Information on potential conflicts



of interest is published in the colophon of this report. All members of the KCE Expert Team make yearly declarations of interest and further details of these are available upon request.

Reported interests:

'All experts and stakeholders consulted within this report were selected because of their involvement in the topic. Therefore, by definition, a certain degree of conflict of interest might be present for all involved in this report'.

Membership of a stakeholder group on which the results of this report could have an impact: Paul Baker (Member of the British Orthopaedic Association (BOA), Member of the British Association for Surgery of the Knee (BASK)), Isabel De Boosere (Reumanet as an interest group for patients with rheuma), Nina Østerås (Joint Effort Initiative Implementation Working Group in OARSI with the goal to accelerating the uptake of osteoarthritis best programmes of care), Emmanuel Thienpont (Member of the Executive committee of the European Knee Society), Johan Vanlauwe (Belgian Association of Orthopedics and Traumatology: secretary), Philippe Van Overschelde (Belgian Knee Society), Peter Verdonk (BVAS, BVOT, BKS, ESSKA, ISAKOS, ICRS, MoRE), Frank Verheyden (President Belgian Knee Society), Jan Victor (BVOT, Belgian Knee Society, European Knee Society, American Knee Society)

Owner of subscribed capital, options, shares or other financial instruments: Yves Henrotin (Artialis sa), Peter Verdonk (Royalties CONMED)

Holder of intellectual property (patent, product developer, copyrights, trademarks, etc.): Jan Victor (Patents licensed to Smith and Nephew and Corin)

Fees or other compensation for writing a publication or participating in its development: Axel de Aguirre (Report on the implementation for the conservative knee and hip osteoarthritis management of EBPracticenet), Céline Labie (Doctoral student)

Participation in scientific or experimental research as an initiator, principal investigator or researcher: Paul Baker (NIHR Grant Holder – 2 NIHR research projects, OPAL Study – Occupational Advice for patients undergoing arthroplasty of the lower limb, OPAL Trial – Occupational Support for patients undergoing arthroplasty of the lower limb), Liesbet De Baets (PREMEO trial: the integration of cognitive behavioral therapy for insomnia in best-practice care for patients with knee osteoarthritis and insomnia- A randomized controlled trial), Yves Henrotin (CUBO (Tilman), WOBESMART (Nestlé), T-MOTION (Naturex), LASARE (4P-PHARMA)), Marlies Kaerts (Researcher of the scientific study: "Health status, objective physical fitness and physical therapy use in psoriatic arthritis" at UZ/KU Leuven (S65783)), Céline Labie (Researcher in the study: Towards tailor-made therapy for people with osteoarthritis: the added value of cognitive behavioral therapy for insomnia in people with knee osteoarthritis and insomnia (PREMEO study)), Jo Nijs (Several ongoing studies on the treatment of knee osteoarthritis), Nina Østerås (Principal investigator for two randomised controlled trials on remote care for axial spondyloarthritis and gout, for a population-based longitudinal osteoarthritis cohort study and work package leader of 'Innovative approaches to remote care' in the REMEDY center. Co-supervisor of a PhD student with a randomised trial on digital exercise in knee/hip osteoarthritis), Nils Runge (PhD funding as part of the PREMEO research), Philippe Van Overschelde (Mobile app for rehab RCT-Patient reported outcome of rehabilitation and



quality of life in computer literature patients undergoing primary knee or hip arthroplasty and randomized to rehabilitation with or without the possible use of a mobile application), Peter Verdonk (LIPOGEM vs Hyaluronic Acid RCT), Jan Victor (Atlas study (Moximed), Move Up study for NIHDI)

A grant, fees or funds for a member of staff or another form of compensation for the execution of research described above: Olivier Bruyère (Grant research (in the last 5 years) from Biophytis, IBSA, Mylan, TRB), Jo Nijs (Research funds for research into the treatment of knee osteoarthritis. These research funds are (partly) managed by me, in my role at the VUB (as PI or co-PI) of these projects), Jan Victor (FWO funding for doctoral research concerning total knee prosthesis alignment and revision)

Consultancy or employment for a company, an association or an organisation that may gain or lose financially due to the results of this report: Olivier Bruyère (Consulting or lecture fees from Amgen, Aptissen, Biophytis, IBSA, Mylan, Novartis, Orifarm, Sanofi, UCB and Viatrix), Pierre Burton (Amplitude, ICB), Dirk De Wachter (VIKZ), Yves Henrotin (Tilman, Kiomed, Expanscience, Nestlé, 4P-Pharma, Geenequine, Grunenthal), Natacha Laeremans (As a volunteer for a company project through ReumaNet vzw), Peter Verdonk (LIPOGEM, CARTIHEAL, CONMED, AQTOR)

Payments to speak, training remuneration, subsidised travel or payment for participation at a conference: Pierre Burton (Amplitude, ICB), Liesbet De Baets (Courses regarding sleep management in a chronic pain population, including individuals with osteoarthritis), Isabel De Boosere (Reumanet volunteering for Grünenthal (volunteering remuneration) - a pharmaceutical company that is developing a drug for osteoarthritis. Reumanet volunteering for the FAMHP - application for a pilot study application for a medication for osteoarthritis), Yves Henrotin (Tilman, Kiomed, Expanscience, Lahbra, Nestlé), Céline Labie (As part of my PhD), Nina Østerås (Subsidised travel and accommodation for the EULAR congress 2023 and the Scandinavian congress of Rheumatology 2023), Nils Runge (Travel expenses and time reimbursement for presentation at Physio Congress 2023 Germany (topic: insomnia and chronic pain)), Frank Verheyden (Sometimes I speak at meetings organized by Smith and Nephew)

Presidency or accountable function within an institution, association, department or other entity on which the results of this report could have an impact: Paul Baker (Previous NICE guideline committee member (NG157) and NICE quality standard committee member (these roles ended in 2020 and 2021 respectively)), Olivier Bruyère (Member of European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO) who constructed guidelines in the field of osteoarthritis), Svin Deneckere (Director of VIKZ. The results of this study can lead to the design of new indicators within VIKZ), Emmanuel Thienpont (Head of Orthopedics-Traumatology Department, Saint Luc University Clinics, Brussels), Johan Vanlauwe (Belgian Association of Orthopedics and Traumatology: secretary), Peter Verdonk (Past president BKS, incoming president BVOT), Frank Verheyden (President Belgian Knee Society), Jan Victor (BKS, EKS)

Other possible interests that could lead to a potential or actual conflict of interest: Isabel De Boosere (As a Reumanet volunteer, I also participate in the steering group of the KCE project COGENIUS on knee osteoarthritis and postoperative knee pain).



Layout:

Joyce Grijseels, Ine Verhulst

Disclaimer:

- The external experts were consulted at two timepoints during the project. First to deliver written feedback and second to participate in a meeting; to reach consensus on the clinical relevance of the statement and indicators.
- Subsequently, a (final) version was submitted to the validators. The validation of the report results from a consensus process between the validators. The external experts and validators did not co-author the scientific report and did not necessarily agree with its content.
- Finally, this report has been approved by common assent by the Executive Board.
- Only the KCE is responsible for errors or omissions that could persist. The policy recommendations are also under the full responsibility of the KCE.

Project number:

2021-09

Publication date:

19 December 2023

Domain:

Health Services Research (HSR)

MeSH:

Osteoarthritis, Knee; Humans; Quality of Health Care; Quality Indicators, Health Care; Quality Assurance, Health Care

NLM Classification:

WE 870

Language:

English

Format:

Adobe® PDF™ (A4)

Legal depot:

D/2023/10.273/39

ISSN:

2466-6459

Copyright:

KCE reports are published under a “by/nc/nd” Creative Commons Licence
<http://kce.fgov.be/content/about-copyrights-for-kce-publications>.
<https://doi.org/10.57598/R375C>



How to refer to this document?

Jespers V, Camberlin C, Van Ginckel A, Cornelis J, Leroy R. A quality standard and quality indicators for symptomatic knee osteoarthritis care. Health Services Research (HSR). Brussels: Belgian Health Care Knowledge Centre (KCE). 2023. KCE Reports 375. D/2023/10.273/39.



■ TABLE OF CONTENTS

LIST OF FIGURES.....	5
LIST OF TABLES	6
LIST OF ABBREVIATIONS	9
■ SCIENTIFIC REPORT	11
1 INTRODUCTION	11
1.1 BACKGROUND.....	11
1.2 SCOPE AND AIM	13
1.3 TARGET AUDIENCE.....	14
2 CARE OF KNEE OSTEOARTHRITIS IN BELGIUM	15
2.1 PREVALENCE OF KNEE OSTEOARTHRITIS IN FLANDERS.....	15
2.2 HOSPITAL ADMISSIONS FOR KNEE OSTEOARTHRITIS.....	16
2.3 KNEE REPLACEMENT PROCEDURES.....	17
3 METHODOLOGY	23
3.1 THE EXPERT PANEL	23
3.2 PICO CRITERIA FOR INCLUSION AND EXCLUSION	24
3.3 SEARCH FOR QUALITY INDICATOR LITERATURE, SEARCH STRATEGY, AND DATA LIMITS..	25
3.4 QUALITY EVALUATION OF INCLUDED LITERATURE.....	26
3.5 CHARACTERISTICS OF INCLUDED LITERATURE.....	26
3.6 SEARCH FOR GUIDELINE LITERATURE, SEARCH STRATEGY, AND DATA LIMITS.....	26
3.7 QUALITY EVALUATION OF GUIDELINES	27
3.8 CHARACTERISTICS OF INCLUDED GUIDELINES	28
3.9 INFORMATION EXTRACTION	29



3.10	SELECTION PROCESS BY EXTERNAL EXPERT CONSULTATION	31
3.11	DEFINING MEASURABILITY	31
4	ASSESSMENT OF THE CLINICAL RELEVANCE OF QUALITY STATEMENTS AND QUALITY INDICATORS.....	32
4.1	OVERVIEW OF THE RANKING	32
4.2	HIGH.....	32
4.2.1	Assessment, info, and advice.....	32
4.2.2	Interventions with and without drugs	33
4.2.3	Surgical non-replacement interventions.....	34
4.2.4	Optimisation and preoperative interventions knee replacement surgery.....	35
4.2.5	Interventions knee replacement surgery.....	36
4.2.6	Postoperative interventions knee replacement surgery.....	37
4.3	MEDIUM.....	39
4.3.1	Diagnosis, info and advice, training.....	39
4.3.2	Interventions with and without drugs	40
4.3.3	Surgical non-replacement interventions.....	41
4.3.4	Referral interventions.....	41
4.3.5	Optimisation interventions knee replacement surgery.....	42
4.3.6	Preoperative interventions knee replacement surgery	43
4.3.7	Interventions knee replacement surgery.....	44
4.3.8	Postoperative interventions knee replacement surgery.....	45
5	ASSESSMENT OF MEASURABILITY	47
5.1	HIGH RATING QUALITY STATEMENTS AND INDICATORS	47
5.1.1	Assessment, info, and advice.....	47



5.1.2	Interventions with and without drugs	48
5.1.3	Surgical non-replacement interventions.....	49
5.1.4	Optimisation and preoperative interventions knee replacement surgery.....	50
5.1.5	Interventions knee replacement surgery.....	52
5.1.6	Postoperative interventions knee replacement surgery.....	53
5.2	MEDIUM RATING QUALITY STATEMENTS AND INDICATORS.....	55
5.2.1	Assessment, info, and advice, training	55
5.2.2	Interventions with and without drugs	56
5.2.3	Surgical non-replacement	57
5.2.4	Referral	57
5.2.5	Optimisation interventions knee replacement surgery.....	58
5.2.6	Preoperative interventions knee replacement surgery	60
5.2.7	Interventions knee replacement surgery.....	61
5.2.8	Postoperative interventions knee replacement surgery.....	62
6	CLINICALLY RELEVANT QUALITY STATEMENTS AND INDICATORS FOR THE BELGIAN SETTING - DISCUSSION.....	65
6.1	INTRODUCTION	65
6.2	A QUALITY STANDARD FOR KNEE OSTEOARTHRITIS CARE IN BELGIUM.....	65
6.3	QUALITY INDICATORS FOR KNEE OSTEOARTHRITIS CARE IN BELGIUM.....	72
6.4	THE NEED FOR HIGH QUALITY DATA.....	75
6.4.1	Strenghts of the databases	75
6.4.2	Limitations of the databases and need for quality improvements	76
6.5	THE NEED FOR MEASURABLE EXERCISE CARE.....	78
6.6	PATIENT-REPORTED OUTCOME MEASURES AND PATIENT-CENTRED CARE.....	80



6.7	CAN A CARE TRAJECTORY CONTRIBUTE TO QUALITY OF CARE FOR PATIENTS WITH KNEE OSTEOARTHRITIS	81
6.8	STRENGTHS AND LIMITATIONS	82
6.9	CONCLUSION AND FUTURE PROSPECTS.....	83
■	APPENDIX.....	84
■	REFERENCES.....	187



LIST OF FIGURES

Figure 1 – Number of knee replacements per 100 000 population, 2019-2020.	18
Figure 2 – Number of knee interventions reimbursed in Belgium, 2007 - 2021	19
Figure 3 – Overall prosthesis survival by type (a) and age of the patient (b) after primary knee replacement procedure.....	21
Figure 4 – Examples of a quality standard from the United Kingdom and Australia.....	71
Figure 5 – Age pyramid of stays with knee osteoarthritis as principal diagnosis, TCT data 2016-2020.....	88
Figure 6 – Length of stay - distribution parameters of stays with knee osteoarthritis as principal diagnosis, TCT data 2020	90
Figure 7 – PRISMA Flowchart	107



LIST OF TABLES

Table 1 – PICO for the quality statement/indicator review on the management of symptomatic knee osteoarthritis.....	24
Table 2 – Number of quality statements/indicators retrieved by theme	29
Table 3 – High rating: themes assessment and information	32
Table 4 – High rating: themes non-drug and drug-related interventions.....	33
Table 5 – High rating: theme surgical non-replacement.....	34
Table 6 – High rating: theme optimisation for knee replacement surgery	35
Table 7 – High rating: theme knee replacement surgery	36
Table 8 – High rating: theme postoperative knee replacement surgery.....	37
Table 9 – Medium rating: theme diagnosis and information.....	39
Table 10 – Medium rating: themes non-drug and drug-related interventions.....	40
Table 11 – Medium rating: theme surgical non-replacement	41
Table 12 – Medium rating: theme referral	41
Table 13 – Medium rating: theme optimisation for knee replacement surgery.....	42
Table 14 – Medium rating: theme preoperative knee replacement surgery	43
Table 15 – Medium rating: theme knee replacement surgery	44
Table 16 – Medium rating: theme postoperative knee replacement surgery.....	45
Table 17 – Measurability high rating: themes assessment and information.....	47
Table 18 – Measurability high rating: themes non-drug and drug-related interventions	48
Table 19 – Measurability high rating: theme surgical non-replacement.....	49
Table 20 – Measurability high rating: theme optimisation and preoperative for knee replacement surgery	50
Table 21 – Measurability high rating: theme knee replacement surgery.....	52
Table 22 – Measurability high rating: theme postoperative knee replacement surgery.....	53



Table 23 – Measurability medium rating: themes assessment and information.....	55
Table 24 – Measurability medium rating: themes non-drug and drug-related interventions	56
Table 25 – Measurability medium rating: theme surgical non-replacement	57
Table 26 – Measurability medium rating: theme referral	57
Table 27 – Measurability medium rating: theme optimisation for knee replacement surgery	58
Table 28 – Measurability medium rating: theme preoperative for knee replacement surgery.....	60
Table 29 – Measurability medium rating: theme knee replacement surgery.....	61
Table 30 – Measurability medium rating: theme postoperative knee replacement surgery	62
Table 31 – Quality standard for knee osteoarthritis care.....	67
Table 32 – Quality indicators for knee osteoarthritis care	72
Table 33 – Knee arthroplasties reimbursement codes.....	86
Table 34 – Number of stays with knee osteoarthritis as principal or secondary diagnosis by type of hospitalisation and year, TCT data 2016-2020	86
Table 35 – Number of stays with knee osteoarthritis as principal or secondary diagnosis by sex and year, TCT data 2016-2020	87
Table 36 – Age distribution parameters of stays with knee osteoarthritis as principal or secondary diagnosis by year, TCT data 2016-2020	87
Table 37 – Principal diagnoses of stays with knee osteoarthritis (M17) as principal diagnosis by year, TCT data 2016-2020	89
Table 38 – Length of stay distribution parameters of stays with knee osteoarthritis as principal diagnosis by year, TCT data 2016-2020	91
Table 39 – ICD-10-BE procedure codes in patients with knee osteoarthritis as principal or secondary diagnosis, number of stays per year, TCT data 2016-2020	92
Table 40 – Knee replacement procedures billed per RIZIV – INAMI codes in patients with knee osteoarthritis as principal or secondary diagnosis, number of stays per year, TCT data 2016-2020	94



Table 41 – Diagnostic arthroscopies and meniscectomies in patients with knee osteoarthritis as principal or secondary diagnosis, number of stays per year, TCT data 2016-2020	95
Table 42 – Physiotherapy nomenclature (art.7) in patients with knee osteoarthritis as principal or secondary diagnosis, per year, TCT data 2016-2020: number of stays per year.....	96
Table 43 – Full nomenclature code explanation Table 42.....	98
Table 44 – Rehabilitation sessions nomenclature (art. 22) in patients with knee osteoarthritis as principal or secondary diagnosis, per year, TCT data 2016-2020: number of stays per year.....	100
Table 45 – Full nomenclature code explanation Table 44.....	101
Table 46 – Physiotherapy nomenclature (art. 22) for patients admitted for knee osteoarthritis (principal diagnosis): average number of sessions per stay, by hospitalisation type TCT data 2016-2020.....	102
Table 47 – MZG – RHM registration of anaesthesia in case of primary knee replacement (*): values and number of stays for patients admitted for knee osteoarthritis (principal diagnosis), TCT data 2016-2020	104
Table 48 – Included peer-reviewed publications or reports for quality indicator/indicator identification	108
Table 49 – AGREE II instrument.....	112
Table 50 – Retrieved guidelines diagnosis and non-surgical management of knee osteoarthritis.....	114
Table 51 – Retrieved guidelines surgical management of knee osteoarthritis	115
Table 52 – AGREE II scores.....	117



LIST OF ABBREVIATIONS

ABBREVIATION	DEFINITION
AAOS	American Academy of Orthopaedic Surgeons
ADH – HJA	Day-care Anonymous Hospital Stays (Anonieme Dag Hospitalisaties – Hospitalisations de Jour Anonymes)
ARC/AF	American College of Rheumatology/Arthritis Foundation
AGREE	The Appraisal of Guidelines Research and Evaluation
AZV – SHA	Hospital Inpatient Anonymous Hospital Stays (Anonieme Ziekenhuis Verblijven – Séjours Hospitaliers Anonymes)
BCFI/CBIP	Belgian Centre for Pharmacotherapeutic Information (BCFI/CBIP)
BSTH	Belgian Society on Thrombosis and Haemostasis
COVID-19	Coronavirus disease 2019
DVT	Deep venous thrombosis
ERAS	Enhanced Recovery After Surgery Society
ESCEO	European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases
ESSKA	European society of sports traumatology, knee surgery and arthroscopy
EULAR	European Alliance of Associations for Rheumatology
FAMPH	Federal Agency for Medicines and Health Products (FAGG – AFMSP, Federaal Agentschap voor Geneesmiddelen en Gezondheidsproducten - Agence Fédérale des Médicaments et des Produits de Santé)
FPS	Federal Public Service (Federale Overheidsdienst - Service Public Fédéral, FOD - SPF)
ICD-10-BE	International Classification of Diseases-10th Revision-Belgium
ICD-10-CM	International Classification of Diseases-10th Revision-Clinical Modifications
ICD-10-PCS	International Classification of Diseases-10th Revision-Procedure Coding System
IMA data	Data of IMA — AMI, InterMutualistisch Agentschap - Agence InterMutualiste
KNGF	Koninklijk Nederlands Genootschap voor Fysiotherapie



MZG — RHM	Minimale Ziekenhuis Gegevens – Résumé Hospitalier Minimum
MRI	Magnetic resonance imaging
NICE	The National Institute for Health and Care Excellence
NSAIDs	Nonsteroidal anti-inflammatory drugs
OARSI	The Osteoarthritis Research Society International
OECD	Organization for Economic Cooperation and Development
PAQS	Plateforme pour l'Amélioration continue de la Qualité des soins et de la Sécurité des patients
PICO	Patient/population, intervention, comparison, and outcomes
PREM	Patient-Reported Experience Measure
PROM	Patient-Reported Outcome Measure
RACGP	Royal Australian College of General Practitioners
NIHDI – RIZIV – INAMI	National Institute for Health and Disability Insurance (Rijksinstituut voor Ziekte- en Invaliditeitsverzekering - Institut National d'Assurance Maladie-Invalidité)
SD	Standard deviation
TCT	Technical Cel (Technische Cel – Cellule Technique)
VIKZ	Vlaams Instituut voor Kwaliteit van Zorg - Flemish Institute for Quality of Care
XR	X-ray



■ SCIENTIFIC REPORT

1 INTRODUCTION

1.1 Background

Osteoarthritis is the leading form of arthritis with primarily affecting weight-bearing joints such as the hip, knee, spine, and the big toe.¹ The knee is being affected most often.¹ Osteoarthritis is characterised by the degradation of the joint cartilage, synovial inflammation, and bone remodelling. Patients suffer pain, stiffness, joint swelling, loss of normal joint function (severely) affecting daily activities and quality of life. Osteoarthritis is a disorder with a rising prevalence, presenting with flare-ups, often becoming chronic and affecting more than one joint and this with differing severity. The lifetime risk of knee osteoarthritis is high (45%, 95% CI 42-49%) and increases with age, a history of knee injury and/or with increasing body mass index.^{2, 3} Osteoarthritis in the older patient with multiple chronic conditions can affect the patient's ability to self-manage at home and mobility issues or chronic pain might affect the patient's ability to access a healthcare professional.⁴

Whilst a curative treatment does not exist, the treatment of knee osteoarthritis aims to slow down the disease progression preventing deterioration, reducing the symptoms of the patient, thereby improving the mobility of the patient, increasing coping skills and quality of life in general.³ The general practitioner commonly is the first point of contact for patients with symptomatic knee osteoarthritis. Whilst patients consult the general practitioner on a regular basis, some might not consult due to stigma and the misconception that the joint pain is part of ageing. The patient might eventually be referred for a surgical intervention in the form of a joint replacement of the knee, although surgery should be reserved for those that have not responded appropriately to less invasive methods.³



For the care of symptomatic knee arthritis, a breadth of treatments are employed in primary care. The majority of people manage their knee arthritis with non-surgical treatments, education, exercise, weight loss, activity avoidance, lifestyle adaption, changes to the home (extra hand rail, seat raises, stairlift etc.), walking aids, analgesic, therapeutic injections, braces and supports.^{3, 5, 6} Guidelines agree on the core treatment for knee osteoarthritis consisting of exercise, education and self-management, and weight loss if overweight or obese. The current advice on first-line medication has shifted from paracetamol to nonsteroidal anti-inflammatory drugs (NSAIDs). Whereas paracetamol was previously the first-line pain medication for osteoarthritis, it was shown to have only a small effect if used on its own.⁷ The use of an oral NSAIDs was reported as most effective in terms of pain and function but safety profiles of these drugs have to be considered for each patient.⁷ Topical NSAIDs were shown to be effective and safe for osteoarthritis (no serious gastrointestinal and renal adverse events).⁸ Patients might benefit from a referral for an intra-articular corticosteroid injection when there is no response to oral or topical pain medication.⁹ But the effects have been shown to be most pronounced in patients with worse joint inflammation signs and the effect might not be sustained after 6 weeks.^{9, 10}

Arthroscopic knee surgery is not beneficial for primary knee osteoarthritis, can be potentially harmful (complications might occur e.g. synovitis, deep venous thrombosis, effusion, etc.) and should be reserved for people with mechanical knee locking evidence.^{11, 12} Joint replacement of the knee is indicated for patients whose quality of life and function is severely affected by knee osteoarthritis. It was shown that the intervention is cost-effective for end-stage disease.^{13, 14} Patients should be well informed about the complications (e.g. infection(s), venous thrombosis, neurovascular injury, peri-implant fractures, and degeneration of the prosthesis) and the expected pain relief and functional improvement after the operation.

In the future, disease modifying drugs interfering with disease progression might become available for osteoarthritis e.g. fibroblast growth factors, platelet-rich plasma, transforming growth factors, matrix extracellular phosphoglycoproteins, and interleukins. The development is ongoing, and some products have entered phase III studies. Other areas of research

focus on the disease pathogenesis and pain and symptom experiences; a better understanding might allow for a more targeted treatment.¹⁰

Although evidence-based recommendations for the management of knee osteoarthritis are available for a broad range of non-pharmacological, pharmacological, and surgical interventions, it is seen that guideline implementation for patients with knee osteoarthritis is not optimal in clinical care.¹⁵ In primary care conservative management, a low referral for physical therapy of 41% [95% CI 33-49] was demonstrated.¹⁶ Guideline implementation was shown to be difficult due to patients' disagreement with guidelines recommendations, insisting on medical imaging, having fear that physiotherapy aggravates pain, and the perception that knee osteoarthritis is not a priority health issue.¹⁵ A study in physiotherapists showed a large variations in adherence to quality statements/indicators in osteoarthritis management.¹⁷ The core therapy of exercise was well followed but treatment modalities that do not contribute to high quality care, massage (49%) and cold application (24%) were frequently applied. For surgical care, a geographical variation for knee replacements is seen across Belgium.¹⁸

This variation in clinical practice can partially be explained by the increased pressure on services due to the growing number of patients with osteoarthritis. Also, good management asks for a complex interaction of healthcare providers in primary and secondary care. Thus, the management of knee osteoarthritis needs the involvement of different healthcare providers depending on the stage of the illness i.e. a general practitioner, a physiotherapist, a surgeon, a physical medicine doctor, a dietician, a social worker. Further, the patient might independently consult for specific treatments such as chiropraxie, acupuncture, insoles and braces, etc. Currently, a care pathway defining responsibilities of healthcare providers, as seen in the literature, is not available in Belgium.

Clinical practice guidelines have the potential to improve patient care whenever the guidelines are translated into practice.¹⁹ Unfortunately, clinical implementation and change of practice is a slow process and takes time. Guidelines can be used to develop quality standards for individual health professionals and healthcare organisations (see Box 1). A standard can also inform education and training of health professionals and inform patient decisions.



Clinical quality indicators are used to measure components of a standard and this is done with explicit criteria for inclusion, exclusion, timeframe and setting. Quality indicators for osteoarthritis have been developed in some European countries and have been applied as part of research projects. For Belgium, a set of quality statements and/or indicators for an integrated approach of knee osteoarthritis in primary care was tested in 2014, however guidelines have been updated since.^{17, 20, 21} This indicator set was not initially developed to query patient perspectives.²⁰

As a result KCE received a question to investigate whether 'quality indicators' for knee osteoarthritis could be identified from the international literature, and to assess the quality of care offered to patients with knee osteoarthritis in Belgium.

1.2 Scope and aim

This KCE project aimed to develop quality statements and quality indicators for the management of symptomatic knee osteoarthritis for the Belgian setting and aimed to add to the quality of care offered to patients with symptomatic knee osteoarthritis. Osteoarthritis of the hip, which was originally considered for inclusion, was partially covered by the ongoing hip prosthesis hospital [audit project](#) of RIZIV – INAMI, and excluded. Another related project that is ongoing is the implementation project by Ebpracticenet for primary care knee and hip osteoarthritis, based on the Dutch physiotherapy guideline.²²

Previous KCE quality indicator projects started from a Belgian guideline on the topic, which was then translated into a set of quality indicators. For osteoarthritis a Belgian guideline does not exist. The option of developing a primary guideline (before this project) was rejected as several up-to-date international guidelines existed and are applied by Belgian healthcare professionals. As a result, this project explored in first instance the possibility of developing a quality standard and quality indicators and included to this end also a critical appraisal of selected international guidelines. Our approach is supported by the systematic review by Arslan et al, concluding that quality indicator sets should always be reviewed against the latest guidelines especially regarding pharmacological treatments.²³ During the scoping and preparatory phase, we realised that quality indicators,

particularly those relevant to primary or ambulant care, would not be measurable using national routinely collected data. As this could impose a risk of bias in identifying priority areas of quality of care for symptomatic knee osteoarthritis, we opted to first develop a quality standard and then define quality indicators (see Box 1).

Box 1

How to measure quality of care

Clinical practice guidelines are a first necessary tool for a quality system. They contain the latest 'evidence-based' information on the management of a condition. This allows healthcare providers to suggest the most appropriate treatment to the patient with full knowledge of the facts and allows the patient to make an informed decision.

Subsequently, **quality statements**, as part of a **quality standard**, and **quality indicators** can be developed.

Quality indicators are intended to check whether and how a guideline is applied by healthcare providers. This allows quality of care to be measured primarily at national and hospital level. Therefore, the indicators must be robust and able to be put into practice in a consistent and reliable way.

There are different types of indicators, but in general we mainly speak of **structural indicators**, **process indicators** and **outcome indicators**. Structural indicators refer to the resources available in the healthcare sector (e.g. the number of doctors and nurses, the number of scanners or the number of surgical procedures per hospital). Process indicators deal with how care is organised and administered (e.g. adherence to clinical guidelines), while outcome indicators focus on the consequences (desirable or not) of this care (e.g. rate of relapse after treatment, recovery, improvement, or survival after an intervention).

Ideally, each hospital will receive an **individual feedback** report on its results which can guide the hospital to further improve quality of care.



New in this report is the **quality standard**, also used by the quality institutes in England and Australia.^{24, 25} A quality standard consists of a group of key recommendations formulated as **quality statements** around a medical theme, e.g. in this report around the care of knee osteoarthritis. They are formulated to promote quality within a particular area of health, health care or social care at local (and possibly) national level. They are derived from the best available evidence from good quality guidelines.

These standards can be used to encourage local quality improvement initiatives and include identified local needs.

Following the example of the NICE quality standards, we opted to apply a broad approach including several aspects of care of the patient with knee osteoarthritis i.e. themes related to diagnosis, information and advice, assessment, follow-up, referral, non-surgical interventions, and surgical interventions including follow-up and revalidation interventions.^{26, 27} Mild to severe osteoarthritis was included and could be clinically or radiologically classified e.g. all stages of disease as defined by Kellgren and Lawrence score.^{28, 29} The scope excluded the primary prevention of osteoarthritis and secondary prevention after knee injuries e.g. meniscus lesions or fractures. Single degenerative meniscus lesions were also excluded.

To answer the overarching question, "What is the quality of care that is offered to patients with symptomatic knee osteoarthritis?" the following three sub-questions were put forward:

1. Which quality indicators for managing symptomatic knee osteoarthritis can be identified from the international literature?
2. Which additional quality statements for managing symptomatic knee osteoarthritis can be derived from high quality international guidelines?
3. Which identified quality statements and/or indicators can be calculated with routinely available data in Belgium?

The aim was to present a quality standard and a set of quality indicators for the care of symptomatic knee osteoarthritis in Belgium.²⁴

The report only deals with the development of quality statements/indicators intended to evaluate the quality of healthcare, not other - admittedly relevant - aspects that may be (in)directly related to knee osteoarthritis, such as professional practice, sports.

This project did not aim to operationalise the identified quality standard and quality indicators, nor to calculate the results.

1.3 Target audience

This report is in the first place intended for the Flemish Institute for Quality of Care ('Vlaams Instituut voor Kwaliteit van Zorg', VIKZ) and its counterpart in Brussels and the Walloon region, i.e. 'Plateforme pour l'Amélioration continue de la Qualité des soins et de la Sécurité des patients' (PAQS), who can use the quality standard and quality indicators presented and further operationalise them. The regions in Belgium, as a result of the sixth State Reform, are competent for the care policy at the level of care facilities (with the exception of those authorisations that are explicitly reserved for the federal government), quality assessment and assurance in healthcare facilities, preventive healthcare and the recognition of healthcare professions.³⁰ On the other hand, the largest part (patient and time wise) of knee osteoarthritis care is likely to take place within primary care. Rehabilitation after surgery will also take place in a primary care setting for most patients. Responsibilities for primary and home care, elderly care, rehabilitation and health promotion is a responsibility of the regions and this is where this report can also contribute.

The results will be of interest to health professionals and hospitals who provide care for patients affected by knee osteoarthritis. The implementation project of the Dutch physiotherapy guideline by the Belgian evidence based Eviky network can be guided by this report and the Intego network might be interested in adapting this topic to a barometer in the future.



We acknowledge that the needs of patient associations, and individual patients, may not be fully addressed. Nevertheless, the place for future use of Patient Reported Outcomes and Experiences (PROMs and PREMs) is addressed and may be of interest.

Finally, the FPS Public Health is also among the potential target audience and this in relation to the Quality Practice in Healthcare Act (also known as the "[Quality Act](#)") and the compulsory health insurance (NIHDI) can use this report in the context of reimbursement for knee osteoarthritis-related procedures e.g. knee surgery, physiotherapy.

2 CARE OF KNEE OSTEOARTHRITIS IN BELGIUM

It is currently very difficult to fully describe the management of osteoarthritis in Belgium. Administrative databases are mainly useful for studying knee replacements but offer few possibilities for non-surgical management and primary care. There is indeed no exhaustive national registration of diagnoses outside the hospital setting in Belgium. Nevertheless the Intego network database provides an estimate of the extent of osteoarthritis in Flanders. In order to depict the extent of knee osteoarthritis in Belgian hospitals, the osteoarthritis related hospital care, and more particularly knee replacement procedures, we used the Technical Cell (TCT) data from the period 2016-2020, as well as results published by the RIZIV – INAMI, and ORTHOpriide.^{18, 31} Unfortunately, no recent Belgian data are available to assess the quality of care offered in the primary healthcare setting to patients with knee osteoarthritis.

A general description of the TCT data and the methods used to extract and analyse the data can be found in Appendix 1. Of course the lack of data in the community setting has direct consequences when it comes to measuring quality which is less troublesome for surgical management.

2.1 Prevalence of knee osteoarthritis in Flanders

Since 1996, the Intego register is a primary care database of morbidities extracted from the electronic medical records of a sample of general practices located in Flanders. Its patient population is representative for the Flemish population in age and sex. Due to its design (registration of new diagnoses encountered during consultations) prevalences can only be estimated for (incurable) chronic diseases. Knee osteoarthritis prevalence between 1996 and 2015 was estimated and published by Spitaels et al. in 2020, using, as denominator, the annual number of unique patients having had contact(s) in the practices showing an optimal registration performance.⁴ In 2015, the age-standardised prevalence amounted to 3.6% of these patients; 2.6% in men and 4.6% in women. This number increased with age from 1.8% in the 25-34 years age bracket to 15% for patients 85 years and more.



2.2 Hospital admissions for knee osteoarthritis

As seen in Table 34, knee osteoarthritis was responsible for about 26 000 hospital admissions in Belgium each year, from which only 2% in day care (In 2020 this figure dropped to 19 000 due to the COVID-19 pandemic. Female patients represented 61% of the admissions (Table 35 and Figure 5). The patient was on average 68 years (SD= 10.7, median 69 years) (Table 36). In addition, osteoarthritis was documented as a comorbidity during about 13 000 stays, of which 23% were in day care. Of the 13 000 patients with a secondary diagnosis of osteoarthritis, 64% were female and patients were older with average age of 75 years (SD= 14.2; median 78) compared to those with a primary diagnosis. Again, in 2020 a lower number of patients was registered (10 000 patients).

When knee osteoarthritis was the main reason for admission, the most common principal diagnosis in 2020 was primary osteoarthritis of the right knee (47.5%) or the left knee (42.8%) (Table 39). Bilateral and unspecified unilateral primary osteoarthritis represented another 3.4% and 0.1%, totalling 93.8% for any primary type. Secondary osteoarthritis as a principal diagnosis accounted for 4.6% of admissions and post-traumatic osteoarthritis for 1.2% only. Note that the remaining 0.4% of the diagnoses were unspecified. The share of unspecified knee osteoarthritis was as high as 14.9% in 2016 after the introduction of the new ICD-10-BE coding and improved year after year, we thus prefer to present the most accurate figures for the last year (2020).

On average the length of stay for admissions for knee osteoarthritis was 7.7 days (SD= 9.7; median=5 days), diminishing from 8.4 days (SD= 9.9; median=5 days) in 2016 till 6.7 days (SD= 9.5; median=4 days) in 2020 (Table 38 and Figure 6). The stays ended with the death of the patient in 85 cases (0.07%).

The vast majority of patients admitted to hospital for knee osteoarthritis in 2020 underwent a primary knee replacement procedure (93.8% in 2020) as indicated by the ICD-10-BE procedure code (versus 4.6% when the knee osteoarthritis was only registered as secondary diagnosis). Details on the type of procedure used is given in Appendix 1.3, Table 39.

Beside knee replacement procedures, some patients also benefited from physiotherapy at the hospital. The number of stays during which a physiotherapy code from article 7 for which the qualification of a physiotherapist is required (also called the M-nomenclature) was billed, are shown in Table 42 in Appendix 1.3. Patients admitted with a principal diagnosis of knee osteoarthritis received at least one of these interventions in 69% of the admissions (versus 47% when the knee osteoarthritis was a secondary diagnosis). Code 560501 (individual physiotherapy session of 30 minutes) was found to be by far the most frequent code (resp. 67% and 43% during admissions with knee osteoarthritis in principal or secondary diagnosis). Unfortunately the nomenclature is not specific at all and gives no indication whatsoever on the type of care provided except when it comes to manual lymphatic drainage (which is not relevant for the present topic).

Multidisciplinary physiotherapy interventions are not listed in art.7 but in art.22 of the nomenclature. Table 44 in Appendix 1.3 presents the number of stays during which a physiotherapy code for rehabilitation was offered and for which the qualification of a physician specialist for physical medicine and rehabilitation is required, also called the K-nomenclature. Approximately three quarters of stays with a principal diagnosis presented at least one of these codes, against a third of the stays with knee osteoarthritis as secondary diagnosis. More than half of the stays with a principal diagnosis of knee osteoarthritis (54.1% vs 10.2% when the condition is only present as secondary diagnosis) had an examination to start a multidisciplinary rehabilitation treatment including a detailed treatment file tailored to the patient (codes 558950 – 558961). This code may be billed before the multidisciplinary sessions involving at least 2 disciplines during at least 60 minutes (558810 - 558821), 90 minutes (558014 - 558025) or 120 minutes (558832-558843). It is noteworthy that 20 571 (16.9%) of the stays with knee osteoarthritis had at least one of the multidisciplinary session codes but no examination code to precede the multidisciplinary rehabilitation (4.1% with the condition in secondary diagnosis).

Arthroscopies were performed less and less in patients hospitalised for knee osteoarthritis over time (see Appendix 1.3, Table 41). Diagnostic arthroscopies were performed during about 0.1% of the stays with a principal diagnosis of knee osteoarthritis while the number of stays with meniscectomies reduced by half between 2016 and 2022 (from about 2% till

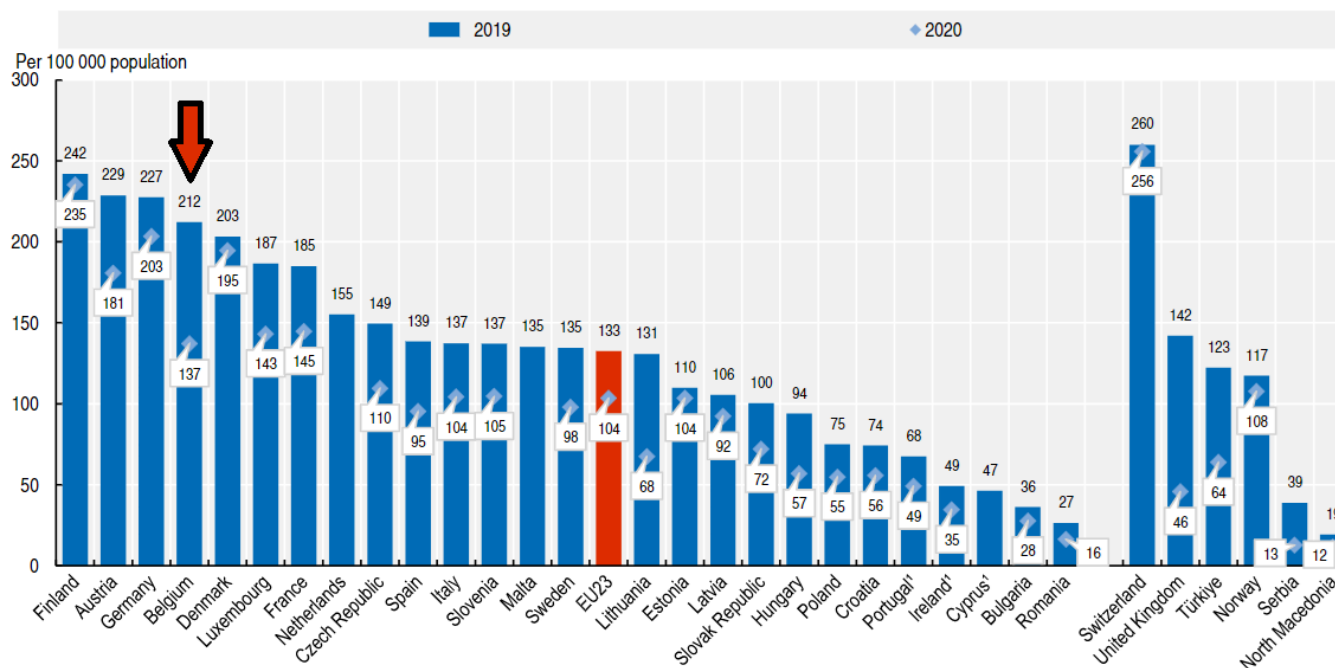


1% of the stays). These figures might be slightly overestimated compared with the actual number of arthroscopies. The number of meniscectomies billed under code 276636 – 276640 represents a maximum number of therapeutic arthroscopies as the codes may be billed “regardless of the technique”. In the future the number of meniscectomies, reimbursed and measurable, may decrease as the National Council for the Promotion of the Quality has limited the reimbursement of the intervention 276636- 276640 in patients aged 50-years or older. The aim is to reduce the inappropriate use of meniscectomy in this population. The aim for reductions is set at a reduction of 45% of the number of interventions that occurred in April 2023.^a Obviously, interventions that are performed but not reimbursed will not be measured.

2.3 Knee replacement procedures

Amongst the European countries, Belgium has one of the highest rates of knee replacements per inhabitant.³² Note that the Organization for Economic Cooperation and Development (OECD) work has established that variability between countries was not neutralised when taking population demographics into account.³² Belgium saw a drop in knee replacements during the COVID-19 pandemic, even more noticeably than in other countries, as seen in Figure 1

^a Indicator voor de arthroscopische meniscectomie bij patiënten ouder dan 50 jaar, B. S. 17 april 2023 – Indicateur pour la méniscectomie arthroscopique chez les patients de plus de 50 ans, M.B. 17 avril 2023.

**Figure 1 – Number of knee replacements per 100 000 population, 2019-2020.**

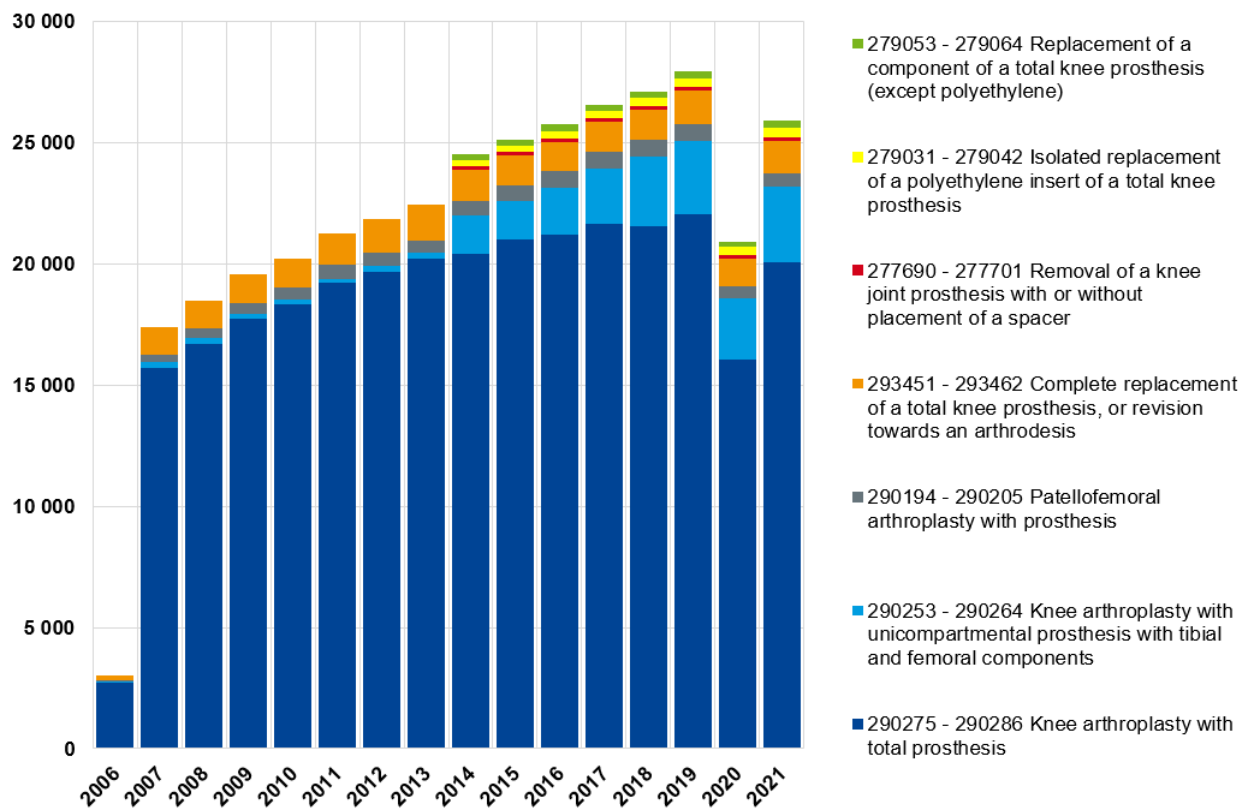
Source: OECD, *Health at a Glance 2022* (OECD Health Statistics 2022; Eurostat Database). The EU average is unweighted. In Portugal (mainland), Ireland, United Kingdom and Cyprus, data cover only surgical operations carried out in public hospitals (in Ireland, the inclusion of private hospitals would more than triple the volume of operations in 2020 (110 per 100 000 population)).

Figure 2 shows the total Belgian number of interventions of the knee, primary replacements and revisions included, based on the RIZIV – INAMI nomenclature.¹⁸ In 2021, the number of interventions started to rise again without reaching the level attained before the pandemic. The primary replacements pictured in blue (total), light blue (unicompartmental) and grey (patellofemoral) totalised 23 743 procedures in 2021 versus 25 732 in 2019 while the revisions in orange (total replacement of the prosthesis),

red (removal), yellow (isolated removal – polyethylene) and green (isolated removal – not polyethylene) slices represented 2169 procedures in 2021 versus 2208 in 2019. The elective character of a primary knee replacement explains that the reduction of primary implants observed during the first year of the pandemic was greater (-25.9% in 2020) than the reduction in revisions (-17.3% in 2020).



Figure 2 – Number of knee interventions reimbursed in Belgium, 2007 - 2021



*Source: RIZIV – INAMI- DocN



Whereas ten years ago almost all knee primary implants were total prostheses (96.5%); these currently represent 84.5% of the replacements.¹⁸ The percentages of types of replacement were equivalent to those observed in the ORTHOpride register (see Box 2).³³ The percentage of unicompartmental replacements rose and reached 13%, the few remaining prostheses being patellofemoral, bicompartamental or partial resurfacing femoral condyle. This last type of procedure occurred mostly in younger patients (around 50 years old in the ORTHOpride 2020 register). Contrary to the other type of prostheses, unicompartmental prostheses were more implanted in male patients (53% reported by the ORTHOpride 2020 register).³³

Box 2

ORTHOpride: the ORTHOpride@Qermid register³³

ORTHOpride, the Belgian register for hip and knee procedures, was originally developed in 2009 by the orthopaedic sector. The (voluntary) registration aimed at collecting information to study the quality of care, to gather information on the type of prostheses implanted and their life span. Since July 1st 2014, the registration became compulsory as a Qermid register ("Quality Electronic Registration of Medical acts, Implants and Devices" register) for the prosthesis reimbursement by the RIZIV –INAMI^b. Other Qermid registers cover e.g. coronary stent placements, cardiac valve replacements, transvaginal mesh for pelvic organ prolapse, etc. Each healthcare provider (an orthopaedic surgeon or an administrative collaborator) registers each knee intervention or procedure, along with the patient demographics and implant characteristics, via the web interface Qermid@ORTHOpride. Originally developed by the non-profit organisation Smals, this register is now managed by healthdata.be at Sciensano (as all Qermid registers will be transferred over the next few years). Each year ORTHOpride data are analysed in a public report. In 2020, 21 917 knee procedures were registered.

Based on the data from ORTHOpride (as compared to RIZIV – INAMI), around 24 300 knee replacement procedures are performed each year in Belgium from which about 0.2 % in a day-care setting. Patients are on average 68 years old and 60% are women.¹⁸ According to the ORTHOpride registration of 2020, 66% of the patients were aged between 60 and 79 years.³³ Patients entitled to a preferential reimbursement represented 22% of the knee replacement procedures, equivalent to an age and sex standardised utilisation rate of 208 / 100 000 population versus 210 / 100 000 population for the regular insured. Note that 3.8% of patients had two replacements in 2022.¹⁸

The main indication by far was osteoarthritis (94.9%), followed by trauma (1.6%), vascular necrosis (1.5%), inflammatory arthropathy (0.6%), fracture (0.5%), previous infection (0.1%) or other indication (1.0%). Mortality at 90-days after replacement (or revision) was 0.2% (n=312 / 155 927).³³

When a revision had to be done after implantation (n=2130), the reasons recorded (more than one answer possible) in ORTHOpride for 2020 were aseptic loosening (25.1%), infection (22.9%), instability (19.8%), pain (18.7%), progressive osteoarthritis in non-replaced component (11.7%), etc. Wear of a polyethylene component and implant fracture were involved in respectively 4.2% and 2.1% of the revisions.

Noticeable geographic variations in use of knee replacement procedures were observed in the 2023 RIZIV – INAMI report on Medical practice variations dedicated to knee prosthesis, based on the patient residence in the 2022 billing data. Age, sex and reimbursement status standardised utilisation rate went from 153 procedures per 100 000 population in Brussels to 260 in East Flanders.¹⁸

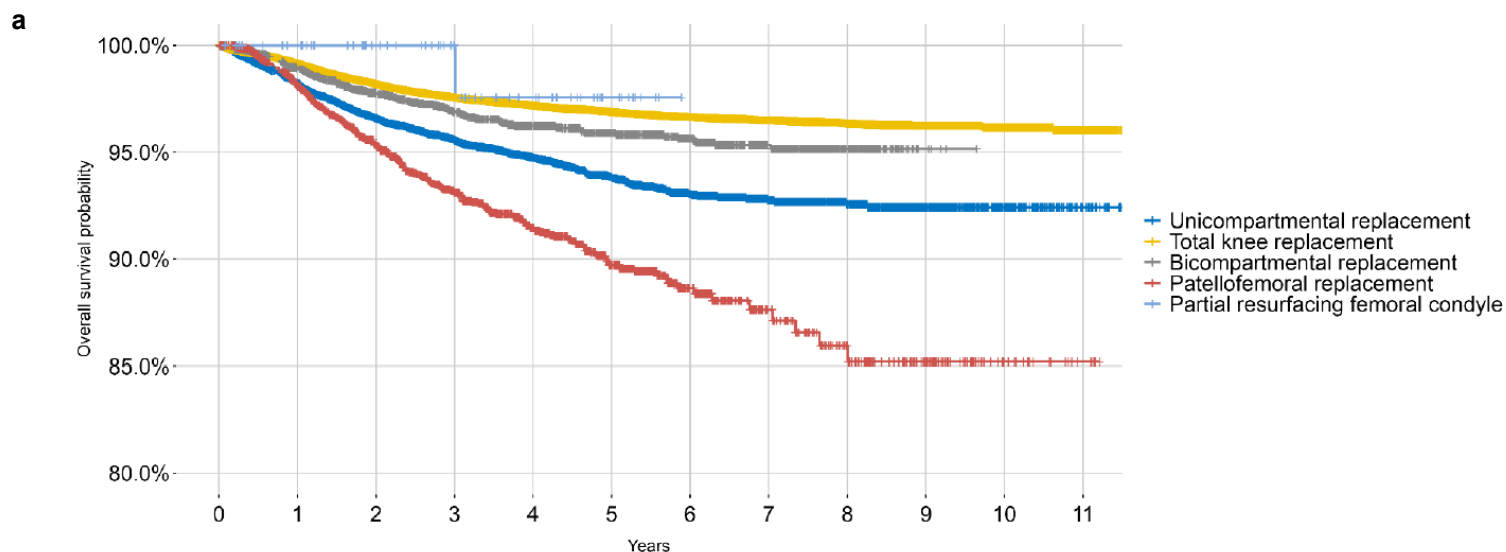
According to the ORTHOpride report 2022, computer assisted navigation was used in 6.8% of the knee replacement procedures and custom-made guides in 4.7%.³³

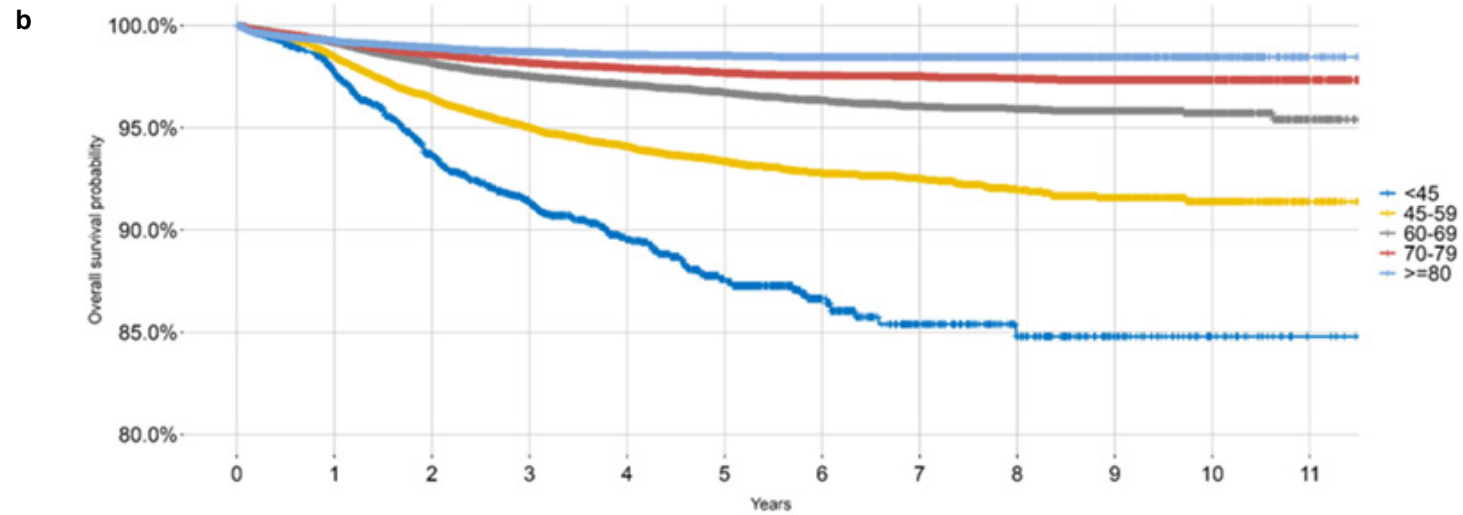
^b The implants for knee replacements are available via the the [SIMPL database](#)



Figure 3a shows that, in case of a primary knee replacement, the lifetime of the prosthesis appears to be longer for the total prosthesis compared to the unicompartamental, bicompartamental or patellofemoral types (there are too few partial resurfacing femoral condyle types be taken into account). In the case of patellofemoral types, a revision was needed in 15% of the cases in the 10 years following the implantation. Nevertheless, interpretation must be done cautiously as patient populations receiving the different types of prosthesis may present different characteristics. As seen in Figure 3b, the lifetime of the prosthesis implanted during a primary knee replacement is longer in older patients. In other words, revisions after a primary knee replacement are less frequently considered in older patients.

Figure 3 – Overall prosthesis survival by type (a) and age of the patient (b) after primary knee replacement procedure





Source: ORTHOpride Belgian Hip and Knee Arthroplasty Register, Annual Report 2020, January 2022.³³



3 METHODOLOGY

This chapter describes how the selection of quality statements and quality indicators with the consultation of experts took place. The Participants–Interventions–Comparator–Outcomes (PICO) which was used to extract information from the retrieved literature is described in section 3.2. A parallel search was performed, one to identify quality indicator literature and one to retrieve guidelines. The search strategies are described in 3.3 and 3.6, respectively. The retrieved information was joined into one set of quality statements and/or quality indicators and presented to the experts for scoring. The final quality standard and set of quality indicators was defined in consensus with the external experts.

3.1 The expert panel

This project was performed by KCE experts, in collaboration with a multidisciplinary external expert panel of practicing healthcare professionals and patient representatives. The expert group is documented in the colophon.

The roles assigned to the expert panel were:

- To provide feedback on the selection of guidelines and studies and identify further relevant manuscripts which may have been missed;
- To prioritise quality indicators from the literature and quality statements from high quality guidelines;
- To provide feedback on identified constraints for the calculation of quality indicators on the management of symptomatic knee osteoarthritis in the Belgian setting.

The experts were asked to deliver their input, preferably (but it was not a requirement), at two points in time:

- Timepoint 1: The experts were contacted by email, and had to deliver written feedback (see Appendix 5.1)
- Timepoint 2: This concerned a meeting (face-to-face or by videoconferencing) in which consensus was sought for the selection of relevant statements and indicators.

We needed a balanced mix of participants in each language group representing both the multidisciplinary aspect in the care for patients with knee osteoarthritis and clinical (academic) expertise in knee replacement and osteoarthritis. Therefore, a selection was made of the following profiles: general practitioners, orthopaedic surgeons, physiotherapists, geriatricians, medical doctor in physical medicine, psychologists, and occupational therapists. The sampling was guided by a sampling strategy designed to recruit participants that are expert in the field. We searched for key organisations such as University Research Groups, PAQS, European Society for Clinical and Economic Aspects of Osteoporosis, Axxon, Osteoarthritis Foundation, Osteoarthritis and Musculoskeletal Diseases (ESCEO), and the European Alliance of Associations for Rheumatology (EULAR), and asked to delegate an expert in the topic. In addition snowballing was used, as we asked selected experts who else could be of interest to participate. Moreover, we also selected two patient representatives (affiliated to REUMANET) involving the patient perspective. Two stakeholders were specifically involved due to their role in the topic:

- RIZIV-INAMI: who worked on an audit of hip prostheses. They were involved in both phases i.e. the external review as well as the expert meeting.
- VIKZ: who was the submitter of this project did not deliver written feedback on timepoint 1 but attended the meeting at timepoint 2.



This selection led to 26 (19 Dutch speaking; 7 French speaking) experts invited to provide written feedback (timepoint 1). Only 24 feedback reports were delivered. All experts invited at timepoint 1 were also invited at timepoint 2. At timepoint 2, 23 experts participated at the meeting, and 2 experts provided written feedback, totaling 25 experts (18 Dutch speaking; 7 French speaking).

3.2 PICO criteria for inclusion and exclusion

The study question ‘which are quality statements/indicators for the management of knee osteoarthritis care in adult patients?’ was translated into Participants–Interventions–Comparator–Outcomes (PICO). Primary prevention of osteoarthritis was excluded as the focus was on patients with osteoarthritis causing symptoms. Secondary prevention after knee injuries e.g. meniscus lesions or fractures were excluded as were single degenerative meniscus lesions. The strong recommendations were extracted from guidelines, the weak and moderate recommendations were not retained.

Table 1 – PICO for the quality statement/indicator review on the management of symptomatic knee osteoarthritis

Quality statement and indicator review on the management of symptomatic knee osteoarthritis	
Objective	To determine quality statement/indicator on the non-surgical and surgical management of symptomatic knee osteoarthritis. The quality statement/indicator can cover broad themes including themes related to utilisation of care, patient experiences, diagnosis, information and advice, assessment, follow-up, referral, interventions before a knee replacement that are non-medication or medication based, and surgical interventions including preoperative, perioperative and postoperative interventions.
Population	Included: symptomatic adult women and men with knee osteoarthritis Excluded: asymptomatic patients, children, hip osteoarthritis and/or hip replacement specifically, generalised osteoarthritis or total joint replacement unspecified. In case of primary studies in mixed patient samples, for example osteoarthritis in several joints, the results for the population with knee osteoarthritis had to be reported separately to be included
Intervention	Included: any intervention for the management of symptomatic knee osteoarthritis Excluded: interventions for the prevention of knee osteoarthritis; any intervention defined as a weak/moderate recommendation in guidelines; an intervention focusing on degenerative meniscus lesions only
Comparator	Not applicable
Outcomes	Quality statements/indicators as reported by the authors, including, Structure, Process, and Outcome indicators (see box 3 below) An intervention defined as a strong recommendation
Eligibility criteria – study design	Quality indicator literature: systematic review and primary study included, narrative reviews and editorials excluded. Guidelines of high quality as defined by AGREE with a score of 7.5 or more.

**Box 3****Description of structure, process, and outcome indicators***

Structure indicators relate to the attributes of the settings in which care occurs. This includes material resources (such as facilities, equipment, and financing), human resources (such as the number and qualifications of personnel) and the organisational structure (such as medical staff, organisation, methods of peer review, and methods of reimbursement).

Process indicators refer to what is actually done in giving and receiving care, i.e. the practitioner's activities in making a diagnosis, recommending or implementing treatment, or other interaction with the patient.

Outcome indicators attempt to describe the effects of care on the health status of patients and populations.

**Reference Donabedian's classification³⁴*

3.3 Search for quality indicator literature, search strategy, and data limits

In parallel to findings from high quality clinical guidelines, and in keeping with time and resources, we conducted an additional pragmatic literature review. Whilst one electronic database was sourced (Medline, for search strategy see Appendix 2.1), the grey literature search included reports published by national and international healthcare agencies as well as studies or reports provided by experts or identified through a manual search of reference lists of included studies. A Prisma flow chart with exclusion reasons, as well as the full list of included studies and reports can be consulted in Appendix 2.

The (inter)national agencies considered for reports were:

- National Institute of Health, USA
- Zorginstituut Nederland, The Netherlands
- EUmuscle.net, Sweden

- KCE reports (other than clinical guidelines), Belgium
- Federal Government Public Health, Belgium
- Agency for healthcare research and quality, USA
- National Institute for Public Health and the Environment, The Netherlands
- Haute Autorité de la Santé, France
- International Consortium for Health Outcomes
- Vlaams Netwerk Ziekenhuizen, KULeuven, Belgium
- Vlaams Instituut voor Kwaliteit van Zorg, Belgium
- Platform for Continuous Improvement of Quality of Care and Patient Safety, Belgium
- Flanders Quality Model, Belgium

The Medline searches were performed first in September 2022, and updated last in July 2023. Following removal of duplicates in Endnote, Medline citations were imported into the Rayyan platform to facilitate selection of eligible studies.³⁵ Although no limits in language or publication date were implemented in the search strategy, the (grey) literature yield was confined to studies or reports in English, Dutch or French and published in the past 20 years. The clinical guidelines (see section 3.6) ensured the implementation of recent clinical evidence to endorse quality indicators (process type indicators mostly). To allow for a greater yield of quality indicators other than process indicators, however, we applied a wider time frame in this search but limited to 20 years to exclude studies on likely outdated quality indicators or treatment modalities no longer recommended.²³



3.4 Quality evaluation of included literature

Unlike clinical guideline appraisals, a formal quality appraisal was not performed, as a dedicated assessment tool for such studies does not exist.²³

3.5 Characteristics of included literature

After removal of duplicates, 222 Medline citations, and subsequently 43 full texts, were screened for eligibility. Titles and abstracts were screened, and relevant citations or reports were selected according to the predefined PICO criteria. Finally, 19 full texts were included for data extraction. The grey literature search additionally revealed 8 and 10 eligible papers and reports, respectively.

Of all eligible peer-reviewed publications (n=26, Appendix 2.3), three citations were systematic reviews.^{23, 36, 37} Amongst primary studies, 13 studies aimed to develop sets of quality indicators,^{20, 38-49} Additionally, existing quality indicators were evaluated in cross-sectional (n=5)^{16, 17, 50-52} or cohort studies (n=5)⁵³⁻⁵⁷ with the aim to assess quality of care in knee osteoarthritis and/or replacement populations.

Overall, across peer-reviewed articles as well as other publications, process indicators were most often identified than were structure or outcome indicators; the latter more commonly reported in the orthopaedic setting, replacement surgery and/or physiotherapeutic osteoarthritis care in particular.^{23, 39, 40, 53}

The retrieved literature indicated that dedicated sets of quality indicators have been developed and/or are being used in research, and that mainly address aspects of **non-operative usual care**. These questionnaires or tools were designed by teams based in Norway (The Osteoarthritis Quality Indicator questionnaire),^{46, 47, 50, 51} Australia (The Quality Indicators for Physiotherapy Management of Hip and Knee Osteoarthritis tool),⁴⁵ Belgium,^{16, 17, 20} The Netherlands (Dutch version of the Osteoarthritis Quality Indicator questionnaire and the Quality Indicators for Physiotherapy in Hip and Knee Osteoarthritis questionnaire),^{39, 40, 48} United Kingdom (The Osteoarthritis Quality Indicator – UK questionnaire),⁴⁹ and USA (The Arthritis Foundation's Quality Indicator set for osteoarthritis)^{42, 52}. The development

of the UK as well as Australian tools drew from the questionnaire designed by the Norwegian team; yet differences exist with respect to the healthcare disciplines targeted (usual care, and primary or physiotherapeutic care specifically). The quality indicators questionnaires from these teams^{49 46, 47 45} were specifically designed to collect patient-reported perspectives on the quality of their care, as opposed to others^{20, 39, 40 42} simply querying the implementation of aspects of care.³⁸

As opposed to studies focussing on non-operative care, Westby et al.⁴¹ performed a systematic literature review and Delphi study amongst Canadian experts to propose a list of 36 quality indicators for the **pre-, peri- and postoperative care in elective total knee replacement**. In the study by Shie et al.⁴⁴ a composite ordinal score of surgery-related indicators (such as revision, readmission, complication and/or long length of stay) was proposed based on a data-driven ranking approach using a national arthroplasty register in the Netherlands.

All but one⁵⁸ report (Appendix 2.3) discussed quality indicators related to the surgical management (replacement) of knee osteoarthritis and were developed by agencies in Belgium, France or The Netherlands.⁵⁹⁻⁶⁵ Reports relevant to the surgical field in general were also retained.^{66, 67}

3.6 Search for guideline literature, search strategy, and data limits

A search of the literature for guidelines on the management of adult patients with symptomatic knee osteoarthritis was performed on November 10th, 2022 and updated on May 26th, 2023. The general term “osteoarthritis” was used in the search of the websites from the agencies described below. The search went back to 2010 but in a next step, guidelines were considered out of date and excluded when their search strategy was performed before 2015.

The following agencies and guideline web pages were searched:

- American Association of Hip and Knee Surgeons ([AAHKS](#))
- American Academy of Orthopedic Surgeons ([AAOS](#))



- American College of Rheumatology ([ACR](#))
- [Arthritis Foundation](#);
- Belgian Centre for Pharmacotherapeutic Information ([BCFI/CBIP](#))
- Belgian Knee Society ([BKS](#))
- Belgian Society for Orthopaedics and Trauma ([BVOT](#))
- [Domus Medica](#)
- [Ebpracticenet](#)
- Enhanced Recovery After Surgery Society [ERAS® Society](#)
- European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases ([ESCEO](#))
- European society of sports traumatology, knee surgery and arthroscopy ([ESSKA](#))
- European Alliance of Associations for Rheumatology ([EULAR](#))
- European Medicine Agency ([EMA](#))
- Federation Medical Specialists The Netherlands ([Federatie Medisch Specialisten](#));
- [Guideline central](#);
- Guidelines International Network ([GIN](#))
- [Healthcare excellence Canada](#);
- International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine([ISAKOS](#))
- Royal Dutch Society for Physiotherapy; ([KNGF](#))
- The National Institute for Health and Care Excellence ([NICE](#))
- Osteoarthritis Research Society International ([OARSI](#))

- Organisation for Economic Co-operation and Development ([OECD](#))
- Ottawa panel evidence-based clinical practice guidelines;
- Royal Australian College of General Practitioners ([RACGP](#))
- World Health Organization ([WHO](#))

The guidelines retrieved are listed under Appendix 4. Members of the expert panel were consulted to identify relevant evidence that might have been missed during the search process.

3.7 Quality evaluation of guidelines

A total of 23 guidelines was retrieved of which two guidelines were considered out of date and four out of scope (Appendix 1.1). The Appraisal of Guidelines Research and Evaluation (AGREE) II instrument was used to evaluate the methodological quality of the selected 17 international guidelines (Appendix 4.1) (www.agreetrust.org). The AGREE II evaluation score (Appendix 3) was used to critically appraise the guidelines. Authors often apply a cut-off to distinguish between high- and low-quality guidelines, although a specified standardised cut-off defined by AGREE-II is lacking.⁶⁸ We set the cut-off based on (i) cut-offs set by other authors (i.e. between 60%-85%) and (ii) the cut-offs adopted in GCP (good clinical practice) projects at KCE (generally a cut-off higher than 7 is taken to define high quality). A high quality guideline was defined as scoring 7.5 and above with AGREE. Each guideline was scored by one researcher (Ans Van Ginckel (AVG) or Vicky Jaspers (VJ), KCE). For guidelines scoring 6.5 to 7.4, a second evaluation was performed by the other researcher and the points of difference were discussed and reviewed in case of disagreement to come to a final score. For one guideline a consensus discussion was set up.⁶⁹

Based on this quality appraisal, six guidelines were retained covering the **non-surgical management** of knee osteoarthritis (see Appendix 1.1).^{5, 6, 22, 70-72} Four of the six guidelines scored 9 and above.^{5, 6, 71, 72}

For the **surgical management** of knee osteoarthritis, the assessment with AGREE identified five high quality guidelines (see Appendix 1.1).^{6, 73-76}



3.8 Characteristics of included guidelines

Non-surgical management of knee osteoarthritis

The most recent non-surgical guideline on (knee) osteoarthritis was the NICE 2022 guideline 'Osteoarthritis in over 16s: diagnosis and management'.⁵ The recommendations were made after a review of the evidence on topics of diagnosis and management, information and support, non-pharmacological and pharmacological treatments, follow-up, and referral for joint replacement. The guideline stipulates that certain recommendations might change practice e.g. a reduction of imaging when diagnosing osteoarthritis which could reduce unnecessary resource use, recommending tailored exercise (including supervised exercise) and using treatment packages, and current practice of pharmacological treatment may change towards using medicines for a shorter time, increasing use of topical NSAIDs, and reducing use of paracetamol and opioids.

The American Academy of Orthopedic Surgeons Clinical Practice Guideline on Management of Knee osteoarthritis reviewed the evidence for a long list of non-arthroplasty interventions.⁷²

Similarly, the American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee reviewed the evidence for non-arthroplasty interventions and divided these into pharmacological and physical, psychosocial, and mind-body approaches.⁷¹

The Australian Guideline for the management of knee and hip osteoarthritis evaluated the evidence for 37 research questions of non-pharmacological interventions and 35 pharmacological questions.⁶ Obviously, the overlap with the above mentioned three guidelines is extensive.

The guideline from 'Het Koninklijk Nederlands Genootschap voor Fysiotherapie' is written from a physiotherapist perspective and details recommendations and guidance for knee and hip osteoarthritis including the pre- and postoperative arthroplasty phase.²²

Surgical management of knee osteoarthritis

The recent American Academy of Orthopedic Surgeons guideline (scoring 9.7 on AGREE) details, next to the non-surgical management, the surgical management of knee osteoarthritis. Recommendations are broad and include, for example, the type of operation (cementless, hybrid fixation, femoral and tibial components, navigation, patellar resurfacing), the patient risk factors, medication and materials used (tranexamic acid, opioids, drains, tourniquets, local infiltration, nerve block).⁷²

The NICE guideline on primary joint replacement covers several themes of clinical care concerning knee replacement²⁷:

- Information needs and shared decision-making;
- Preoperative rehabilitation;
- Anaesthesia;
- Tranexamic acid to reduce blood loss;
- Preventing infection through the use of wound irrigation and the type of operating room ventilation;
- Reducing incorrect implant selection errors;
- Aspects of surgery specific to knee joint replacement;
- Inpatient and outpatient postoperative rehabilitation;
- Long-term follow-up and surveillance.

The NICE guideline on primary joint replacement incorporates the NICE guideline on surgical site infections and the NICE guideline on venous thromboembolism in over 16s.^{74, 75} Both guidelines were included in the review by AGREE.

The Australian Guideline also covered the surgical management of knee and hip osteoarthritis, and looked at the evidence for the referral of patients with osteoarthritis by general practitioners for arthroscopy (lavage and debridement, meniscectomy, cartilage repair procedures).⁶



Healthcare Excellence Canada developed the Enhanced Recovery After Surgery consensus guideline for perioperative care in total knee replacement.⁷⁷ This consensus indicator includes 17 strong recommendations to improve the quality of perioperative care by focusing on interventions to reduce perioperative stress, maintain and support homeostasis and physiological function, to apply discharge criteria and minimising complications. Different from the other guidelines on surgical interventions, it is presented as a 'pathway for enhanced recovery' or also called a 'fast-track'. An example of the implementation of the guideline pathway is the clinical pathway that was developed in Canada for inpatient and outpatient (hip) and knee arthroplasty.⁷⁸

3.9 Information extraction

The strong recommendations (for the quality statements) based on high level evidence and existing quality indicators were extracted by two KCE researchers (VJ and AVG). The information was tabulated first separately, for guidelines and quality indicators, and sorted by theme. Next, the information from the guidelines and the indicators literature was joined together by themes (Table 2). To build this synthesis, the most recent guidelines, and the recent review by Arslan et al. were used as a starting point.^{5, 23, 72} The information of other selected references were then added. Across 11 final themes 90 items, quality statements and quality indicators together, were counted (Table 2). 37 items concerned non-knee replacement content and 53 topics were related to knee replacement surgery.

Table 2 – Number of quality statements/indicators retrieved by theme

Theme	Sub-theme	Number
1 Diagnosis, initial assessments, and follow-up	Diagnosis	1
	Assessment	1
	Follow-up	1
2 Information and advice patients and training professionals	Info	2
	Diet	1
	Training	1
3 Non-drug and non-operative based interventions	Core treatment	1
	Exercise	4
	Other treatment	5
4 Drug-based interventions	Medication	8
5 Surgical non-replacement interventions	Non replacement surgery	3
6 Experience and utilisation of care	Experience	1
	Utilisation of care	1
7 Referral interventions	Joint replacement referral	2



Theme	Sub-theme	Number
8 Optimisation - Replacement surgery	Referral other	5
	Education preop	1
	Physical function	3
	Patient reported outcomes	1
	Comorbidities	4
9 Preoperative - Replacement surgery	Social activity	1
	Preop lab	1
	Thrombosis	2
	Antibiotics	2
	Anaesthesia	4
10 Intraoperative and operative in general - Replacement surgery	Tranexamic	1
	Tourniquet	1
	General operation	3
	Surgical technique	6
	Care pathway	1
11 Postoperative - Replacement surgery	Hospital structure	3
	Medication postop	2
	Mobilisation	2
	Discharge criteria	3
	Complication	4
	Patient reported outcomes	2
	Rehabilitation	2
	Physical function postop	3
	Document	1



3.10 Selection process by external expert consultation

In a following step, the preliminary list of ninety quality statements and/or indicators was assessed for clinical relevance by the external experts through a written process. Experts rated each quality statement/indicator according to clinical relevance. The priority scoring was based on a 11-point scale: from 0 (not a priority, should not be included), over 5 (some priority, inclusion unsure) to 10 (top priority, should be included). Experts were also provided the option 'no opinion' whenever they were unfamiliar with the topic. Comments were welcomed explaining why the expert chose a certain scoring. The experts were also invited to give feedback on the phrasing or wording of the statements/indicators and to make suggestions for improvement.

The scoring led to a ranking which the KCE experts ordered into high, medium, and low. The high ranking was defined by the KCE experts as those statements/indicators scoring 8 to 10 by at least 70% of the experts. The cut-off of 70% was based on previous KCE projects and literature where 70-75% as a cut-off is commonly used to define a high category.^{40,79} The medium ranking category were defined as those scoring 8 to 10 by 50% to 69% of the experts. The remaining statements/indicators were low. The statements and/or indicators that were ranked highest (there were 22 high-ranking, 36 medium-ranking, and 32 low-ranking items) were taken forward for discussion at the expert meeting (Appendix 5.2). At this meeting, the measurability was taken into account into the prioritisation. Considering the limited availability of routine data and to have a wide enough breath across primary and secondary care, the KCE experts included all items in the above 50% category for further consideration and discussion. Statements and/or indicators within the same theme that were overlapping were joined together by the KCE team prior to the meeting. The discussion with the external experts focussed on the statements and/or indicators and their measurability (Appendix 5.2) and was based on consensus agreements (Appendix 5.3).

3.11 Defining measurability

The initial assessment of measurability was drawn up by the KCE for the high and medium ranked quality indicators. It was verified whether the elements required for the measurement could be identified within the national administrative healthcare databases. These databases include the billing data such as those collected by the IMA and the INAMI – RIZIV, the MZG - RHM hospital data centralised by the FPS Public Health, Food Chain Safety and Environment and the TCT data, which is a linkage of MZG – RHM, AZV – SHA/ and ADH – HJA data by the Technical Cell (TCT data are shortly presented in Appendix 1.1) Some verifications on the registration quality or the codes used by hospitals were done based on the extracted TCT data used in section 2.1. Finally, the information recorded in the ORTHOpriide register was also taken into account.³³

A first draft of the definitions of the quality indicators, including the relevant ICD-10-BE or nomenclature codes, were submitted to the experts accompanying the project, as well as to the members of the Hospital Audit unit, a cogovernance RIZIV – INAMI / FPS Public Health, Food Chain Safety and Environment / FAMHP. The definitions, refined thanks to their comments, constitute an outline which will have to be finalised and updated when the indicators are being operationalised.



4 ASSESSMENT OF THE CLINICAL RELEVANCE OF QUALITY STATEMENTS AND QUALITY INDICATORS

4.1 Overview of the ranking

Of the 90 quality statements and / or indicators retrieved from the scientific literature, 22 were high-ranking, 36 were medium-ranking, and 32 were low-ranking.

4.2 High

An overview of the quality statements/indicators scoring 8 to 10 by at least 70% of the experts is summarised below (see Table 3, Table 4, Table 5, Table 6, Table 7, Table 8).

4.2.1 Assessment, info, and advice

Table 3 – High rating: themes assessment and information

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
1.2.1	Assessment	Arslan 2021 and others ^{20, 23, 39, 45, 47, 48, 50-52}	Assess and document the effect of osteoarthritis at initial and follow-up consultations on the person's • function, • quality of life, • occupation, • mood, • relationships, • and leisure activities, and assess the person's • health education needs, • health beliefs, • and motivation to self-manage.	5	10	8.6	1.6	9	75%
2.1.1	Info and advice	NICE 2022 ⁵ AAOS 2021 ⁷² KNGF 2018 ²²	Adults with (knee) osteoarthritis are given information about their condition and its management at diagnosis and follow-up appointments. Information is • tailored to the individual needs (such as language and culture), • in an accessible format (oral, written, online,...), Information is delivered • in a way that enables the patient to participate actively,	5	10	9.1	1.2	9	91%



						• putting shared decision-making into practice, • providing an approach to care that takes account of multimorbidity.						
2.1.2	Info advice	and Arslan 2021 and other ^{20, 23, 39, 40, 45, 47, 48, 50-52, 58}			The provided education and information topics include	• pathology of osteoarthritis, • joint protection and the use of aids, • lifestyle and physical activity, • self-management strategies, • advice about body weight and joint pain, • work advice, • footwear advice, • treatment in general, • exercise core therapy, • medication with risks of medication use and screening for side effects, • resources and tools while waiting for an appointment.	3	10	8.4	1.8	9	78%

4.2.2 Interventions with and without drugs

Table 4 – High rating: themes non-drug and drug-related interventions

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
3.1.1	Core treatment	NICE 2022 ⁵ AAOS 2021 ⁷² RACGP 2018 ⁶	The core treatment for knee osteoarthritis, regardless of age, structural disease severity, functional status or pain levels, to improve pain and function consists of a combination of • (supervised) therapeutic exercise tailored to the patient's need (e.g. local muscle strengthening, general aerobic fitness), • self-management programs, • weight loss for people who are living with overweight.	2	10	8.4	2.0	9	78%
3.2.1	Exercise	Arslan 2021 and other ^{23, 39, 40, 45, 47, 48, 50-52}	Prescribe and recommend a personalised exercise and a physical activity program according to • needs, • preferences, • self-motivation, • and ability to perform exercises. Exercises can be in the form of • strengthening exercises, • aerobic exercises,	4	10	8.4	2.0	9	70%



			- functional exercises, - walking exercises. Combine exercise therapy with education and self-management interventions.							
4.1.8	Medication	Arslan 2021 and other ^{23, 39, 47, 48, 50, 51, 58}	'Number' of prescriptions of - first-line medication therapy, - steroid injection, - medication with a recommendation 'against' such as opioids. Provision of information about risks of medication use and screening for side effects.	3	10	8.1	2.7	9.5	70%	

4.2.3 Surgical non-replacement interventions

Table 5 – High rating: theme surgical non-replacement

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
5.1.1	Non-replacement surgery	AAOS 2021 ⁷² NICE 2022 ⁵ RACGP 2018 ⁶	Arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis is not recommended.	5	10	9.2	1.4	10	87%



4.2.4 Optimisation and preoperative interventions knee replacement surgery

Table 6 – High rating: theme optimisation for knee replacement surgery

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
8.1.1	Education preop	Westby 2018 ⁴¹ NIPH Netherlands 2007 ⁶³	Multidisciplinary preoperative education that uses appropriate delivery formats (in-person, video, telehealth, print), provides an opportunity for questions to be addressed, allows participation of a family member or other support and addresses (at a minimum): • Surgical procedure • Risks and benefits • Patient expectations • Pain management strategies • Home preparation • Assistive devices • Postoperative care and rehabilitation Should be documented preoperatively.	0	10	8.2	2.2	9	81%
9.2.1	Thrombosis	NICE 2018 ⁷⁵ ERAS 2020 ⁷⁷	Offer venous thromboembolism (VTE) prophylaxis undergoing elective knee replacement surgery • when the VTE risk outweighs the risk of bleeding • in accordance with local policy	7	10	8.9	1.2	9	80%
9.4.1	Anaesthesia	AAOS 2022 ⁷⁶	The intake of clear fluids until 2 hours before the induction of anaesthesia, and a 6-hour fast for solid food is recommended.	6	10	9.2	1.4	10	82%
9.4.2	Anaesthesia	ERAS 2020 ⁷⁷ AAOS 2022 ⁷⁶	Standardised anaesthetic protocol • the routine administration of sedatives to reduce anxiety preoperatively is not recommended. • spinal opioids are not recommended for routine use because of the potential for adverse effects which delay recovery • epidural analgesia is not recommended for routine use	7	10	8.6	1.0	9	86%
9.4.3	Anaesthesia ^c	NICE 2020 ⁷³	Offer a choice of:	5	10	8.3	1.8	9	71%

^c Regional anaesthesia consists of infiltrating a peripheral nerve with an anaesthetic agent blocking transmission to avoid or relieve pain. It does not affect the patient's consciousness level. In 'rachi-anaesthesia' the full lower body is involved whereas when anaesthesia is only performed on one limb it is called a 'peripheral nerve block'. Local infiltration analgesia (LIA) is a technique based on systematic infiltration of a mixture of ropivacaine, ketorolac, and adrenaline into the tissues around the surgical field to achieve pain control with little physiological disturbance.⁸⁰ The technique allows virtually immediate mobilisation and earlier discharge from hospital.



		AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	- regional anaesthesia in combination with local infiltration analgesia (LIA), or - general anaesthesia in combination with LIA - add a peripheral nerve block provided it does not delay surgery significantly as it may delay early and safe mobilisation							
9.4.4	Anaesthesia	AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	Aim for optimisation of - perioperative glucose control (<126mg/dl) - postoperative nausea and vomiting - screening preop - give paracetamol prophylactically	5	10	8.3	1.6	9	78%	

4.2.5 Interventions knee replacement surgery

Table 7 – High rating: theme knee replacement surgery

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
10.1.2	General operation	ERAS 2020 ⁷⁷	Normal body temperature should be maintained peri- and postoperatively through prewarming and the active warming of patients intraoperatively to enhance recovery after surgery.	7	10	8.7	1.3	9	71%
10.1.3	General operation	ERAS 2020 ⁷⁷	The routine use of urinary catheters is not recommended and does not enhance recovery after surgery.	7	10	9.1	0.9	9	89%
10.2.4	Surgical technique	AAOS 2022 ⁷⁶ NICE 2020 ⁷³	Offer a choice of partial or total knee replacement to people with isolated medial compartmental osteoarthritis. Discuss the potential benefits and risks of each option with the person.	5	10	8.3	1.9	9	73%
10.2.5	Surgical technique	AAOS 2022 ⁷⁶ NICE 2020 ⁷³	Both patellar resurfacing and non-patellar resurfacing in total knee arthroplasty is accepted.	5	10	8.7	1.7	9	86%



4.2.6 Postoperative interventions knee replacement surgery

Table 8 – High rating: theme postoperative knee replacement surgery

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
11.2.1	Mobilisation	Westby 2018 ⁴¹ NIPH Netherlands 2007 ⁶³	Multidisciplinary preoperative education that uses appropriate delivery formats (in-person, video, telehealth, print), provides an opportunity for questions to be addressed, allows participation of a family member or other support and addresses (at a minimum): • Surgical procedure • Risks and benefits • Patient expectations • Pain management strategies • Home preparation • Assistive devices • Postoperative care and rehabilitation Should be documented preoperatively.	3	10	8.8	1.8	10	79%
11.2.2	Mobilisation	NICE 2020 ⁷³ ERAS 2020 ⁷⁷ KNGF 2018 ²²	Patients should be mobilised as soon as possible post-surgery. A physiotherapist or occupational therapist should offer rehabilitation • on the day of surgery if possible and no more than 24 hours after knee replacement, advice on managing activities of daily living and home exercise programmes and mobilisation, AND • before the person leaves hospital, advice on self-directed rehabilitation meaning a clear understanding of their rehabilitation goals and the importance of doing the exercises prescribed to achieve these goals, and a point of contact for advice and support.	5	10	9.2	1.2	9	95%
11.3.1	Discharge criteria	Westby 2018 ⁴¹	If there were no significant perioperative complications, THEN achievement of the following functional outcomes (at a minimum): • Transfer independently in/out of bed and on/off chair and toilet • Ambulate safely with an appropriate assistive device on level surfaces and stairs (if appropriate for home situation) • Perform basic activities of daily living independently using related equipment • Demonstrate independence in home exercise program These factors should be documented by the occupational therapist or physiotherapist prior to discharge to home from the acute care hospital.	3	10	8.6	2.0	9	80%



11.4.1	Complication	Indicatorenset. Knie-prothese NL 2022 ⁶⁵	Percentage of deep postoperative wound infections within 90 days or within 365 days	5	10	8.4	1.6	9	73%
11.7.3	Physical function postop	Westby 2018 ⁴¹ Arslan 2022 ^{23, 39}	The physiotherapist provides and documents (standardised approach e.g., class attendances, exercise log, online health journal) prior to discharge from post-acute rehabilitation - physiotherapy (including therapeutic exercise) that is individualised to the patient's functional needs, supervised, appropriately dosed, regularly progressed, at least 6 weeks in duration and monitored for adherence AND includes the following components (at a minimum): - Pain management strategies - Active knee range of motion exercise - Progressive resistance training for lower limb muscles - Static and dynamic balance training - Postural and core stability training - Gait training (including use of walking aids and differing walking surfaces) - Functional exercises (including stair climbing, rising/lowering to chair) - Provision of a home exercise program and education on how to progress exercises	2	10	7.9	2.5	9	72%



4.3 Medium

An overview of the quality indicators scoring 8 to 10 by at least 50% to 69% of the experts is summarised below (see Table 9, Table 10, Table 11, Table 12, Table 13, Table 15, Table 16).

4.3.1 *Diagnosis, info and advice, training*

Table 9 – Medium rating: theme diagnosis and information

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
1.1.1	Diagnosis	NICE 2022 ⁵ KNGF 2018 ²²	Diagnose osteoarthritis clinically without imaging in people who: • are 45 or over, and • have activity-related joint pain, and • have either no morning joint-related stiffness or morning stiffness that lasts no longer than 30 minutes.	2	10	6.4	2.8	7.5	50%
2.2.1	Diet	NICE 2022 ⁵ AAOS 2021 ⁷² RACGP 2018 ⁶	For a person with (knee) osteoarthritis who is living with overweight or obesity: • advise that weight loss will improve the quality of life and physical function, and reduce pain, • provide support to choose a weight loss goal, • explain that any amount of weight loss is likely to be beneficial but losing 10% of body weight is likely to be better than 5%.	5	10	8.3	1.3	8.5	67%
2.3.1	Training	Eumusc.net ⁵⁸	All professionals managing patients at a primary healthcare centre should have continuous access to education on important preventive and therapeutic strategies in the management of osteoarthritis.	2	10	7.8	2.1	8.5	63%



4.3.2 Interventions with and without drugs

Table 10 – Medium rating: themes non-drug and drug-related interventions

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
3.2.2	Exercise	Ingelsrud 2020 ⁵¹	Assess the extent to which the physiotherapy treatment goals were achieved.	0	10	7.0	2.6	8	55%
3.3.2	Other treatment	NICE 2022 ⁵ KNGF 2018 ²² ACR/AF 2019 ⁷¹	Do not offer any of the following electrotherapy treatments to people with osteoarthritis because there is insufficient evidence of benefit: • transcutaneous electrical nerve stimulation (TENS); • ultrasound therapy; • interferential therapy; • laser therapy; • pulsed short-wave therapy; • neuromuscular electrical stimulation (NMES).	4	10	7.8	2.0	8	68%
3.3.3	Other treatment	NICE 2022 ⁵	Do not offer acupuncture or dry needling to manage osteoarthritis.	2	10	7.4	2.2	8.5	55%
3.3.5	Other treatment	Arslan 2021 ²³	Do not prescribe interventions 'recommended against'.	0	10	6.5	3.3	7.5	57%
4.1.1	Medication	NICE 2022 ⁵	If pharmacological treatments are needed to manage osteoarthritis, use them: • alongside non-pharmacological treatments and to support therapeutic exercise, • at the lowest effective dose for the shortest possible time.	5	10	8.4	1.5	9	68%
4.1.4	Medication	NICE 2022 ⁵	Do not routinely offer paracetamol or weak opioids unless: • they are only used infrequently for short-term pain relief and • all other pharmacological treatments are contraindicated, not tolerated or ineffective.	1	10	6.5	3.3	8	56%
4.1.6	Medication	AAOS 2021 ⁷² ; NICE 2022 ⁵ ; RACGP 2018 ⁶	Do not offer oral narcotics (strong or weak opioids), including tramadol (weak opioid), as they result • in a significant increase of adverse events and • are not effective at improving pain or function for treatment of osteoarthritis of the knee.	2	10	7.1	3.0	8.5	56%



4.3.3 Surgical non-replacement interventions

Table 11 – Medium rating: theme surgical non-replacement

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
5.1.3	Non replacement surgery	AAOS 2021 ⁸¹	Free-floating (un-fixed) interpositional devices in patients with symptomatic medial compartment osteoarthritis of the knee are not recommended.	3	10	7.9	2.3	9	64%

4.3.4 Referral interventions

Table 12 – Medium rating: theme referral

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
7.1.1	Joint replacement referral	NICE 2022 ⁵	Consider referring people with knee osteoarthritis for joint replacement if: - their joint symptoms (such as pain, stiffness, reduced function, or progressive joint deformity) are substantially impacting their quality of life, and - non-surgical management (for example, therapeutic exercise, weight loss, pain relief) offered for at least 3 months is ineffective or unsuitable. Adults with osteoarthritis are supported with non-surgical core treatments for at least 3 months before any referral for consideration of joint surgery.	1	10	7.5	2.4	8	55%
7.2.2	Referral other	Arslan 2021 ²³ and ^{45, 50-52, 82}	Referral for exercise therapy, and other programmes and activities for osteoarthritis	0	10	7.4	2.9	8	55%
7.2.3	Referral other	Arslan 2021 ²³	Referral to a weight loss service	0	10	7.4	2.6	7	50%



4.3.5 Optimisation interventions knee replacement surgery

Table 13 – Medium rating: theme optimisation for knee replacement surgery

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
8.2.1	Physical function	Westby 2018 ⁴¹	A health professional with training in musculoskeletal exam skills performs and documents a physical examination of the lower limbs and lumbo-pelvic region using standardised methods and including (at a minimum): • Gait pattern and use of walking aids • Standing posture and lower limb alignment • Bilateral passive & active knee and hip range of motion • Bilateral lower limb soft tissue flexibility/contractures • Bilateral lower limb strength • Static and dynamic balance	2	10	7.4	2.4	8.5	60%
8.2.3	Physical function	Westby 2018 ⁴¹ ERAS 2020 ⁷⁷	Initiate at least 8 weeks prior to surgery an individualised, structured, and progressive exercise program to allow a physiologic training effect (no effect on enhanced recovery) that includes at a minimum: • Upper extremity strength training (in preparation for use of walking aids and transfers) • Lower extremity functional strength training as tolerated • Lower extremity range of motion exercises • Gait training with instruction on use of walking aids • Guidance on remaining physically active	2	10	7.4	2.3	7.5	50%
8.4.1	Comorbidities	Westby 2018 ⁴¹ AAOS 2022 ⁷⁶	Document type and severity of comorbidities including • cardiovascular disease • high blood pressure • chronic kidney disease • obesity (BMI ≥ 30 kg/m²) • lung disease • diabetes • malnutrition • back pain or other lower limb joint involvement/pain • anxiety and depression • opioid tolerance • cognitive impairment	3	10	7.9	1.9	8	57%



8.4.2	Comorbidities	ERAS 2020 ⁷⁷	Preoperative anaemia should be identified, investigated, and corrected prior to knee replacement to enhance recovery after surgery.	3	10	7.3	2.5	7.5	50%
8.5.1	Social activity	Westby 2018 ⁴¹	Assessment of social participation including - care-giving activities, - paid/unpaid work, - leisure and sporting activities. Assessment of social functioning in a non-residential care setting including - support, - access to safe and efficient transportation (prior to and after surgery), - home safety and fall risk factors, - guidance on preparing the home environment to promote safety, accessibility, and independent day-to-day function, - need for assistive devices, equipment, and mobility aids.	0	10	7.1	2.8	8	55%

4.3.6 Preoperative interventions knee replacement surgery

Table 14 – Medium rating: theme preoperative knee replacement surgery

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
9.2.2	Thrombosis	NICE 2018 ⁷⁵ ERAS 2020 ⁷⁷	For people who are at increased risk of VTE, give them and their family members or carers verbal and written information on the following before offering VTE prophylaxis: - the person's risks and possible consequences of VTE - the importance of VTE prophylaxis and its possible side effects – for example, pharmacological prophylaxis can increase bleeding risk - the correct use of VTE prophylaxis – for example, anti-embolism stockings, intermittent pneumatic compression - how people can reduce their risk of VTE (such as keeping well hydrated and, if possible, exercising and becoming more mobile). Ensure that people who need anti-embolism stockings have their legs measured and that they are provided with the correct size of stocking. Anti-embolism stockings should be fitted, and patients shown how to use them by staff trained in their use.	5	10	8.1	1.5	8.5	58%
9.3.1	Antibiotics	NICE 2018 ⁷⁵ ERAS 2020 ⁷⁷	Patients should receive systemic antimicrobial prophylaxis in accordance with local policy and availability. Do not use wound irrigation to reduce the risk of surgical site infection.	5	10	7.9	2.2	9	55%



9.5.1	Tranexamic	NICE 2020 ⁷⁴ AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	For reduced postoperative blood loss, give • if no renal impairment ○ intravenous tranexamic acid AND ○ 1 g to 2 g of topical intra-articular tranexamic acid diluted in saline after the final wash-out and before wound closure AND ○ total combined dose of tranexamic acid does not exceed 3 g • If renal impairment, give a reduced dose of intravenous tranexamic acid on its own	7	10	8.4	1.3	8	67%
--------------	------------	--	---	---	----	-----	-----	---	-----

4.3.7 Interventions knee replacement surgery

Table 15 – Medium rating: theme knee replacement surgery

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
10.1.1	General operation	NICE 2020 ⁷⁴ NIH 2003 ⁶³	Use ultra-clean air ventilation in operating theatres for primary knee elective joint replacement.	5	10	8.6	2.0	10	67%
10.2.1	Surgical technique	AAOS 2022 ⁷⁶	Surgical technique aspects • cemented femoral and tibial components versus cementless femoral and tibial components, • cemented femoral and tibial components versus hybrid fixation (cementless femur), • navigation versus conventional techniques, • kinematic versus mechanical alignment principles • cruciate retaining versus posterior stabilised total knee arthroplasty designs • do not influence functional outcomes, complications, pain, and reoperations.	2	10	6.6	3.4	7	50%
10.2.2	Surgical technique	AAOS 2022 ⁷⁶	Patient specific technology (e.g., guides, cutting blocks) should not be used. There is no significant difference in patient outcomes, function, or pain as compared to conventional total knee arthroplasty. Additionally, it does not reduce operating time, blood loss, length of stay, and/or complications.	3	10	7.3	2.9	8	50%
10.2.6	Surgical technique	AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	Drains should not be used with total knee arthroplasty because there is no significant difference in complications or outcomes.	2	10	7.5	2.5	8	50%
10.3.1	Care pathway	Westby 2018 ⁴¹	Use of a standardised clinical care pathway should be documented during the acute care stay.	2	10	7.6	2.2	8	67%



4.3.8 Postoperative interventions knee replacement surgery

Table 16 – Medium rating: theme postoperative knee replacement surgery

ID	Theme	Reference	Description quality statement/indicator	Min	Max	Mean	SD	Median	Percent
11.1.1	Medication postop	ERAS 2020 ⁷⁷	Multimodal analgesia for enhanced recovery - the routine use of paracetamol is recommended - the routine use of NSAIDS is recommended for patients without contraindications - gabapentinoids are not currently recommended as an adjunct in a multimodal analgesia regime to enhance recovery after surgery although further studies are indicated	5	10	7.6	1.5	8	54%
11.3.3	Discharge criteria	NIPH NL 2007 ⁶³	Patient participation in the discharge trajectory.	2	10	7.6	2.3	8	52%
11.4.2	Complication	KCE report 313, 2019 ⁵⁹	Incidence of postoperative pulmonary embolism or deep vein thrombosis, after knee replacement (/100 000 knee surgery discharges).	3	10	7.7	2.1	8	60%
11.4.3	Complication	NIPH NL 2007 ⁶³ AHRQ 2022 ⁸³ Rolfson US 2016 ⁴³	Number of patients with - decubitus - urine infection - postop respiratory failure - iatrogenic pneumothorax - postop sepsis - postop wound dehiscence - postop haemorrhage or haematoma - accidental puncture or laceration - postop metabolic derangements - death, all cause 30-day mortality - readmission, all cause 30-day	2	10	7.7	2.4	9	67%
11.4.4	Complication	NICE 2020 ⁷³	Primary care practitioners should refer people who develop new or worsening pain, limp or loss of function related to their joint replacement to an orthopaedic surgical service.	2	10	7.7	2.5	8	63%
11.5.1	Patient reported outcomes	I. Knie-prothese NL 2022 ⁶⁵ Westby 2018 ⁴¹	Collect postoperative patient reported outcome measures (PROM) on the knee problem with validated health questionnaires - at 6 months AND - at 12 months	0	10	7.1	2.6	8	57%



			and compare with the preop PROMs						
11.6.1	Rehabilitation	NICE 2020 ⁷³ KNGF 2018 ²²	Offer supervised group or individual outpatient rehabilitation to people who: • have difficulties managing activities of daily living or • have ongoing functional impairment leading to specific rehabilitation needs or • find that self-directed rehabilitation is not meeting their rehabilitation goals.	2	10	6.9	2.9	8	50%
11.7.1	Physical function postop	Westby 2018 ⁴¹	A health professional with training in musculoskeletal exam skills performs and documents a physical examination of the lower limbs and lumbo-pelvic region including (at a minimum): • Surgical knee effusion (knee circumference) • Muscle recruitment/voluntary activation of quadriceps • Gait pattern and use of walking aids • Standing posture and lower limb alignment • Bilateral passive & active knee and hip range of motion • Bilateral lower limb strength, soft tissue flexibility/contractures • Static and dynamic balance	2	10	7.3	2.6	9	53%
11.8.1	Document	Westby 2018 ⁴¹	Document (transfer form, discharge letter) that the event took place or was cancelled, declined or other for • follow-up appointment, • transfer of care to another rehabilitation provider or setting (e.g., transfer from acute care to outpatient care setting), referral to another rehabilitation provider (e.g., referral to physiotherapy or occupational therapy)	2	10	7.4	2.2	7.5	50%



5 ASSESSMENT OF MEASURABILITY

The measurability as presented below for the high and medium scoring quality indicators was based on what is measurable with routinely available data from the national administrative healthcare databases (see section 3.11. and Appendix 1.1).

5.1 High rating quality statements and indicators

5.1.1 Assessment, info, and advice

Table 17 – Measurability high rating: themes assessment and information

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
1.2.1	Assessment	Assess and document the effect of osteoarthritis at initial and follow-up consultations on the person's • function, • quality of life, • occupation, • mood, • relationships, • and leisure activities and assess the person's • health education needs, • health beliefs, • and motivation to self-manage.	Not measurable - This kind of information may be documented in the electronic medical file but is not available in any national administrative database	NA
2.1.1	Info and advice	Adults with (knee) osteoarthritis are given information about their condition and its management at diagnosis and follow-up appointments. Information is • tailored to the individual needs (such as language and culture), • in an accessible format (oral, written, online,...), Information is delivered • in a way that enables the patient to participate actively, • putting shared decision-making into practice,	Not measurable - There is no information available	NA



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
		providing an approach to care that takes account of multimorbidity.		
2.1.2	Info and advice	The provided education and information topics include - pathology of osteoarthritis, - joint protection and the use of aids, - lifestyle and physical activity, - self-management strategies, - advice about body weight and joint pain, - work advice, - footwear advice, - treatment in general, - exercise core therapy, - medication with risks of medication use and screening for side effects, - resources and tools while waiting for an appointment.	Not measurable - There is no information available	NA

5.1.2 Interventions with and without drugs

Table 18 – Measurability high rating: themes non-drug and drug-related interventions

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
3.1.1	Non-drug/operative intervention	The core treatment for knee osteoarthritis, regardless of age, structural disease severity, functional status or pain levels, to improve pain and function consists of a combination of (supervised) therapeutic exercise tailored to the patient's need (e.g. local muscle strengthening, general aerobic fitness), - self-management programs, - weight loss for people who are living with overweight.	Not measurable - This kind of information may be documented in the electronic medical file but is not available in any national administrative database	NA
3.2.1	Exercise	Prescribe and recommend a personalised exercise and a physical activity program according to - needs, - preferences, - self-motivation, - and ability to perform exercises.	Not measurable	



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
		Exercises can be in the form of - strengthening exercises, - aerobic exercises, - functional exercises, - walking exercises. Combine exercise therapy with education and self-management interventions.		
4.1.8	Drug-based intervention	'Number' of prescriptions of - first-line medication therapy, - steroid injection, - medication with a recommendation 'against' such as opioids. Provision of information about risks of medication use and screening for side effects.	Probably measurable (without second part of statement) on IMA data– Only operated patients can be identified on IMA data. Number of prescriptions should be replaced by number of patients with prescription per prescribing physician. Condition: first-line pharmaceuticals (to be defined) must be reimbursed to be identified. No information is available on provision of information.	Proportion of patients with knee replacement intervention (denominator) with at least one of the (to be defined) listed pharmaceuticals in the X weeks/months before their knee replacement intervention (IMA data)

5.1.3 Surgical non-replacement interventions

Table 19 – Measurability high rating: theme surgical non-replacement

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
5.1.1	Surgical non-replacement intervention	Arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis is not recommended.	Measurable on MZG – RHM or TCT data, or IMA data- Arthroscopy can be identified, therefore this is only measurable on population admitted with osteoarthritis as denominator (MZG – RHM or TCT data). Lavage and/or debridement should be translated into ICD-10-BE or nomenclature codes.	Proportion of patients hospitalised with a principal diagnosis of knee osteoarthritis (denominator) having an arthroscopy with lavage and/or debridement (identified by nomenclature of ICD-10-BE codes) during their hospitalisation (MZG – RHM or TCT data, or IMA data) <i>Note:</i> As this procedure is not recommended, the target should be low.



5.1.4 Optimisation and preoperative interventions knee replacement surgery

Table 20 – Measurability high rating: theme optimisation and preoperative for knee replacement surgery

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
8.1.1	Education preop	Multidisciplinary preoperative education that uses appropriate delivery formats (in-person, video, telehealth, print), provides an opportunity for questions to be addressed, allows participation of a family member or other support and addresses (at a minimum): • Surgical procedure • Risks and benefits • Patient expectations • Pain management strategies • Home preparation • Assistive devices • Postoperative care and rehabilitation Should be documented preoperatively.	Not measurable - There is no information available	NA
9.2.1	Thrombosis	Offer venous thromboembolism (VTE) prophylaxis undergoing elective knee replacement surgery • when the VTE risk outweighs the risk of bleeding • in accordance with local policy	Medication for VTE prophylaxis measurable on TCT or IMA data – Risks and benefits not measurable	Proportion of patients with knee replacement intervention (denominator) with at least one of listed pharmaceuticals (Apixaban, Dabigatran, Rivaroxaban, Enoxaparine, Nadroparine, calcium, Tinzaparine, natrium, Fondaparinux) given at the time of the knee replacement intervention (TCT (during hospitalisation) or IMA data (on the day of the intervention and the next days))
9.4.1	Anaesthesia	The intake of clear fluids until 2 hours before the induction of anaesthesia, and a 6-hour fast for solid food is recommended.	Not measurable - There is no information available	NA
9.4.2	Anaesthesia	Standardised anaesthetic protocol • the routine administration of sedatives to reduce anxiety preoperatively is not recommended.	Probably measurable on TCT data – warning from expert on the validity of anesthesia information recorded in MZG – RHM data ^d .	Proportion of patients with knee replacement intervention (denominator) with (a) reimbursed sedative(s) on the day of the intervention (pharmaceuticals to be defined) per hospital, or

^d See 2.4., field 15 on https://www.health.belgium.be/sites/default/files/uploads/fields/fpshealth_theme_file/richtlijnen_domein_5_medische_gegevens.pdf



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
		- spinal opioids are not recommended for routine use because of the potential for adverse effects which delay recovery - epidural analgesia is not recommended for routine use		(b) spinal opioid's injection (pharmaceuticals to be defined) per hospital, or (c) epidural analgesia as recorded in MZG - RHM (TCT data – a) and b) also measurable on IMA data when reimbursed) <i>Note:</i> As this procedure is not recommended, the target should be low.
9.4.3	Anaesthesia	Offer a choice of: - regional anaesthesia in combination with local infiltration analgesia (LIA), or - general anaesthesia in combination with LIA - add a peripheral nerve block provided it does not delay surgery significantly as it may delay early and safe mobilisation	Probably measurable on TCT data	
9.4.4	Anaesthesia	Aim for optimisation of - perioperative glucose control (<126mg/dl) - postoperative nausea and vomiting - screening preop - give paracetamol prophylactically	Partially measurable on TCT or IMA data - Perioperative glucose 'measurement' is identifiable but if action was undertaken is more difficult to verify.	Proportion of patients with knee replacement intervention (denominator) with glucose control (nomenclature code to defined) on day of operation and after their knee replacement intervention (TCT or IMA data)



5.1.5 Interventions knee replacement surgery

Table 21 – Measurability high rating: theme knee replacement surgery

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
10.1.2	General operation	Normal body temperature should be maintained peri- and postoperatively through prewarming and the active warming of patients intraoperatively to enhance recovery after surgery.	Not measurable - There is no information available	NA
10.1.3	General operation	The routine use of urinary catheters is not recommended and does not enhance recovery after surgery.	Measurable on MZG –RHM or TCT data– Urinary catheters are identifiable in ICD-10 "0T9B..." Measurable on MZG –RHM – Urinary catheters are identifiable in ICD-10-BE but are undercoded	Proportion of patients with knee replacement intervention (denominator) with ICD-10-BE urinary catheterisation code (0T9B...or 0T9C) on the day their knee replacement intervention (MZG - RHM or TCT data) <i>Note:</i> As this procedure is not recommended, the target should be low.
10.2.4	Surgical technique	Offer a choice of partial or total knee replacement to people with isolated medial compartmental osteoarthritis. Discuss the potential benefits and risks of each option with the person.	Not measurable - There is no information available	NA
10.2.5	Surgical technique	Both patellar resurfacing and non-patellar resurfacing in total knee arthroplasty is accepted.	There is no identification possible of 'patellar resurfacing' performed during a primary total knee replacement.	NA



5.1.6 Postoperative interventions knee replacement surgery

Table 22 – Measurability high rating: theme postoperative knee replacement surgery

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
11.2.1	Mobilisation	Patients should be mobilised as soon as possible post-surgery. A physiotherapist or occupational therapist should offer rehabilitation - on the day of surgery if possible and no more than 24 hours after knee replacement, advice on managing activities of daily living and home exercise programmes and mobilisation, AND - before the person leaves hospital, advice on self-directed rehabilitation meaning a clear understanding of their rehabilitation goals and the importance of doing the exercises prescribed to achieve these goals, and a point of contact for advice and support.	Measurable if the indicator is modified – date of start of physiotherapy available in TCT data or IMA data Second part not measurable - This should be available in the electronic medical file.	Proportion of patients with knee replacement intervention (denominator) with ICD-10-BE F07etc... or art.22 nomenclature codes (to be defined) on the day or in the 1, 2 or 3 days after their intervention (TCT data)
11.2.2	Mobilisation	When patient has NO medical contra-indications, start physiotherapist-supervised daily exercise therapy and document - mobilisation on postoperative day 1 - including (at a minimum): - active range of motion of lower limbs - isometric and small movement isotonic lower limb strengthening - bed mobility and transfer training - balance and gait training (level ground and on stairs if appropriate) - or the reason patient cannot be mobilised - If the patient can actively move the surgical knee THEN continuous passive motion should NOT be used This indicator does not preclude a second session of exercise therapy supervised by a rehab assistant or other trained health professional.	Bullet 1 measurable – date of start of physiotherapy available in TCT data or IMA data Bullet 2 to 4 not measurable - This should be available in the electronic medical file.	This indicator was joined with indicator 11.2.1 above



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
11.3.1	Postoperative	If there were no significant perioperative complications, THEN achievement of the following functional outcomes (at a minimum): • Transfer independently in/out of bed and on/off chair and toilet • Ambulate safely with an appropriate assistive device on level surfaces and stairs (if appropriate for home situation) • Perform basic activities of daily living independently using related equipment • Demonstrate independence in home exercise program These factors should be documented by the occupational therapist or physiotherapist prior to discharge to home from the acute care hospital.	Not measurable - There is no such documentation available in the administrative databases but should be available in the electronic medical file.	
11.4.1	Postoperative	Percentage of deep postoperative wound infections within 90 days or within 365 days	Measurable on TCT data in surgical admission or readmissions (TCT data)	Proportion of patients with knee replacement intervention (denominator) with ICD-10-BE deep postoperative wound infections (ICD-10-BE T81.42 or T84.5) in the 90 days after the knee replacement intervention (TCT data)
11.7.3	Postoperative	The physiotherapist provides and documents (standardised approach e.g., class attendances, exercise log, online health journal) prior to discharge from post-acute rehabilitation • physiotherapy (including therapeutic exercise) that is individualised to the patient's functional needs, supervised, appropriately dosed, regularly progressed, at least 6 weeks in duration and monitored for adherence AND includes the following components (at a minimum): ○ Pain management strategies ○ Active knee range of motion exercise ○ Progressive resistance training for lower limb muscles ○ Static and dynamic balance training ○ Postural and core stability training	Probably measurable - Multidisciplinary RIZIV – INAMI codes are not specific but ICD-10-BE codes are. Exhaustivity and homogeneity of coding may be questionable.	NA



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
		○ Gait training (including use of walking aids and differing walking surfaces) ○ Functional exercises (including stair climbing, rising/lowering to chair) ○ Provision of a home exercise program and education on how to progress exercises		

5.2 Medium rating quality statements and indicators

5.2.1 Assessment, info, and advice, training

Table 23 – Measurability medium rating: themes assessment and information

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
1.1.1	Diagnosis	Diagnose osteoarthritis clinically without imaging in people who: • are 45 or over, and • have activity-related joint pain, and • have either no morning joint-related stiffness or morning stiffness that lasts no longer than 30 minutes.	Probably measurable (modified definition) on IMA data – % Patient 45 years operated with no imaging in a certain period before surgery	Proportion patients 45 years or older with knee replacement intervention (denominator) with imaging (XR or/and MRI) in the X months (depending on setting) before the intervention (IMA data)
2.2.1	Diet	For a person with (knee) osteoarthritis who is living with overweight or obesity: • advise that weight loss will improve the quality of life and physical function, and reduce pain, • provide support to choose a weight loss goal, • explain that any amount of weight loss is likely to be beneficial but losing 10% of body weight is likely to be better than 5%.	Not measurable.	
2.3.1	Training	All professionals managing patients at a primary healthcare centre should have continuous access to education on important preventive and therapeutic strategies in the management of osteoarthritis.	Not measurable.	



5.2.2 Interventions with and without drugs

Table 24 – Measurability medium rating: themes non-drug and drug-related interventions

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
3.2.2	Exercise	Assess the extent to which the physiotherapy treatment goals were achieved.	Not measurable.	
3.3.2	Other treatment	Do not offer any of the following electrotherapy treatments to people with osteoarthritis because there is insufficient evidence of benefit: - transcutaneous electrical nerve stimulation (TENS); - ultrasound therapy; - interferential therapy; - laser therapy; - pulsed short-wave therapy; - neuromuscular electrical stimulation (NMES).	Probably not measurable - No specific RIZIV – INAMI code exists. The treatments belong to generic billing codes including several therapies.	NA
3.3.3	Other treatment	Do not offer acupuncture or dry needling to manage osteoarthritis.	Not measurable.	
3.3.5	Other treatment	Do not prescribe interventions ‘recommended against’.	NA	
4.1.1	Medication	If pharmacological treatments are needed to manage osteoarthritis, use them: - alongside non-pharmacological treatments and to support therapeutic exercise, - at the lowest effective dose for the shortest possible time.	Partially measurable – identification of large boxes for patients with a chronic pain attestation for paracetamol. Request form for chronic pain reimbursement	Number of patients with paracetamol attestation for pain related to chronic osteoarthritis (RIZIV –INAMI Chapter IV drugs) <i>Note:</i> the total number should increase the coming years because this new attestation was installed in 2023.
4.1.4	Medication	Do not routinely offer paracetamol or weak opioids unless: - they are only used infrequently for short-term pain relief and - all other pharmacological treatments are contraindicated, not tolerated or ineffective.	Not measurable. No data on e.g. intolerance of contraindication	



- | | | | |
|--------------|------------|--|----------------------|
| 4.1.6 | Medication | Do not offer oral narcotics (strong or weak opioids), including tramadol (weak opioid), as they result <ul style="list-style-type: none"> • in a significant increase of adverse events and • are not effective at improving pain or function for treatment of osteoarthritis of the knee. | See indicator 4.1.8. |
|--------------|------------|--|----------------------|

5.2.3 Surgical non-replacement

Table 25 – Measurability medium rating: theme surgical non-replacement

?	Theme	Description quality statement/indicator	Measurability	Quality indicator
5.1.3	Non replacement surgery	Free-floating (un-fixed) interpositional devices in patients with symptomatic medial compartment osteoarthritis of the knee are not recommended.	Probably measurable - Free-floating interpositional devices (ICD-10-BE procedure codes or nomenclature 166854 – 166865 antibiotics impregnated spacer)	Proportion of patients with free-floating interpositional devices

5.2.4 Referral

Table 26 – Measurability medium rating: theme referral

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
7.1.1	Joint replacement referral	Consider referring people with knee osteoarthritis for joint replacement if: • their joint symptoms (such as pain, stiffness, reduced function, or progressive joint deformity) are substantially impacting their quality of life, and • non-surgical management (for example, therapeutic exercise, weight loss, pain relief) offered for at least 3 months is ineffective or unsuitable. Adults with osteoarthritis are supported with non-surgical core treatments for at least 3 months before any referral for consideration of joint surgery.	Not measurable	
7.2.2	Referral other	Referral for exercise therapy, and other programmes and activities for osteoarthritis	Probably measurable (modified definition) on IMA data – % operated patients with multidisciplinary “K	Proportion of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
			nomenclature" in a certain period before surgery. See table below.	defined) in the XX months before their intervention (IMA data)
7.2.3	Referral other	Referral to a weight loss service	Probably not measurable as a dietician intervention is included in the generic multidisciplinary codes	Proportion of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the XX months before their intervention (IMA data)

5.2.5 Optimisation interventions knee replacement surgery

Table 27 – Measurability medium rating: theme optimisation for knee replacement surgery

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
8.2.1	Physical function	A health professional with training in musculoskeletal exam skills performs and documents a physical examination of the lower limbs and lumbo-pelvic region using standardised methods and including (at a minimum): • Gait pattern and use of walking aids • Standing posture and lower limb alignment • Bilateral passive & active knee and hip range of motion • Bilateral lower limb soft tissue flexibility/contractures • Bilateral lower limb strength • Static and dynamic balance	Not measurable	
8.2.3	Physical function	Initiate at least 8 weeks prior to surgery an individualised, structured, and progressive exercise program to allow a physiologic training effect (no effect on enhanced recovery) that includes at a minimum: • Upper extremity strength training (in preparation for use of walking aids and transfers) • Lower extremity functional strength training as tolerated • Lower extremity range of motion exercises • Gait training with instruction on use of walking aids • Guidance on remaining physically active	Probably measurable (modified definition) on IMA data – % operated patients with multidisciplinary "K nomenclature" in a certain period before surgery.	Proportion of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the 8 weeks before their intervention (IMA data)
8.4.1	Comorbidities	Document type and severity of comorbidities including	Not measurable	NA



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
		- cardiovascular disease - high blood pressure - chronic kidney disease - obesity (BMI $\geq$ 30 kg/m²) - lung disease - diabetes - malnutrition - back pain or other lower limb joint involvement/pain - anxiety and depression - opioid tolerance - cognitive impairment		
8.4.2	Comorbidities	Preoperative anaemia should be identified, investigated, and corrected prior to knee replacement to enhance recovery after surgery.	Partially measurable on TCT or IMA data - Perioperative haemoglobin 'measurement' is identifiable but if action was undertaken is more difficult to verify.	Proportion of patients with knee replacement intervention (denominator) with full blood count measurement (s) (nomenclature code to defined) X months before the day of operation (TCT or IMA data)
8.5.1	Social activity	Assessment of social participation including - care-giving activities, - paid/unpaid work, - leisure and sporting activities. Assessment of social functioning in a non-residential care setting including - support, - access to safe and efficient transportation (prior to and after surgery), - home safety and fall risk factors, - guidance on preparing the home environment to promote safety, accessibility, and independent day-to-day function, - need for assistive devices, equipment, and mobility aids.	Not measurable	NA



5.2.6 Preoperative interventions knee replacement surgery

Table 28 – Measurability medium rating: theme preoperative for knee replacement surgery

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
9.2.2	Thrombosis	"For people who are at increased risk of venous thromboembolism (VTE), give them and their family members or carers verbal and written information on the following before offering VTE prophylaxis: - the person's risks and possible consequences of VTE - the importance of VTE prophylaxis and its possible side effects – for example, pharmacological prophylaxis can increase bleeding risk - the correct use of VTE prophylaxis – for example, anti-embolism stockings, intermittent pneumatic compression - how people can reduce their risk of VTE (such as keeping well hydrated and, if possible, exercising and becoming more mobile). Ensure that people who need anti-embolism stockings have their legs measured and that they are provided with the correct size of stocking. Anti-embolism stockings should be fitted, and patients shown how to use them by staff trained in their use."	Not measurable	NA
9.3.1	Antibiotics	Patients should receive systemic antimicrobial prophylaxis in accordance with local policy and availability. Do not use wound irrigation to reduce the risk of surgical site infection.	Probably measurable - Information on reimbursed antibiotic prophylaxis available in TCT data (or IMA data) in accordance with local policy/availability Probably not measurable – no wound irrigation RIZIV code, this is generally not recorded in ICD-10-PCS.	Proportion of patients with knee replacement intervention (denominator) with at least one of the (to be defined) listed pharmaceuticals on the day of their knee replacement intervention (TCT or IMA data).
9.5.1	Tranexamic	For reduced postoperative blood loss, give - if no renal impairment - intravenous tranexamic acid AND 1 g to 2 g of topical intra-articular tranexamic acid diluted in saline after the final wash-out and before wound closure AND - total combined dose of tranexamic acid does not exceed 3 g - If renal impairment, give a reduced dose of intravenous tranexamic acid on its own	Measurable on TCT data. Renal impairment should be defined in ICD-10-CM diagnoses	Proportion of patients with knee replacement intervention (denominator) with intravenous tranexamic acid (ATC=B02AA02) on the day of the knee replacement intervention (TCT or IMA data)



5.2.7 Interventions knee replacement surgery

Table 29 – Measurability medium rating: theme knee replacement surgery

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
10.1.1	General operation	Use ultra-clean air ventilation in operating theatres for primary knee elective joint replacement.	Not measurable	NA
10.2.1	Surgical technique	Surgical technique aspects • cemented femoral and tibial components versus cementless femoral and tibial components, • cemented femoral and tibial components versus hybrid fixation (cementless femur), • navigation versus conventional techniques, • kinematic versus mechanical alignment principles • cruciate retaining versus posterior stabilised total knee arthroplasty designs do not influence functional outcomes, complications, pain, and reoperations.	NA	NA
10.2.2	Surgical technique	Patient specific technology (e.g., guides, cutting blocks) should not be used. There is no significant difference in patient outcomes, function, or pain as compared to conventional total knee arthroplasty. Additionally, it does not reduce operating time, blood loss, length of stay, and/or complications.	NA	NA
10.2.6	Surgical technique	Drains should not be used with total knee arthroplasty because there is no significant difference in complications or outcomes.	Probably not measurable – Drains identifiable in ICD-10-BE codes not recorded homogeneously by hospitals	Proportion of patients with knee replacement intervention (denominator) with drains on the day of the intervention (MZG - RHM data)
10.3.1	Care pathway	Use of a standardised clinical care pathway should be documented during the acute care stay.	Not measurable	NA



5.2.8 Postoperative interventions knee replacement surgery

Table 30 – Measurability medium rating: theme postoperative knee replacement surgery

ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
11.1.1	Medication postop	Multimodal analgesia for enhanced recovery - the routine use of paracetamol is recommended - the routine use of NSAIDS is recommended for patients without contraindications - gabapentinoids are not currently recommended as an adjunct in a multimodal analgesia regime to enhance recovery after surgery although further studies are indicated	Paracetamol and NSAIDS not reimbursed - gabapentinoids in TCT or IMA data (N02BF)	Proportion of patients with primary knee replacement (denominator) with gabapentinoids
11.3.3	Discharge criteria	Patient participation in the discharge trajectory.	Not measurable	NA
11.4.2	Complication	Incidence of postoperative pulmonary embolism or deep vein thrombosis (DVT), after knee replacement (/100 000 knee surgery discharges).	Measurable on TCT data. This can be applied to include the ambulatory postoperative patient including readmissions - IMA data if ambulatory care is also concerned – depends on the time window	(a) Proportion of patients with knee replacement intervention (denominator) with postoperative pulmonary embolism (code I26.0 or I26.9) in the 90 days after intervention (TCT data) (b) Proportion of patients with knee replacement intervention (denominator) with DVT (I82.8 or I80 to be defined) in the 90 days after intervention (IMA data, identification with DOAC or LMWH) (c) Proportion of patients with knee replacement intervention (denominator) readmitted with DVT in the 90 days after intervention (TCT data) NB: (b+c) coupling TCT-IMA data to capture admissions for DVT (or I.80...or ...I82.8...deep vein thrombosis)
11.4.3	Complication	Number of patients with - decubitus - urine infection - postop respiratory failure	Several indicators. Depends on the bullet point. Some others may be measured on TCT data if admission required (postop sepsis, readmission or iatrogenic	For a selection of indicators: Proportion of patients with knee replacement intervention (denominator) with (infection, mortality, readmission) in the 90 days after



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
		- iatrogenic pneumothorax - postop sepsis - postop wound dehiscence - postop haemorrhage or haematoma - accidental puncture or laceration - postop metabolic derangements - death, all cause 30-day mortality - readmission, all cause 30-day	pneumothorax probably but not urine infection p.ex). All cause 30-D=IMA data. Readmissions 30 D=TCT data.	intervention (IMA data and/or TCT data for infection codes to be defined) NB: or coupling TCT-IMA data to capture readmissions (infection)
11.4.4	Complication	Primary care practitioners should refer people who develop new or worsening pain, limp or loss of function related to their joint replacement to an orthopaedic surgical service.	Probably measurable – referral in MZG – RHM (quality information questionable as no homogeneity in registration)	Proportion of patients with knee replacement intervention (denominator) addressed by GP (MZG – RHM: only measurable per hospital but not homogeneously recorded).
11.5.1	Patient reported outcomes	Collect postoperative patient reported outcome measures (PROM) on the knee problem with validated health questionnaires - at 6 months AND - at 12 months and compare with the preop	Not measurable	NA
11.6.1	Rehabilitation	Offer supervised group or individual outpatient rehabilitation to people who: - have difficulties managing activities of daily living or - have ongoing functional impairment leading to specific rehabilitation needs or - find that self-directed rehabilitation is not meeting their rehabilitation goals.	Not measurable	NA
11.7.1	Physical function postop	A health professional with training in musculoskeletal exam skills performs and documents a physical examination of the lower limbs and lumbo-pelvic region including (at a minimum): - Surgical knee effusion (knee circumference) - Muscle recruitment/voluntary activation of quadriceps	Not measurable	NA



ID	Theme	Description quality statement/indicator	Measurability	Quality indicator
		• Gait pattern and use of walking aids • Standing posture and lower limb alignment • Bilateral passive & active knee and hip range of motion • Bilateral lower limb strength, soft tissue flexibility/contractures • Static and dynamic balance		
11.8.1	Document	Document (transfer form, discharge letter) that the event took place or was cancelled, declined or other for • follow-up appointment, • transfer of care to another rehabilitation provider or setting (e.g., transfer from acute care to outpatient care setting), • referral to another rehabilitation provider (e.g., referral to physiotherapy or occupational therapy)	Not measurable	NA



6 CLINICALLY RELEVANT QUALITY STATEMENTS AND INDICATORS FOR THE BELGIAN SETTING - DISCUSSION

6.1 Introduction

The 90 quality statements and/or indicators retrieved from the scientific literature were ranked for their clinical relevance by the external experts. The themes were not always ranked by all experts as the experience and profession guided which themes could be answered or not. For example, first line professionals were less likely to respond to the surgical topics and vice versa, a professional with a surgical background did not always score the physiotherapy related themes.

The quality statements to form a quality standard (Table 31) were based on the statements and/or indicators that scored 50% and above and were still considered clinically relevant for the Belgian setting (after discussion with the external experts). The experts added two statements to the list, first to document the number of revisions within the year after the procedure and second, the option to identify a case manager for patients with chronic knee osteoarthritis to improve continuity of care. For the final quality standard the KCE experts reformulated the statements and/or indicators into one quality statement. This following the example of the NICE quality standard and the Australian clinical care standard in England.^{5,25} For those quality statements from the quality standard that were measurable, quality indicators were defined (see section 6.3).

An important conclusion from the experts' consultation referred to the need to differentiate between primary and secondary care when deciding on the clinical importance for quality statements and/or indicators. Indeed, the patient's profiles, the treatments and patient expectations are not the same. For example the use of medication will be different depending on the level of care e.g. a weak opioid might be prescribed by an orthopaedic surgeon for a patient who is inoperable while the recommendations are strongly against the use of opioids, and the need for radiography to confirm a

diagnosis of osteoarthritis is inappropriate in primary care while it is part of usual care for an orthopaedic surgeon often in preparation for a knee replacement (see indicator on diagnosis). It also demonstrated the difficulties in disentangling and thus measuring the care; the patient is often referred back and forth between primary and secondary care (section 6.7).

The next paragraph presents the final quality standard, followed by the final quality indicators. After that is a discussion on the need for high quality data for future 'measurable' indicators. Next, a way forward to measure exercise or referral for exercise as this is currently not possible, is presented (see discussion 6.5). Similarly, Patient-Reported Outcome Measures (PROMs) are not collected systematically in Belgium by healthcare institutions. This is further discussed in 6.6.

6.2 A quality standard for knee osteoarthritis care in Belgium

Table 31 presents by theme the quality statements for the quality standard. The themes column starts with aspects all concerning the daily management of a patient with knee osteoarthritis in primary care, assessment and diagnosis, advice, core treatment and referral for a surgical assessment. Next are themes related to surgery including preoperative, perioperative and postoperative aspects. Rehabilitation qualitative statements are strongly represented with the importance of early mobilisation, daily exercises and the definition of minimum achievements prior to discharge, followed by late rehabilitation at home. Finally, postoperative complications should be carefully followed up. The quality standard includes a statement for the collection of pre and -postoperative patient reported outcome measures (PROM) on the knee problem with validated health questionnaires.

For this report we integrated both primary care and secondary care in one quality standard which is a different approach from e.g. the NICE quality standards.^{26, 27} For the Belgian setting, in a first instance, the quality standards might have to be developed separately but to address the continuity of care, the referral themes would be best operationalised with experts from both backgrounds. In England, a standard is used locally for quality improvement. For example, for 'information and advice', evidence can be gathered on the local arrangements to provide this e.g. that patients



should receive regular information and advice about their knee osteoarthritis. The data to follow this up, can be collected from the healthcare professional, practice or hospital. NICE and the Australian standards present this for several themes (see Figure 4).^{26, 25} An example of how such a statement can be translated to quality measures and implemented by different audiences from NICE is as follows:

- Service providers (GPs, community healthcare providers and hospitals) ensure that policies and processes are in place so that adults with osteoarthritis are not referred for consideration of joint surgery until they have been supported with non-surgical core treatments for at least 3 months.
- Healthcare professionals ensure that they do not refer adults with osteoarthritis for consideration of joint surgery until the person has been supported with non-surgical core treatments for at least 3 months.
- Commissioners ensure that they commission services in which adults with osteoarthritis are not referred for consideration of joint surgery until they have been supported with non-surgical core treatments for at least 3 months. Commissioners should consider audits of people referred for consideration of joint surgery to ensure that the patient record shows that they were supported with core treatments for at least 3 months before referral.
- Adults with osteoarthritis are given information, and are advised and supported to exercise and (if appropriate) lose weight to help with joint pain and stiffness, for at least 3 months before any referral for possible joint surgery.

During the external expert consultation, the focus might have been towards the measurable aspects which were more often related to surgical themes. The discussion and actual importance for clinical practice on the more primary care statements was therefore possible not fully explored. A further discussion to finalise and operationalise the quality measures (see Table 31 and Table 32) will have to be held with a representative group of experts for both primary and secondary care. This task ideally should be taken on by the regional quality Institutes but can also be part of local initiatives e.g. recognised general practice networks. For each statement, a related measure(s) has to be developed. This measure needs to be monitored during implementation and demonstrate achievement against the statement.

The individual quality statements can be used as key priority areas for quality improvement. Future data gathering for primary care may benefit from the The Intego network new barometer projects which are being implemented and first data collection taking place in October 2023 for the use of antibiotics and diabetes.⁸⁴

For the proposed quality statements, the quality measure type can vary and will be mostly process or structure. The aspect of 'documentation' itself and organisational resources/structuring would account for structure. The act of 'doing' or 'performing' a guideline recommendation is considered process. Structural aspects would include aspects of staffing/qualified personnel and resources, to deliver care. This is demonstrated by the example from NICE in Figure 4.



Table 31 – Quality standard for knee osteoarthritis care

Theme	Quality statements
Diagnosis	Diagnose osteoarthritis clinically without imaging in people who: are 45 or over, and have activity-related joint pain, and have either no morning joint-related stiffness or morning stiffness that lasts no longer than 30 minutes. Identify a case manager for the care trajectory of a patient with knee osteoarthritis from initial diagnosis onwards but especially when the patient has chronic symptoms, to support the patient in the continuity of care.
Assessment(s)	Assess and document the effect of osteoarthritis at initial and follow-up consultations on the person's function, quality of life, occupation, mood, relationships, and leisure activities and assess the person's health education needs, health beliefs, and motivation to self-manage.
Info and advice	Give information about osteoarthritis and its management at diagnosis and follow-up appointments. Information is tailored to the individual needs (such as language and culture), in an accessible format (oral, written, online,...). Information is delivered in a way that enables the patient to participate actively, putting shared decision-making into practice, providing an approach to care that takes account of multimorbidity. Education and information topics include pathology of osteoarthritis, joint protection and the use of aids, lifestyle and physical activity, self-management strategies, advice about body weight and joint pain, work advice, footwear advice, treatment in general, exercise core therapy, medication with risks of medication use and screening for side effects.
Core treatment	Provide core treatment for knee osteoarthritis, regardless of age, structural disease severity, functional status or pain levels, to improve pain and function consisting of a combination of (supervised) therapeutic exercise tailored to the patient's need (e.g. local muscle strengthening, general aerobic fitness), self-management programs, weight loss for people who are living with overweight.
exercise	Provide (supervised) therapeutic exercise regardless of age, structural disease severity, functional status or pain levels as it will improve pain and function. Refer the patient for a personalised exercise and a physical activity program according to needs, preferences, self-motivation, and ability to perform exercises (e.g. local muscle strengthening, general aerobic fitness, functional exercises, walking exercises). Assess the extent to which the physiotherapy treatment goals were achieved. Continue the exercise treatment for at least 3 to 6 months before any referral for consideration of joint surgery. Provide prior to surgery an individualised, structured, and progressive exercise program to allow a physiologic training effect that includes at a minimum: upper extremity strength training (in preparation for use of walking aids and transfers), lower extremity functional strength training as tolerated, lower extremity range of motion exercises, and gait training with instruction on use of walking aids.
diet	Advise a person with (knee) osteoarthritis who is living with overweight or obesity that weight loss will improve quality of life and physical function and reduce pain. Provide support to choose a weight loss goal and explain that any amount of weight loss is likely to be beneficial but losing 10% of body weight is likely to be better than 5%. Refer to a weight loss service.
medication	Use pharmacological treatments (first line oral and topical NSAID, second line paracetamol) only alongside non-pharmacological treatments and to support therapeutic exercise, at the lowest effective dose for the shortest possible time.



Theme	Quality statements
	Offer a corticosteroid injection to patients with a painful inflamed knee joint. Provide information about risks of medication use and screen for side effects. Do not offer oral narcotics (strong or weak opioids), including tramadol (weak opioid), as they result in a significant increase of adverse events and are not effective at improving pain or function for treatment of osteoarthritis of the knee; unless they are only used infrequently for short-term pain relief and all other pharmacological treatments are contraindicated, not tolerated or ineffective. Do not offer TNF-inhibitors, Interleukine-1 inhibitoren, glucosamine, chondroitin, vitamin D, or fish oil.
other interventions	Do not offer any of the following electrotherapy treatments to people with osteoarthritis because there is insufficient evidence of benefit: transcutaneous electrical nerve stimulation (TENS); ultrasound therapy; interferential therapy; laser therapy; pulsed short-wave therapy; neuromuscular electrical stimulation (NMES). Do not offer acupuncture, dry needling, or manual therapy without therapeutic exercise, to manage osteoarthritis. Do not offer intra-articular hyaluronan injections. Do not offer arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis.
Referral to second line	Consider referring people with knee osteoarthritis to the second line for an opinion on the possibility of joint replacement if their joint symptoms (such as pain, stiffness, reduced function, or progressive joint deformity) are substantially impacting their quality of life, and non-surgical management (therapeutic exercise, weight loss, pain relief) offered for at least 6 months is ineffective or unsuitable.
Preoperative information	Provide multidisciplinary preoperative education that uses appropriate delivery formats (in-person, video, telehealth, print). Provide the opportunity for questions to be addressed, participation of a family member or other support and address (at a minimum): surgical procedure, risks and benefits, patient expectations, pain management strategies, home preparation, assistive devices, postoperative care, and rehabilitation. Inform the patient that the intake of clear fluids until 2 hours before the induction of anaesthesia, and a 6-hour fast for solid food is recommended. Offer a choice of partial or total knee replacement to people with isolated medial compartmental osteoarthritis. Discuss the potential benefits and risks of each option with the person.
assessment	Assess social participation including care-giving activities, paid/unpaid work, leisure and sporting activities. Assess social functioning in a non-residential care setting including support, access to safe and efficient transportation (prior to and after surgery), home safety and fall risk factors, guidance on preparing the home environment to promote safety, accessibility, and independent day-to-day function, need for assistive devices, equipment, and mobility aids. Document type and severity of comorbidities including cardiovascular disease, high blood pressure, chronic kidney disease, obesity (BMI ≥ 30 kg/m²), lung disease, diabetes, malnutrition, back pain or other lower limb joint involvement/pain, anxiety and depression, opioid tolerance, cognitive impairment. Detect, investigate, and correct anaemia prior to knee replacement to enhance recovery after surgery. Collect preoperative patient reported outcome measures (PROM) on the knee problem with validated health questionnaires and compare with the postop PROMs.



Theme	Quality statements
Knee replacement Interventions	Offer venous thromboembolism (VTE) prophylaxis to patients undergoing elective knee replacement surgery when the VTE risk outweighs the risk of bleeding in accordance with local policy. Offer a choice of regional anaesthesia in combination with local infiltration analgesia (LIA) or general anaesthesia in combination with LIA; add a peripheral nerve block provided it does not delay surgery significantly as it may delay early and safe mobilisation. Do not routinely administer sedatives to reduce anxiety preoperatively. Do not routinely administer spinal opioids because of the potential for adverse effects which delay recovery. Do not routinely administer epidural analgesia. Give for reduced postoperative blood loss (if no renal impairment) intravenous tranexamic acid AND 1g to 2g of topical intra-articular tranexamic acid diluted in saline after the final wash-out and before wound closure (total combined dose of tranexamic acid does not exceed 3g). If renal impairment, give a reduced dose of intravenous tranexamic acid on its own.
surgery	Use a standardised clinical care pathway during the acute care stay. Give systemic antimicrobial prophylaxis in accordance with local policy and availability. Optimise perioperative glucose control (<126mg/dl) and postoperative nausea and vomiting. Do not routinely use urinary catheters. Maintain normal body temperature peri- and postoperatively through prewarming and the active warming of patients intraoperatively to enhance recovery after surgery.
Postoperative medication	Offer routinely analgesia for enhanced recovery, paracetamol or NSAIDs for patients without contraindications. Do not offer gabapentinoids as an adjunct in a multimodal analgesia regime for enhanced recovery.
mobilisation and early rehabilitation	Mobilise the patient post-surgery on the day of surgery. Start rehabilitation by a physiotherapist or occupational therapist on the day of surgery if possible and no more than 24 hours after knee replacement. Continue daily mobilisation including (at a minimum): active range of motion of lower limbs, isometric and small movement isotonic lower limb strengthening, bed mobility and transfer training, balance and gait training (level ground and on stairs if appropriate). Document the reason why the patient cannot be mobilised. Do not use continuous passive motion if the patient can actively move the surgical knee. Achievement prior to discharge home, guided by the occupational therapist and/or physiotherapist, at a minimum the following functional outcomes (if no significant perioperative complications): transfer independently in/out of bed and on/off chair and toilet; ambulate safely with an appropriate assistive device on level surfaces and stairs (if appropriate for home situation); perform basic activities of daily living independently using related equipment; demonstrate independence in home exercise program.
discharge	Involve the patient in the discharge trajectory. Advice prior to discharge on managing activities of daily living and home exercise programmes and mobilisation, AND advice on self-directed rehabilitation meaning a clear understanding of their rehabilitation goals and the importance of doing the exercises prescribed to achieve these goals, and a point of contact for advice and support.



Theme	Quality statements
	Document (transfer form, discharge letter) that the event took place or was cancelled, declined or other for follow-up appointment, transfer of care to another rehabilitation provider or setting (e.g., transfer from acute care to outpatient care setting), referral to another rehabilitation provider (e.g., referral to physiotherapy or occupational therapy).
late rehabilitation	Provide minimum 6 weeks post-acute rehabilitation physiotherapy (documented standardised approach) with monitoring for adherence and including pain management strategies, active knee range of motion exercise, progressive resistance training for lower limb muscles, static and dynamic balance training, postural and core stability training, gait training (including use of walking aids and differing walking surfaces), functional exercises (including stair climbing, rising/lowering to chair), provision of a home exercise program and education on how to progress exercises Offer supervised group or individual outpatient rehabilitation to people who: have difficulties managing activities of daily living or have ongoing functional impairment leading to specific rehabilitation needs or find that self-directed rehabilitation is not meeting their rehabilitation goals.
patient reports	Collect postoperative patient reported outcome measures (PROM) on the knee problem with validated health questionnaires at 6 months AND at 12 months and compare with the preop PROMs.
Complications after surgery	Follow up the patient for deep postoperative wound infections, postoperative pulmonary embolism or deep vein thrombosis, urinary tract infection, and other complications. Refer for readmission if needed. Document the number of revisions within the year after the procedure.



Figure 4 – Examples of a quality standard from the United Kingdom and Australia

Quality standard Tools and resou Overview Quality statements Quality statement 1: Diagnosis Quality statement 2: Assessment at diagnosis Quality statement 3: Information and support Quality statement 4: Therapeutic exercise Quality statement 5: Weight loss Quality statement 6: Follow-up Quality statement 7: Core treatments before referral for consideration of joint surgery Quality statement 8: Referral for consideration of joint surgery Update information About this quality standard	Osteoarthritis in over 16s Quality standard [QS87] Published: 11 June 2015 Last updated: 19 October 2022 Quality statement Adults with osteoarthritis are supported with non-surgical core treatments for at least 3 months before any referral for consideration of joint surgery. Quality measures The following measures can be used to assess the quality of care or service provision specified in the statement. They are examples of how the statement can be measured, and can be adapted and used flexibly. Structure Evidence of local arrangements to ensure that adults with osteoarthritis are supported with non-surgical core treatments for at least 3 months before any referral for consideration of joint surgery. Data source: Evidence can be collected from information recorded locally by healthcare professionals and provider organisations, for example, from service specifications. Process Proportion of adults with osteoarthritis referred for consideration of joint surgery who were supported with non-surgical core treatments for at least 3 months. 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: Data can be collected from information recorded locally by healthcare professionals and provider organisations, for example, from patient records.	Osteoarthritis of the Knee Clinical Care Standard 1 Comprehensive assessment. A patient with knee pain and other symptoms suggestive of osteoarthritis receives a comprehensive assessment that includes a detailed history of the presenting symptoms and other health conditions, a physical examination, and a psychosocial evaluation that identifies factors that may affect their quality of life and participation in their usual activities. 2 Diagnosis. A patient with knee pain and other symptoms suggestive of osteoarthritis is diagnosed as having knee osteoarthritis based on clinical assessment alone. X-rays are considered only if an alternative diagnosis is suspected (for example, insufficiency fracture, malignancy). Magnetic resonance imaging (MRI) is considered only if there is suspicion of serious pathology not detected by X-ray. 3 Education and self-management. A patient with knee osteoarthritis receives education about their condition and treatments for it, and participates in the development of an individualised self-management plan that addresses both their physical and psychosocial health needs. 4 Weight loss and exercise. A patient with knee osteoarthritis is offered support to lose weight, if they are overweight or obese, and advice on exercise, tailored to their needs and preferences. The patient is encouraged to set weight and exercise goals, and is referred to services to help them achieve these, as required. 5 Medicines used to manage symptoms. A patient with knee osteoarthritis is offered medicines to manage their symptoms according to the current version of <i>Therapeutic Guidelines: Rheumatology</i> (or concordant local guidelines). This includes consideration of the patient's clinical condition and their preferences. 6 Patient review. A patient with knee osteoarthritis receives planned clinical reviews at agreed intervals, and management of the condition is adjusted for any changing needs. If the patient has worsening symptoms with severe functional impairment that persists despite the best conservative management, they are referred for specialist assessment. 7 Surgery. A patient with knee osteoarthritis who is not responding to conservative management is offered timely joint-conserving* or joint replacement surgery, depending on their fitness for surgery and preferences. The patient receives information about the procedure to inform their treatment decision. Arthroscopic procedures are not effective treatments for knee osteoarthritis, and therefore should only be offered if the patient has true mechanical locking or another appropriate indication for these procedures.[†]
UK ²⁶		Australia ²⁵



6.3 Quality indicators for knee osteoarthritis care in Belgium

The discussion with the experts led to a consensus list of quality indicators presented in Table 32. The table shows the quality indicators selected together with the external experts in this report. Further operationalisation is best taken up by the quality institutes VIKZ and PAQS, together with experts from the field. This includes: defining numerator, denominator, inclusion and exclusion criteria based on the nomenclature and ICD-10-BE codes, defining deadlines for looking up these codes in the databases, defining a target value for each indicator, and determining case-mix variables, etc. Afterwards, the technical definitions should be validated, or in other words, the correspondence checked between what is measured by administrative data and what is verified in the medical records for each quality indicator. The results can then be used to verify whether, and to what extent, the quality of care meets the objectives of the quality indicator.

Table 32 – Quality indicators for knee osteoarthritis care

Theme	Quality indicator	Type of indicator
Diagnosis	Proportion of patients 45 years or older with a primary knee replacement intervention (denominator) with standard XR or MRI imaging prescribed by a general practitioner in the XX months before the primary knee replacement intervention (IMA data)	Process
	Proportion of patients 45 years or older with a primary knee replacement intervention (denominator) with MRI imaging prescribed by a specialist (to be defined) in the XX months before the primary knee replacement intervention (IMA data)	Process
Drug-based intervention	The yearly number of patients with a chronic pain attestation for osteoarthritis per year (increment should be seen on IMA data) (Chapter IV drugs) compared to the number per year in the previous years	Process
	Proportion of patients with primary knee replacement intervention (denominator) with a reimbursement of a prescription for opioids (ATC=N02A) in the XX months before the knee replacement intervention (IMA data)	Process
Optimisation surgery	Proportion of patients with primary knee replacement intervention (denominator) with full blood count or haemoglobin measurement (nomenclature code to defined) X months before the day of operation (TCT or IMA data)	Process
Preoperative	Proportion of patients with primary knee replacement intervention (denominator) with at least one of the (systemic antimicrobial to be defined) listed pharmaceuticals on the day of the knee replacement intervention (TCT or IMA data)	Process
	Proportion of patients with primary knee replacement intervention (denominator) with intravenous tranexamic acid (ATC=B02AA02) on the day of the knee replacement intervention (TCT or IMA data)	Process



Theme	Quality indicator	Type of indicator
	Proportion of patients with primary knee replacement intervention (denominator) with at least one of listed pharmaceuticals (in accordance with venous thromboembolism (VTE) prophylaxis local policy; to be defined one of the following: Apixaban, Dabigatran, Rivaroxaban, Enoxaparine, Nadroparine, Tinzaparine, Fondaparinux) given at the time of the knee replacement intervention (TCT (during hospitalisation) or IMA data (on the day of the intervention and the next days))	Process
Intraoperative	Proportion of patients with primary knee replacement intervention (denominator) with ICD-10-BE urinary catheterisation code (OT9B00Z, OT9B30Z, OT9C00Z, OT9C30Z) on the day of the knee replacement intervention (MZG - RHM)	Process
	Proportion of patients with primary knee replacement intervention (denominator) with (a) spinal opioid's injection (pharmaceuticals to be defined), or (b) epidural analgesia as recorded in MZG - RHM (TCT data – (a) also measurable on IMA data when reimbursed)	Process
	Proportion of patients with primary knee replacement intervention (denominator) with (a) regional anaesthesia in combination with local infiltration analgesia (LIA) or (b) general anaesthesia in combination with LIA as recorded in MZG - RHM (TCT data)	Process
Post surgery	Proportion of patients with primary knee replacement intervention (denominator) with physiotherapy on the day of operation (date of start of physiotherapy available in TCT data or IMA data), identified by nomenclature codes 558950 - 558961, 558014 - 558025, 558810 - 558821, 558832 - 55884	Process (Structure)
Complications	Proportion of patients with primary knee replacement intervention (denominator) with ICD-10-BE deep postoperative wound infections (ICD-10-BE T8... to be defined) in the 90 days after the knee replacement intervention (TCT data)	Outcome
	(a) Proportion of patients with primary knee replacement intervention (denominator) with postoperative pulmonary embolism (code I26.0 or I26.9) in the 90 days after the knee replacement intervention (TCT data) (b) Proportion of patients with primary knee replacement intervention (denominator) with DVT (I82.8 or I80 to be defined) in the 90 days after the knee replacement intervention (IMA data, identification with DOAC or LMWH) (c) Proportion of patients with primary knee replacement intervention (denominator) readmitted with DVT in the 90 days after the knee replacement intervention (TCT data) NB: (b+c) coupling TCT-IMA data to capture admissions for DVT (or I.80...or ...I82.8...deep vein thrombosis)	Outcome
	Proportion of patients with primary knee replacement intervention (denominator) with (mortality, readmission) in the 90 days after the knee replacement intervention (IMA data and/or TCT data for infection codes to be defined). NB: or coupling TCT-IMA data to capture readmissions (infection)	Outcome
	Proportion of patients with primary knee replacement intervention (denominator) with revision within 1 year after the knee replacement intervention (TCT or IMA data)	Outcome

Note: XX to be defined in the operationalisation phase based on evidence and/or expert consensus; DOAC: direct oral anticoagulation; LMWH: low molecular weight heparin



The first two indicators concerned the indication for an XR (X-ray) or MRI (magnetic resonance imaging) in the diagnosis for patients with osteoarthritis of the knee. The use of imaging is not necessary for a diagnosis of osteoarthritis in primary care as the diagnosis of knee osteoarthritis is primarily made on clinical grounds. In secondary care, a clinical and radiographic (XR but not MRI) investigation is necessary for diagnosis and the preparation for surgery. This viewpoint is in line with the current Belgian Society of Radiology guideline recommendations (published in 2010) which were taken on by the Belgian Federal Public Service in 2016 for the [campaign](#) on good practices for the use of medical imaging.⁸⁵ The advice states that in patients with knee pain without blockages or limitation of movements (clinically a knee osteoarthritis or a pathology involving structures outside of the joint) there is no indication to perform an XR initially. In a second stage, an XR can be used to identify and quantify femoral-tibial and femoral-patellar osteoarthritis complications and is an essential preoperative assessment. During the operationalisation phase it should be taken into account that under certain conditions a general practitioner will take an XR whereas a specialist may not. Simply linking the intended indicator to the type of healthcare provider will not suffice.

A quality statement on pain medication use has been proposed in the literature. For this, we proposed tracking the number of patients with a chronic pain attestation for osteoarthritis (introduced in January 2022 link [NL](#) or [FR](#)). This is a descriptive quality indicator but by monitoring the number of prescriptions annually through this chronic pain attestation, it can be a good description of the evolution of the quality of care. After all, paracetamol and NSAIDs are not or only partially reimbursed, and therefore their use cannot be traced in the administrative databases. Quality of care may improve if more patients are informed by their physician of a newly existing attestation that is of benefit to patients with high dose consumption of paracetamol (large boxes are reimbursed). Further, the place for opioids is very limited and reserved for specific patient populations (inoperable, kidney failure prohibiting NSAID use) in secondary care. Of note, the experts mentioned that in the next phase, factors that should be taken into consideration were: palliative treatments to be excluded, a distinction should be made between one-off and chronic treatments, weak and strong opioids,

and the initial prescribing physician versus the physician continuing the prescription.

The next indicators, although related to surgery in general, were considered of high importance for the clinical outcome of a knee replacement. Detection of anaemia through haemoglobin measurement prior to knee replacement surgery can prevent infections and poor recovery when corrected before surgery. Antibiotics should be given at the time of the operation and although the coverage is probably already high, the target should be 100%. At the time of operation, the administration of tranexamic acid is also an important aspect, and this can be measured on routine data for IV administration. Urinary catheters should not be placed unless absolutely necessary.

Two indicators in the list concern thromboembolism events. A process indicator on the use of venous thromboembolism (VTE) prophylaxis and the other an outcome indicator measuring the incidence of postoperative pulmonary embolism or deep VTE after knee replacement surgery. The description of the indicator on prophylaxis specifies to follow local policy. Currently no guidance exists for Belgium. Once guidance is available, measuring both indicators could help to disentangle which aspect of VTE care is not going well. The Belgian Society on Thrombosis and Haemostasis (BSTH) currently considers developing guidance on this topic (*personal communication from the BSTH*). Aspects that need clarification are the preference of direct oral anticoagulants (DOAC) versus low-molecular-weight heparins (LMWH), the place of aspirin, the risk profile of the patient, and the duration of use of the medication.

The use of anaesthesia varies between hospitals, with spinal or rachi-anaesthesia commonly used and local infiltration (LIA) anaesthesia less so. LIA was introduced to reduce postoperative time to mobilisation.⁸⁶ It is part of the surgical procedure and administered by the surgeon.⁸⁷ It is considered an easy procedure compared to the peripheral nerve block anaesthesia.⁸⁸ Several factors may explain why a certain anaesthetic method is applied or favoured: the infrastructure e.g. an extra preop room is needed for certain anaesthesia, trained personnel in the recommended methods, and a knowledgeable anaesthetist. LIA anaesthesia is favourable for early mobilisation and a fast recovery; the patient will be on his feet two hours



after the operation. This in contrast with spinal or rachi-anaesthesia. Currently, the ambiguous registration of anaesthesia in the MZG – RHM (see Appendix 1.3, Table 47) impedes the measurement of the recommended LIA anaesthesia and the nomenclature is not specific enough to distinguish between the methods used.

On the day of surgery, even on a late afternoon or early evening, mobilisation should be started, and all patients should be seen by a physiotherapist. Currently, the treatment is often delayed until the day after surgery.

Postoperative complications considered of high clinical relevance were deep wound infections, pulmonary embolism or deep vein thrombosis, readmission, revision of the knee replacement, and mortality. An international patient safety indicator (PSI) “Postoperative pulmonary embolism or deep vein thrombosis in adults after hip or knee replacement” is already measured in Belgium. For this indicator the timeframe of hospitalisation is used.⁸⁹ A broadening of the time window to include the timeframe after discharge from hospital will include embolic events that are missed due to the short registration time while hospitalised. A longer follow-up of 90 days could increase the detection and improve the quality of care. The mortality and readmission registration are part of the ORTHOpriDe analysis. Experts were interested to learn how Belgium would compare to the international community as the same registration of mortality and readmission, up to 90 days, is used in e.g. US based insurance reports. Similarly, the experts proposed to include the quality indicator of revision of the knee replacement within 1 year. Of note, based on the Dutch Arthroplasty Register, Van Schie et al. proposed to combine (into an ordinal composite outcome) indicators of revision, readmission, complications, and long length of stay to allow for a more comprehensive evaluation of quality of delivered care and improved differentiation between hospitals using one year of data.⁴⁴

6.4 The need for high quality data

Without reliable data, no quality measurement is obviously possible. Administrative databases have all their own specificities, advantages and limitations. As stated in a recent KCE report “National routinely collected data are relatively inexpensive, comprehensive sources of information with a stable longitudinal structure”.⁹⁰

6.4.1 Strengths of the databases

Several sources are available to measure and monitor quality of health care in Belgium. First, **billing data** available from the IMA data, the TCT data or some other RIZIV – INAMI documents offer a national readily available source of information on the health care provided, at least when reimbursed by the national healthcare insurance.

Second, thanks to the registration of **clinical information** using the ICD-10-BE classification, which combines the international ICD-10-CM (for diagnoses) and ICD-10-PCS (for procedures) classifications, MZG – RHM data represent another useful source of information in the hospital setting when quality of care of knee replacement surgery comes under the spotlight. Even though 2015 data were not exploitable due to the necessary adaptation of hospitals clinical coders to the ICD-10-BE classification system, data have become more and more reliable and the proportion of unspecified codes has dropped (see for example “M179 Osteoarthritis of knee, unspecified” that represented 0.4% of the principal diagnoses of knee osteoarthritis in hospitals in 2020 against 14.6% in 2016).

When **case-mix adjustment** is recommended (see quality indicator on the proportion of deep postoperative wound infection), this can be done on the MZG – RHM clinical codes whereas it is much more difficult (though feasible for some conditions) to approximate comorbidities through pharmaceutical consumption in the IMA data.⁹¹



Furthermore, the TCT data, consisting in the MZG – RHM data linked to the hospital billing data by the Technical Cell (Technische Cel – Cellule Technique)^e, combines the strengths of both sources. Billing data also include information on the pharmaceuticals given during the hospitalisation. The validity of the information can be reinforced by comparing both sources (cross-controlling). In some cases, ICD-10 codes can be clinically more specific than nomenclature codes, in other cases nomenclature can be more helpful.

As far as knee replacement surgery is concerned, the **OrthoPride register** for (hip and) knee, may also be used to measure quality of care. Certain clinical information lacking from the other databases, are included (e.g. patient ASA score, detailed specificities of the material implanted, ...). Possible linkages with existing administrative databases could be investigated by the newly created Health (Care) Data Agency.

This **Health (Care) Data Agency** was recently created by a law^f that defines its missions. Some of them may be helpful in the operationalisation of quality indicators and in particular their translation in algorithms applicable to administrative databases. The Agency will be responsible to publish a metadata catalogue, with for each database a description of its content, who is responsible for the data, how frequently the data are updated, how one can access the data, ... It will give directions on the exchange and re-use of data and advise on the regulation (standardising requests, standardising contracts and data transfer protocols, ...). The agency will also give guidance to organisations (both governmental and other) with a need for health and healthcare data; giving technical, procedural and methodological support for data requests and providing training. Finally, it is also in its tasks

to investigate the possibilities of linkage between the existing health(care) administrative databases.

6.4.2 *Limitations of the databases and need for quality improvements*

The routinely registration of clinical information in primary care is generally lacking in Belgium. Some useful data can only be retrieved by the patients' medical files, which is only possible in ad hoc expensive research projects, not on a perennial basis. Interestingly, a recently developed barometer technology by the INTEGEO network, founded for COVID-19, is being rolled out for diabetes and antibiotics, and this may provide (part of) a solution.⁹ INTEGEO works together with general practitioners registering the data and plans for further development of new barometers aiming as much as possible in further improving the use of the electronic medical file and improving quality of care.⁸⁴

Clinical results of examinations such as blood or urine examinations are typically lacking from the administrative databases. This is true for primary care as in a hospital setting. Patient-reported outcomes and experience measures represent another gap in the existing databases as they are not routinely collected but only gathered in ad hoc questionnaires.

When translating the patient medical files into the MZG – RHM registration, hospitals may have different **coding behaviours**, upcoding some information with the case-mix related financial system in mind or on the contrary undercoding some information. For example, body mass index is a well-known underreported patient characteristic. Data quality control of the MZG – RHM is therefore paramount. Recently the KCE has pleaded for a

^e See The Technical Cell ([Technische Cel – Cellule Technique](#), TCT) for more information on TCT data.

^f Wet van 14 maart 2023 houdende oprichting en organisatie van het Gezondheids(zorg)data-agentschap, *B. S. 3 april 2023* - Loi du 14 mars 2023 relative à l'institution et à l'organisation de l'Agence des données de (soins de) santé, *M. B. 3 avril 2023*.

⁹ The concept of a barometer is the automated collection of aggregated data from practice, based on an evidence-based set of process and outcome indicators that can be extracted from the electronic health registration; see the website [Barometers · INTEGEO](#).



reinforcement of the MZG – RHM audits and recommended to make financial penalties for non-compliance with the registration guidelines and coding manual legally possible, as the legal ground is currently lacking.⁹⁰ Finally, some information might be difficult to interpret. The descriptions of anaesthetic procedures coded in the MZG – RHM may be ambiguous; heterogeneity was detected during a 2022 audit on the Caesarean- section data registration (*personal communication from expert RIZIV - INAMI*). This could also be the case for knee replacement surgery. Other ICD-10-PCS codes as those for drains or rehabilitation codes F07 are also registered heterogeneously. Urinary catheterisation cited above is unfortunately theoretically identifiable but this routine procedure is rarely registered in the MZG – RHM.

Similarly, **interpretations** in billing instructions and billing codes may also be interpreted differently by different invoicing systems or healthcare providers (although, contrary to the MZG – RHM registration, penalties are possible in case of fraud or systematic errors). For example for the non-measurable quality indicator ‘do not perform arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis’, the codes for diagnostic arthroscopies are rarely used (Table 41). Generally knee arthroscopies, therapeutic or not, are billed under the codes for meniscectomies, which are better reimbursed. In the very case of the number of arthroscopies performed, there might also be a change in the codes used as the number of arthroscopies in patients aged 50 years or older are now limited to 45% of the arthroscopies.

The use of **non-reimbursed** pharmaceuticals represents another hurdle to the measurement of quality in health care (e.g. paracetamol is only reimbursed under Chapter IV conditions with a chronic pain attestation).

Other interventions such as patient education and information cannot be measured as a specific code does not exist.

Even when interventions are reimbursed, some nomenclature codes may suffer a **lack of specificity**. For example, it is not possible to distinguish between all different interventions and between all the possible healthcare providers disciplines covered by the multidisciplinary billing codes of article 7 and 22 of the RIZIV – INAMI nomenclature (physiotherapy) (Box 4); reimbursement may have been granted for dietary counselling by a dietician, exercises or electrotherapy by a physiotherapist, interventions by an occupational therapist etc..

Box 4

Article 7 and 22 of the RIZIV – INAMI nomenclature

Article 7 of the Appendix to the Royal Decree of 14 September 1984 setting the RIZIV – INAMI nomenclature lists the nomenclature codes for reimbursement of procedures for which the qualification of a physiotherapist is required. The nomenclature is based on various parameters, the main ones being: the patient's profile (pathology), the place of service (the physiotherapist's surgery in the community setting or in an hospital, care by hospitalised patients, psychiatric care homes, at home, etc), and the duration of the session. The type of care provided cannot be deduced from the codes used (except for the manual lymphatic drainage).

Article 22 of the Appendix to the Royal Decree of 14 September 1984 setting the RIZIV – INAMI nomenclature^h lists the nomenclature codes for reimbursement of procedures for which the qualification of a physician specialist for physical medicine and rehabilitation is required. The

^h Koninklijk besluit van 14 september 1984 tot vaststelling van de nomenclatuur van de geneeskundige verstrekkingen inzake verplichte verzekering voor geneeskundige verzorging en uitkeringen / Arrêté royal du 14 septembre 1984 établissant la nomenclature des prestations de santé en matière d'assurance obligatoire soins de santé et indemnités



nomenclature code states that the multidisciplinary team should 1) involve at least 2 healthcare professionals of which one is a physiotherapist OR an occupational therapist AND another paramedic, and 2) minimum 2 of the following techniques should be provided: rehabilitation by movement, psychomotor therapy, electrotherapy for motoric deficiency or pain, mechanotherapy, exercises with external prosthesis, orthosis, or complex technical aids, hydrotherapy in a swimming pool.

The physiotherapist registers the treatment(s) applied for a patient in the patient's record. The nomenclature code may therefore represent 'physiotherapy' as well as any other provided 'technique'.

Another drawback of administrative databases is the **limited timeliness** of their availability, impeding a close monitoring of quality of care. For different reasons, data are sometimes available years after the moment the health care was provided. The legal period to introduce reimbursement receipts to the sickness funds is 2 years and database linkages induces long waiting times (e.g. more than 2 years for TCT data). For ad hoc **linkages**, when personal data protection is at stake and legal authorisation of the Information Security Committee of the Crossroad Bank is required, the delays amount to several years. This would be the case if Orthopride or TCT data were to be linked to IMA data to have additional ambulatory data of patients having undergone a knee replacement surgery.

As already mentioned, the finalisation and optimisation should happen in the next phase. To this extent, the timeframes and analysis per prescribing physician or hospital, of the definitions should be discussed with experts and finalised in the next development stage. Translation of criteria into relevant codes (e.g. ICD-10-BE codes or RIZIV – INAMI nomenclature) should be updated to the classification versions and nomenclatures in force at the registration time of the data used to measure the quality indicators.

6.5 The need for measurable exercise care

The use of exercise or referral for exercise is not measurable at present due to non-specificity of the nomenclature. Nevertheless, measuring exercise or knee osteoarthritis would improve care. Literature shows a substantial variation of the utilisation of physiotherapy (as the main healthcare professionals providing exercise) in people with (advanced) knee osteoarthritis prior to total knee arthroplasty despite the uniform recommendations.⁹²

The multidisciplinary team described under article 22 of the RIZIV – INAMI nomenclature includes physiotherapy, dietary counselling by a dietician, exercises, electrotherapy by a physiotherapist, interventions by an occupational therapist etc.. Several arguments in favour of measuring exercise separately can be put forward.

Health could be improved as exercise is recommended to prevent and to reduce pain in osteoarthritis and other chronic pathologies. For example, by exercising on a regularly basis, body weight can be controlled, and joint injuries avoided. It is however important to adjust the load of the exercises to the specificity of the patient and this individualised training program can best be constructed by a physiotherapist or movement coach. Mild to moderate aerobic physical activity (20-30 min, 2-3/week) combined with mild-moderate strength exercises of the lower limbs and spine can lower pain, improve physical functioning and quality of life. Commencement of treatment by a physiotherapist is recommended. Afterwards, the patient can continue the training on an individual basis, with ad hoc evaluation of the physiotherapist, or with a 'movement coach' (Bewegcoach in Flanders). The latter can be involved with a prescription from a general practitioner. As adherence and responding to exercise is a challenge and potential causes are considered multifactorial in osteoarthritis, a movement coach aims to motivate the patient to reach goals and to support adhering to a healthy lifestyle.^{93, 94}



After a total knee arthroplasty for osteoarthritis, a multidisciplinary approach entails that a physiotherapist among other healthcare professionals (such as dieticians, occupational therapists, psychologist) are involved in the rehabilitation of the patient. The experts agreed on consulting a physiotherapist, as early as possible after the surgical intervention, and within 24h (but preferably a few hours after surgery) to enhance (active) mobilisation of the patient. Article 22 lists the nomenclature codes for reimbursement for which the qualification of physician specialist for physical medicine and rehabilitation is required. These codes were explicitly obtained to enhance the multidisciplinary character and provide an envelope for multidisciplinary treatment.

It is however not possible to measure the indicator since the nomenclature code is not specific. The nomenclature codes for physiotherapy used in primary care ([M-nomenclature, Art 7](#)) are not specified for disease (except for (heavy) diseases listed on E, Fa, or Fb for which the frequency of treatments reimbursed is higher).

In their assessments of the patients, physiotherapists use 'The International Classification of Functioning, Disability and Health' (ICF), a framework for describing and organising information on functioning and disability.⁹⁵ It uses a common standard language and a conceptual basis for the definition and measurement of health and disability. Therefore it can be applied by different healthcare professionals to assess the patient in a multidisciplinary setting. It is also implemented and linked to the developed BelRai-Reva tool.⁹⁶ Currently the BelRai-Reva tool is still tested for its utility, validity, and reliability.⁹⁷ In the future, with the use of this tool, the status of the patient (in an ambulatory setting or a rehabilitation hospital) can be registered, as well as the treatment plan, the healthcare professionals involved, and the treatment given.

Part of the tasks performed by physiotherapists is electrotherapy, which again cannot be measured separately. The quality indicator **not** to use **electrotherapy** treatment ranked highly. Nevertheless, electrotherapy treatments continue to be offered for transient use, to support behavioural change long term and because of the placebo effect. Despite strong recommendations against its use from high quality guidelines, some of the clinical guidelines included in this report have also expressed conditional recommendations (based on very low quality of evidence) to offer TENS that can be used at home for some people with knee and/or hip osteoarthritis, provided clinicians deliver sufficient instructions on self-use, and consider individual accessibility and affordability.⁶ The patient representatives in our expert panel stated that as a patient you are not aware that there's insufficient evidence when this treatment is proposed by healthcare givers.

Examples of the implementation of exercise in a combined approach can be found in Denmark.⁹⁸ The Good Life with osteoArthritis in Denmark (GLA:D®) developed this approach consisting of patient education, exercise and weight management if needed. GLA:D® is an initiative from the University of Southern Denmark with the overarching aim to implement current clinical guidelines for osteoarthritis into clinical care and is being implemented in other countries since (e.g. the Netherlands,ⁱ Switzerland, Ireland, Australia, Canada, New Zealand, China). This project shows exercise (and education) can be implemented in the long-term and presents a way to integrate it into a chronic care trajectory with referral for surgery only when non-operative treatment fails along with the possibility of prospective systematic data collection.^{99, 100}

ⁱ In the Netherlands the GLA:D® programme was introduced in 2020 via a collaboration between practitioners of primary and secondary care in the

Eindhoven region and is subject of research by Fontys Higher Education (<https://www.fontys.nl/Onderzoek/Health-Innovations-Technology-1/GLAD.html>).



6.6 Patient-Reported Outcome Measures and patient-centred care

To understand what patients experience as important in their care, PROMs remain highly valuable and will provide a different perspective. However, in Belgium, healthcare institutions do not (yet) systematically collect PROMs. The main challenge will be to organise and systematise this data collection. Simple assessment tools exist but are not sufficiently installed in standard clinical practice for patients with increased risk profiles. The scores are mostly used in research contexts. Examples are, the (short) KOOS for early osteoarthritis of the knee, the OECD PROMS, the ICHOM PROMs, the OMERACT PROMS^j, or the in development Forgotten Joint Score.^{43, 101, 102} The experts were in favour of the selection of one knee osteoarthritis specific PROM and one general aspect PROM and to be used across Belgium and preferably similar to one used in European countries. The KCE report gives further guidance on PROMs which should be followed.¹⁰³ Recommendations for an arthroplasty register on selection, administration and analysis aspects were made by The International Society of Arthroplasty Registries (ISAR) Patient-Reported Outcome Measures (PROMs) Working Group.¹⁰⁶ An overview by country of the PROMs used is described by Bohm et al.¹⁰⁷ For the collected knee joint-specific PROMs, most frequently the Knee Injury and Osteoarthritis Outcome Score (KOOS) was used. It would be advisable to move forward on the implementation of PROMs for this topic in Belgium.

In addition to PROMs, the use of Patient Reported Experience Measure (PREMs) has also been suggested as a quality indicator because patient centredness considers patients should be involved as active partners to improve quality of care.¹⁰⁴ In Belgium, such measures are being implemented as a universal or hospital-wide level rather than specific to osteoarthritis care.¹⁰³ From 2018, the Pay for Performance Program (Belgian Federal Public Health Service) has already included

measurements of patient experiences (satisfaction) and centredness related to stays on C- and/or D-wards, maternity, geriatrics, or day hospitals.¹⁰⁵ In Flanders, measurements are done using the “Vlaamse Patiëntenpeiling”, an instrument developed by the Flemish Patient Platform (VPP) (4-point and 11-point scales). The French-speaking hospitals can collaborate with [Santhea](#), [BSM-management](#) or PAQS who developed either a 3-, 4-, 5-point and/or 11-point scales. Although these data are currently only collected in general hospitals and do not incorporate the ambulant healthcare setting, in the longer term a similar collection of PROMs is being envisioned for this program.

The use of PROMs or PREMs to measure quality of care requires data collection using standardised questionnaire or structured interview tools. Initiatives for systemic use though happen. For example, a register was set up in Belgium for the MOVE up trial in collaboration with NIHD in which PROMs were collected via a digital application.

To improve patient centredness in measuring quality of care, in addition to PROMs or PREMs, quality indicators of processes of care could also be queried throughout the care path. Our literature review (see section insert 3.5) showed that quality indicator sets already exist, and some evaluated for reliability and validity, but currently are being administered to patients in research settings only.^{45, 47} Such surveys or tools enable the assessment of indicators focussing on non-operative, ambulant or physiotherapeutic care, and continue to be translated and validated for use in other countries or languages.^{38, 38} Therefore, the possibility of a translation and validation of a such a questionnaire to the Belgian context could be considered.

^j The PROMS domains recommended by the OMERACT working group can be found here <https://omeract.org/working-groups/hip-knee-osteoarthritis-core-set/>



6.7 Can a care trajectory contribute to quality of care for patients with knee osteoarthritis

A new process / structure indicator was suggested demonstrating that healthcare professionals use a multidisciplinary care pathway for patients with chronic osteoarthritis and chronic pain. This indicator would broaden the existing non-measurable indicator 'use a standardised clinical care pathway during the acute knee replacement stay'. In Belgium a care pathway for knee (and other) osteoarthritis does not (yet) exist and an indicator incorporating the non-measurable clinically relevant indicators into a multidisciplinary care pathway for knee osteoarthritis could facilitate improved care. Clinical guidelines to date underscore the need for patient-centred and multimodal as well as multidisciplinary care. This should not only be reflected in process indicators of quality of care but also has implications for indicators of structure; e.g., coordination of relevant qualified health-professionals, pathways of care and potential need of a case management structure. Notably, based on the literature as well as the available international guidelines, the body of indicators published to date has mainly identified process and outcome indicators.

A care manager for osteoarthritis could be appointed to guide the patient through the initial early phase of osteoarthritis care, the education, life-style interventions (physical activity and weight loss when needed), and pharmacological treatment to support pain management. Patient-initiated follow-up, an indicator that was rejected, could be supported in this set up and reduce unnecessary consultations when the patient is symptom free. Who then should coordinate not only the early care process, but also the chronic phase? This was a crucial question the experts were asking themselves.

In primary care, the patient often consults a general practitioner who will, after an initial assessment, transfer the patient either to a physiotherapist (often first line, working in private practice), or to a second line physician. In the first scenario, the physiotherapist could initiate the care path. An example of a structured model for integrated osteoarthritis care tested for efficacy in Norway is the SAMBA model (improved management of patients with hip and knee osteoarthritis in primary health care).⁸² In this model care

programme, the general practitioner refers the patient to the physiotherapist for an active program of 8-12 weeks. After this, the general practitioner reviews the status of the patient to assess if referral to the second line is necessary. Although, this is an interesting example, further research will be needed.

A care pathway for knee osteoarthritis could start from the evidence-based findings in this report so that the processes can be more aligned with the evidence (e.g. such as the form of anaesthesia). Next, these processes can be aligned across providers. A care pathway could include a decision tree specific for primary and secondary care to support uptake of the evidence-based guidance.¹⁰⁸

A discussion point is the time when a decision is made for referral for an arthroplasty and linked to this the 'waiting time' before the operation is effectively taking place. It was agreed that an interventional surgical treatment should be considered when there is significant and persistent pain or functional loss that can be improved by a proven therapy (such as a knee replacement). At the same time, a surgical interventional therapy should not be promoted unless the patient has undergone or tried a conservative track for at least 3 to 6 months. Patients favoured therapeutic exercise, self-management programmes, and weight loss advice as the combined approach improves their functioning, even although this is not always the case for their pain experience. Clearly, the need for a balance between self-exercise and physiotherapy with supervised strengthening exercises is important as care should be taken not to cause more pain. For example, adapting daily activities and learning to dose them is part of this. Educating the patient on the basics of exercise and pain medication requires time and is often not the core of general or surgical practice, again, a coordinator could take on this role. To evaluate when the best time for referral is, a general practitioner would probably be the best gate keeper. As an example, in the Netherlands the general practitioner acts as a gatekeeper for referral to secondary care services such as an orthopaedic surgeon. Another profile e.g. to coordinate education and might be chosen depending on time constraints.



The patient with chronic knee osteoarthritis may suffer with osteoarthritis of multiple joints. Knee osteoarthritis is a heterogeneous condition and comorbidities are frequent. Moderate quality evidence underscores an association between multimorbidity (i.e., having ≥ 1 comorbidity) and worse symptoms of pain and/or function. In this population, metabolic comorbidities (e.g., hypertension, diabetes) and/or musculoskeletal comorbidities (e.g., low back pain, widespread or generalised pain) are common and can present intertwined with cognitive-emotional disease burden (e.g., depressive or anxiety symptoms, increased sensitivity to pain, pain catastrophising), all of which may impact symptom severity and clinical progression, and require care that may be more complex.¹⁰⁹ For these patients a coach with a medical profile might be indicated and this should be considered in a care path. Nevertheless, to support the implementation of a care path for (knee) osteoarthritis, a comprehensive evidence synthesis of delivery models evaluated to date is needed and should be studied.

6.8 Strengths and limitations

We consulted a multidisciplinary group, including patient representatives, and larger compared to similar studies developing quality indicators in knee osteoarthritis.^{20, 46, 48, 49, 106} Primary care was represented by the following profiles: general practitioners, physiotherapists, psychologists, and occupational therapists and secondary care by a surgical, geriatric, rheumatology, and medical doctor in physical medicine. The medical professional organisations involved in osteoarthritis care and general practices were asked to collaborate.

Based on recent high quality guidelines complementary to quality indicator literature (peer-reviewed as well as grey literature sources), we adopted a comprehensive and broad search strategy in order to identify existing quality indicators in this field. We did not limit this study to a mere development of quality indicators as such. The inclusion of strong recommendations based on quality statements provide further guidance of recommended as well as “not to do treatments” which ultimately can also facilitate high quality management. We were able to complement proposed quality indicator definitions with precise and directly applicable measurability guidance for

Belgium, when available. This provides a realistic and tangible scope of measuring possibilities in a Belgian health data context.

From the prioritised quality indicators, those measurable do not cover all aspects of management, as for example primary care management other than diagnosis is largely lacking. In particular, indicators of referral between primary and secondary care are critical to measure continuity of care. Evidence-based core treatments for all people with knee osteoarthritis, namely exercise and education, are not measurable but included in the quality standard. Nevertheless, to fully operationalise the proposed quality indicator set, this study has not yet determined measurement targets nor technical descriptions (e.g., with data flowchart or measurement time frames,...). Thus, additional development is required prior to the actual evaluation of quality of care in these patients. This also requires a larger expert group, with adequate representation of primary and secondary care for the Belgian regions. The main quality indicators with social and/or ethical implications are unfortunately not measurable, and potentially limited access to treatments because of personal costs was not considered.

The ethical and societal aspects that were partially addressed in the quality standards and indicators were discussed at the expert meeting. Factors that were important, for example, involve information and advice about risks or benefits of administered treatments (medication or replacement surgery), costs of non-evidence-based treatments, equal access to care valued in Belgium; factors all of which were identified amongst the quality indicators and prioritised by the expert panel. As such, the ethical aspects are implicitly considered in the statements and indicators, but a formal evaluation was not performed.

We acknowledge that the recent guidelines are based mostly on Level I evidence and that therefore lower evidence might not have been included. For example, this would include early treatment of osteoarthritis for which the level of evidence is low.



6.9 Conclusion and future prospects

Osteoarthritis is the most common joint disorder and the number of cases with (knee) osteoarthritis is constantly increasing, due to the ageing population. Unfortunately, there is no curative treatment. The approach is mainly aimed at slowing disease progression, mitigating the patient's symptoms, and improving their mobility and quality of life. For the majority of patients, supervised exercise therapy is sufficient, and surgery is not necessary.

To measure and improve the quality of care in the management of knee osteoarthritis in our country, the KCE was asked to develop quality indicators for the Belgian context.

We first developed a quality standard (Table 31) which can be further developed by primary care in collaboration with scientific associations, and by the second line, together with VIKZ and PAQS. We then defined quality indicators (Table 32), which VIKZ and PAQS can also further operationalise and implement, together with experts from the field. This standard and indicator set are evidence-based, i.e. based on robust scientific data. The general practitioner and physiotherapist play an important role in the conservative treatment of the patient with knee osteoarthritis and are responsible for continuity of care.

The prevention of knee osteoarthritis was not studied in this project. However, this will be important to address the increasing prevalence in the longer term. The emerging evidence for early conservative treatment should also be closely monitored. Reliable scientific data can also be collected on this.



■ APPENDIX

APPENDIX 1. CONTEXT BELGIUM

Appendix 1.1. Data source

All general hospitals are required to submit twice a year a large set of data on all inpatient and day-care hospital stays and emergency room contacts: the [Minimal Hospital Data \(Minimale Ziekenhuis Gegevens – Résumé Hospitalier Minimum, MZG – RHM\)](#) defined by the [Royal Decree of 27 April 2007](#) which are transferred to the Federal Public Service for Health, Food Chain Safety and Environment. Available variables pertain, among others, to demographics, clinical information as diagnoses, comorbidities, treatments and complications, length of stay and discharge status.

The **Hospital Billing Data**, managed by the RIZIV – INAMI, contains all reimbursements by the RIZIV – INAMI related to hospitals stays: fees charged by physicians and other healthcare providers, pharmaceuticals and implants, per admission and per diem lump sum payments, etc. These data are called the Anonymous Hospital Stays (AZV – SHA) for inpatient stays and Anonymous Day-care Stays (ADH – HJA) for day-care stays.

The Technical Cell ([Technische Cel – Cellule Technique](#), TCT) created in the [Law of 29 April 1996 on social provisions](#), is a common service of the RIZIV – INAMI and the Federal Public Service of Public Health, Safety of the Food Chain and Environment. Its mission is to collect, link, validate, and anonymise data relating to hospitals. Each year, the TCT links the Minimal Hospital Data to the Hospital Billing Data for the analysis of links between the expenditures of the healthcare insurance and the treated conditions and for the elaboration of financing rules, accreditation standards and quality conditions in the context of an effective health policy.



Appendix 1.2. Methods

Data were extracted from the TCT data 2016-2020. Stays discharged between 2016 and 2020 were selected if one of the following conditions was met:

- a principal or secondary diagnosis of knee osteoarthritis was documented in the MZG – RHM (ICD-10-BE diagnosis code beginning with M17 Osteoarthritis of the knee),
- one of the following ICD-10-BE knee procedure code was documented in the MZG – RHM: Replacement (0SRCxxx, 0SRDxxx), Removal (0SPCxxx, 0SPDxxx), Inspection (0SJCxxx, 0SJDxxx) Release (0SNCxxx, 0SNDxxx), Repair (0SQCxxx, 0SQDxxx), Resection (0STCxxx, 0STDxxx), Supplement (0SUCxxx, 0SUDxxx), Revision (0SWCxxx, 0SWDxxx) with “x” representing any character.
- a RIZIV – INAMI medical fee code (see Table 33) was recorded in the billing data were also selected.

The analyses were performed using SAS software™ version 9.4 M5 for Microsoft Windows and Microsoft® Excel® for Microsoft 365 MSO.

Stays from which linkage proved to be erroneous (n=254 out of 230 814) were discarded before analysis. Only stays present in MZG – RHM but not in AZV – SHA / ADH – HJA (n=8860) were retained as a few patients may not have been affiliated to a sickness fund and covered by the national health insurance. A few day-care stays (n=7) recorded as an emergency contact with diagnoses and/or procedures recorded (not compulsory for such contacts) as well as first and intermediary administrative admissions (n=17“F” and 5“M”) were not further investigated for rejection.

**Table 33 – Knee arthroplasties reimbursement codes**

Codes	Label	Creation date	Key letter	Medical Fee*
290194 – 290205**	Femoropatellaire arthroplastie met prothese - Arthroplastie fémoro-patellaire avec prothèse	1 April 1985	N 350	€ 401.11
290253 – 290264**	Arthroplastie van de knie door unicompartimentele prothese met femorale en tibiale component - Arthroplastie du genou par prothèse uni-compartimentale avec composant tibial et fémoral	1 April 1985	N 500	€ 573.02
290275 – 290286**	Arthroplastie van de knie met totale prothese - Arthroplastie du genou avec prothèse totale	1 April 1985	N 588	€ 772.16
279031 - 279042	Afzonderlijke vervanging van een insert in polyethyleen van een totale knieprothese - Remplacement isolé d'un insert en polyéthylène d'une prothèse totale du genou	1 Januari 2014	N 285	€ 326.62
277690 - 277701	Verwijderen van een articulaire prothese met of zonder plaatsing van een spacer ter hoogte van: de knie - Ablation d'une prothèse articulaire avec ou sans mise en place dun spacer au niveau : du genou	1 Januari 2014	N 310	€ 355.27
279053 - 279064	Vervanging van een component van een totale knieprothese (behalve polyethyleen) - Remplacement d'un composant d'une prothèse totale de genou (sauf polyéthylène)	1 Januari 2014	N 750	€ 1074.40
293451 - 293462	Totale vervanging van een totale knieprothese, of revisie naar een arthrodese - Remplacement complet d'une prothèse totale de genou, ou révision vers une arthrodèse	1 Januari 1992	N 850	€ 1325.10

* Situation 17th August 2023.

Appendix 1.3. Results

Table 34 – Number of stays with knee osteoarthritis as principal or secondary diagnosis by type of hospitalisation and year, TCT data 2016-2020

Type \ Year	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
Day care	729 2.9%	520 2.0%	518 1.9%	502 1.9%	436 2.2%	2 705 2.2%	3 050 23.5%	3 015 23.4%	3 190 24.6%	2 961 23.4%	2 192 21.5%	14 408 23.4%
Inpatient	24 639 97.1%	25 635 98.0%	26 128 98.1%	26 442 98.1%	19 444 97.8%	122 288 97.8%	9 936 76.5%	9 876 76.6%	9 755 75.4%	9 681 76.6%	8 020 78.5%	47 268 76.6%
Total	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	10 212	61 676



Table 35 – Number of stays with knee osteoarthritis as principal or secondary diagnosis by sex and year, TCT data 2016-2020

Sex \ Year	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
Male	9 595 37.8%	9 875 37.8%	10 401 39.0%	10 651 39.5%	7 988 40.2%	48510 38.8%	4 546 35.0%	4 487 34.8%	4 758 36.8%	4 570 36.2%	3 763 36.9%	22124 35.9%
Female	15 773 62.2%	16 280 62.2%	16 245 61.0%	16 293 60.5%	11 892 59.8%	76483 61.2%	8 440 65.0%	8 404 65.2%	8 187 63.2%	8 072 63.8%	6 449 63.1%	39552 64.1%
Total	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	10 212	61 676

Table 36 – Age distribution parameters of stays with knee osteoarthritis as principal or secondary diagnosis by year, TCT data 2016-2020

Age \ Year	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
N	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	12 986	61 676
Mean	67.8	67.8	67.9	67.8	67.6	67.8	74.3	75	75	74.8	74.3	74.8
SD	10.8	10.76	10.64	10.58	10.59	10.68	14.34	13.91	14.11	14.22	14.34	14.19
Min	2	0.54	0.54	1	2	0.54	2	1	1	4	2	1
Q1	61	61	61	61	60	61	65	66	66	65	65	66
Median	69	69	69	69	68	69	78	78	78	78	78	78
Q3	76	76	76	75	75	75	85	86	86	86	85	86
Max	98	99	99	100	101	101	102	105	107	105	102	107

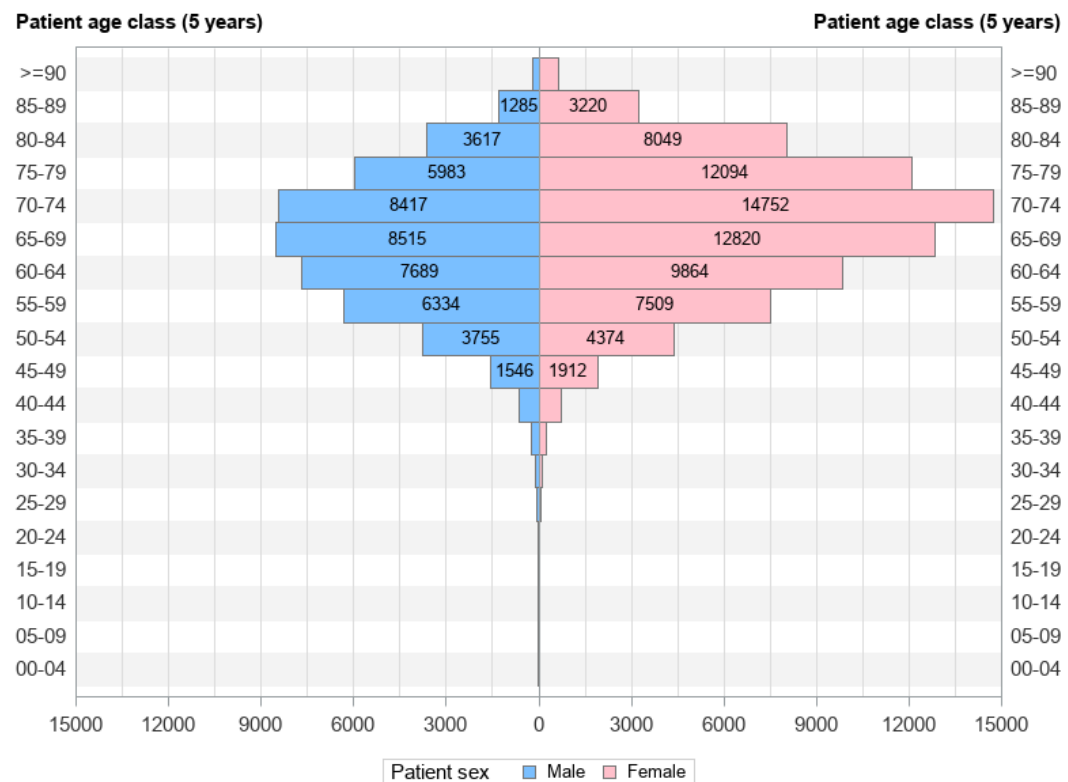
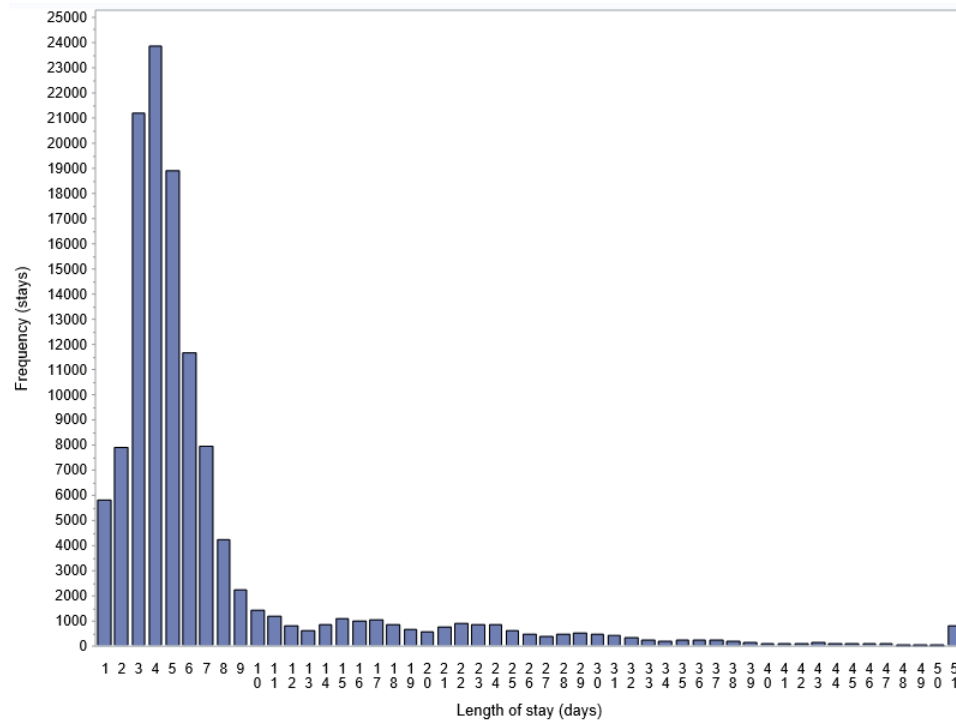
**Figure 5 – Age pyramid of stays with knee osteoarthritis as principal diagnosis, TCT data 2016-2020**


Table 37 – Principal diagnoses of stays with knee osteoarthritis (M17) as principal diagnosis by year, TCT data 2016-2020

Principal diagnosis	2016		2017		2018		2019		2020		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
M1711 Unilateral primary osteoarthritis, right knee	10 073	39.7	11 149	42.6	11 656	43.7	11 895	44.1	9 435	47.5	54 208	43.4
M1712 Unilateral primary osteoarthritis, left knee	9 045	35.7	10 320	39.5	10 730	40.3	10 783	40.0	8 503	42.8	49 381	39.5
M179 Osteoarthritis of knee, unspecified	3 693	14.6	1 833	7.0	1 508	5.7	1 585	5.9	74	0.4	8 693	7.0
M175 Other unilateral secondary osteoarthritis of knee	1 405	5.5	1 548	5.9	1 463	5.5	1 228	4.6	877	4.4	6 521	5.2
M170 Bilateral primary osteoarthritis of knee	755	3.0	912	3.5	902	3.4	1 027	3.8	681	3.4	4 277	3.4
M1732 Unilateral post-traumatic osteoarthritis, left knee	131	0.5	121	0.5	143	0.5	184	0.7	147	0.7	726	0.6
M1731 Unilateral post-traumatic osteoarthritis, right knee	149	0.6	147	0.6	149	0.6	165	0.6	109	0.5	719	0.6
M174 Other bilateral secondary osteoarthritis of knee	90	0.4	108	0.4	81	0.3	68	0.3	36	0.2	383	0.3
M1710 Unilateral primary osteoarthritis, unspecified knee	22	0.1	14	0.1	9	0.0	7	0.0	10	0.1	62	0.0
M172 Bilateral post-traumatic osteoarthritis of knee	5	0.0	3	0.0	4	0.0	2	0.0	8	0.0	22	0.0
M1730 Unilateral post-traumatic osteoarthritis, unspecified knee	.	.	.	.	1	0.0	.	.	.	.	1	0.0
Total	25 368	100.0	26 155	100.0	26 646	100.0	26 944	100.0	19 880	100.0	124 993	100.0



Figure 6 – Length of stay - distribution parameters of stays with knee osteoarthritis as principal diagnosis, TCT data 2020



NB: length of stay = 0 days in case of day-care stays is replaced by 0.5 days for convenience (included in bar 1 day). Length of stay above 50 days are gathered in the 51th bar.


Table 38 – Length of stay distribution parameters of stays with knee osteoarthritis as principal diagnosis by year, TCT data 2016-2020

Length of stay \ Year	Principal diagnosis						Total
	2016	2017	2018	2019	2020		
N	25368	26155	26646	26944	19880	124993	
Mean	8.4	8.0	7.6	7.4	6.7	7.7	
SD	9.90	9.79	9.66	9.64	9.54	9.73	
Min	0.5	0.5	0.5	0.5	0.5	0.5	
P5	2	2	2	2	1	2	
P10	3	3	2	2	2	2	
P25	4	4	3	3	3	3	
P50	5	5	5	4	4	5	
P75	8	7	7	6	6	7	
P90	19	18	18	18	16	18	
P95	28	27	27	27	24	27	
Max	365	435	256	180	225	435	

NB: length of stay = 0 days in case of day-care stays is replaced by 0.5 days for convenience.



Table 39 – ICD-10-BE procedure codes in patients with knee osteoarthritis as principal or secondary diagnosis, number of stays per year, TCT data 2016-2020

ICD-10-BE code	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
N stays	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	10 212	61 676
N with %CD-10-BE primary replacement, revision, or removal - knee procedure codes	23 777	24 692	25 315	25 611	19 053	118 448	269	246	237	638	538	1 928
Denominator of % per code= N stays*	93.7%	94.4%	95.0%	95.1%	95.8%	94.8%	2.1%	1.9%	1.8%	5.0%	5.3%	3.1%
Primary Replacements	23319	24248	24812	25088	18643	116110	210	189	178	550	474	1601
Five most frequent codes	91.9%	92.7%	93.1%	93.1%	93.8%	92.9%	1.6%	1.5%	1.4%	4.4%	4.6%	2.6%
0SRC0J9 Replacement of Right Knee Joint with Synthetic Substitute, Cemented, Open Approach	10 382 40.9%	10 422 39.8%	10 520 39.5%	10 687 39.7%	6 747 33.9%	48 758 39.0%	97 0.7%	71 0.6%	79 0.6%	253 2.0%	219 2.1%	719 1.2%
0SRD0J9 Replacement of Left Knee Joint with Synthetic Substitute, Cemented, Open Approach	9 416 37.1%	9 544 36.5%	9 549 35.8%	9 525 35.4%	5 994 30.2%	44 028 35.2%	71 0.5%	77 0.6%	66 0.5%	238 1.9%	180 1.8%	632 1.0%
0SRC0JA Replacement of Right Knee Joint with Synthetic Substitute, Uncemented, Open Approach	892 3.5%	659 2.5%	597 2.2%	675 2.5%	467 2.3%	3 290 2.6%	6 <0.1%	8 0.1%	4 <0.1%	6 <0.1%	3 <0.1%	27 <0.1%
0SRD0JA Replacement of Left Knee Joint with Synthetic Substitute, Uncemented, Open Approach	812 3.2%	631 2.4%	591 2.2%	635 2.4%	432 2.2%	3 101 2.5%	9 0.1%	1 <0.1%	6 <0.1%	6 <0.1%	9 0.1%	31 0.1%
0SRD0L9 Replacement of Left Knee Joint with Medial Unicondylar Synthetic Substitute, Cemented, Open Approach	0 0.0%	616 2.4%	854 3.2%	888 3.3%	659 3.3%	3 017 2.4%	0 <0.1%	2 <0.1%	2 <0.1%	5 <0.1%	2 <0.1%	11 <0.1%
Revisions	14	14	12	12	11	63	7	6	5	5	0	23
Five most frequent codes	0.1%	0.1%	0.1%	<0.1%	0.1%	0.1%	0.1%	0.1%	<0.1%	<0.1%	0.0%	<0.1%
0SWD0JZ Revision of Synthetic Substitute in Left Knee Joint, Open Approach	5 <0.1%	2 <0.1%	1 <0.1%	2 <0.1%	0 0.0%	10 <0.1%	5 <0.1%	2 <0.1%	0 0.0%	1 <0.1%	0 0.0%	8 <0.1%
0SWC0JZ Revision of Synthetic Substitute in Right Knee Joint, Open Approach	4 <0.1%	3 <0.1%	0 0.0%	3 <0.1%	2 <0.1%	12 <0.1%	2 <0.1%	1 <0.1%	1 <0.1%	1 <0.1%	0 0.0%	5 <0.1%
0SWD0JC Revision of Synthetic Substitute in Left Knee Joint, Patellar Surface, Open Approach	0 0.0%	0 0.0%	2 <0.1%	1 <0.1%	5 <0.1%	8 <0.1%	0 0.0%	1 <0.1%	1 <0.1%	3 <0.1%	0 0.0%	5 <0.1%



0SWC0JC Revision of Synthetic Substitute in Right Knee Joint, Patellar Surface, Open Approach	0 0.0%	1 <0.1%	1 <0.1%	1 <0.1%	1 <0.1%	4 <0.1%	0 0.0%	1 <0.1%	2 <0.1%	0 0.0%	0 0.0%	3 <0.1%
0SWCXJZ Revision of Synthetic Substitute in Right Knee Joint, External Approach	1 <0.1%	3 <0.1%	2 <0.1%	0 <0.1%	1 <0.1%	7 <0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
Removals Five most frequent codes	132 0.5%	137 0.5%	137 0.5%	151 0.6%	162 0.8%	719 0.6%	46 0.4%	49 0.4%	48 0.4%	68 0.5%	57 0.6%	268 0.4%
0SPC0JZ Removal of Synthetic Substitute from Right Knee Joint, Open Approach	54 0.2%	32 0.1%	42 0.2%	44 0.2%	24 0.1%	196 0.2%	18 0.1%	18 0.1%	17 0.1%	21 0.2%	12 0.1%	86 0.1%
0SPD0JZ Removal of Synthetic Substitute from Left Knee Joint, Open Approach	45 0.2%	33 0.1%	35 0.1%	50 0.2%	18 0.1%	181 0.1%	15 0.1%	14 0.1%	16 0.1%	17 0.1%	13 0.1%	75 0.1%
0SPD04Z Removal of Internal Fixation Device from Left Knee Joint, Open Approach	11 <0.1%	13 <0.1%	10 <0.1%	8 <0.1%	9 <0.1%	51 <0.1%	5 <0.1%	3 <0.1%	2 <0.1%	2 <0.1%	3 <0.1%	15 <0.1%
0SPT0JZ Removal of Synthetic Substitute from Right Knee Joint, Femoral Surface, Open Approach	0 0.0%	18 0.1%	14 0.1%	12 <0.1%	5 <0.1%	49 <0.1%	0 0.0%	4 <0.1%	1 <0.1%	7 0.1%	0 0.0%	12 0.0%
0SPC04Z Removal of Internal Fixation Device from Right Knee Joint, Open Approach	8 <0.1%	9 <0.1%	6 <0.1%	8 <0.1%	4 <0.1%	35 <0.1%	4 <0.1%	1 <0.1%	4 <0.1%	5 <0.1%	1 <0.1%	15 <0.1%

Source: TCT data 2015-2020. (*) More than one intervention could have been performed during the same hospitalisation.



Table 40 – Knee replacement procedures billed per RIZIV – INAMI codes in patients with knee osteoarthritis as principal or secondary diagnosis, number of stays per year, TCT data 2016-2020

RIZIV – INAMI code	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
N stays	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	10 212	61 676
N coupled stays	24 725	25 527	25 882	26 096	19 336	121 566	12 428	12 329	12 298	11 850	9 726	58 631
% of N stays	97.5%	97.6%	97.1%	96.9%	97.3%	97.26%	95.7%	95.6%	95.0%	93.7%	95.2%	95.1%
N with interventions (% of coupled stays)	22 807	23 772	24 180	24 279	18 111	113 149	218	190	189	545	471	1 613
Denominator of % per code= N coupled stays (*)	99.1%	99.2%	99.2%	97.8%	97.5%	98.6%	1%	0.8%	0.8%	2.2%	2.5%	1.4%
290275 - 290286 Arthroplastie van de knie met totale prothese - Arthroplastie du genou avec prothèse totale	20 537 83.1%	21 090 82.6%	20 919 80.8%	20 930 80.2%	15 330 79.3%	98 739 81.3%	154 1.2%	124 1.0%	129 1.0%	454 3.8%	389 4.0%	1 250 2.1%
290253 - 290264 Arthroplastie van de knie door unicompartimentele prothese met femorale en tibiale component - Arthroplastie du genou par prothèse uni- compartimentale avec composant tibial et fémoral	1 795 7.3%	2 162 8.5%	2 768 10.7%	2 808 10.8%	2 376 12.3%	11 909 9.8%	15 0.1%	15 0.1%	8 0.1%	30 0.3%	31 0.3%	99 0.2%
290194 - 290205 Femoropatellaire arthroplastie met prothese - Arthroplastie fémoro-patellaire avec prothèse	444 1.8%	486 1.9%	468 1.8%	476 1.8%	343 1.8%	2 217 1.8%	10 0.1%	10 0.1%	9 0.1%	16 0.1%	6 0.1%	51 0.1%
293451 - 293462 Totale vervanging van een totale knieprothese, of revisie naar een arthrodese - Remplacement complet d'une prothèse totale de genou, ou révision vers une arthrodèse	106 0.4%	87 0.3%	100 0.4%	113 0.4%	105 0.5%	511 0.4%	30 0.2%	34 0.3%	30 0.2%	36 0.3%	36 0.4%	166 0.3%
279053 - 279064 Vervanging van een component van een totale knieprothese (behalve polyethyleen) - Remplacement d'un composant d'une prothèse totale de genou (sauf polyéthylène)	16 0.1%	19 0.1%	32 0.1%	28 0.1%	22 0.1%	117 0.1%	7 0.1%	3 <0.1%	11 0.1%	6 0.1%	4 <0.1% %	31 0.1%
279031- 279042 Afzonderlijke vervanging van een insert in polyethyleen van een totale knieprothese - Remplacement isolé d'un insert en polyéthylène d'une prothèse totale du genou	10 <0.1%	15 0.1%	6 <0.1%	11 <0.1%	15 0.1%	57 <0.1%	3 <0.1%	3 <0.1%	2 <0.1%	7 0.1%	7 0.1%	22 <0.1%
277690 - 277701 Verwijderen van een articulaire prothese met of zonder plaatsing van een spacer ter hoogte van: de knie - Ablation d'une prothèse articulaire avec ou sans mise en place d'un spacer au niveau : du genou	2 <0.1%	0 0.0%	2 <0.1%	2 <0.1%	3 <0.1%	9 <0.1%	2 <0.1%	4 <0.1%	1 <0.1%	1 <0.1%	3 <0.1%	11 <0.1%

Source: TCT data 2015-2020. (*) More than one intervention could have been performed during the same hospitalisation.



Table 41 – Diagnostic arthroscopies and meniscectomies in patients with knee osteoarthritis as principal or secondary diagnosis, number of stays per year, TCT data 2016-2020

RIZIV – INAMI code	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
N stays	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	10 212	61 676
N coupled stays	24 725	25 527	25 882	26 096	19 336	121 566	12 428	12 329	12 298	11 850	9 726	58 631
% of N stays	97.5%	97.6%	97.1%	96.9%	97.3%	97.26%	95.7%	95.6%	95.0%	93.7%	95.2%	95.1%
N with arthroscopies (% of coupled stays)	497	304	281	252	177	1 511	23 15	2 003	1 957	1 768	1 169	9 21
Denominator of % per code= N coupled stays (*)	2.0%	1.2%	1.1%	1.0%	0.9%	1.2%	18.6%	16.2%	15.9%	14.9%	12%	15.7%
276636 – 276640 Mediale of laterale meniscectomie, ongeacht de techniek - Méniscectomie interne ou externe du genou, quelle que soit la technique	461 1.9%	272 1.1%	254 1.1%	233 0.9%	160 0.8%	1380 1.1%	2 280 18.3%	1 965 15.9%	1 927 15.7%	1 748 14.8%	1 144 11.8%	9 064 15.5%
277432 – 277443 Meniscectomie geassocieerd met één van de verstrekkings aangeduid met de rangnummers 277336-277340, 277351-277362 (**) - Méniscectomie associée à une des prestations désignées par les numéros d'ordre 277336-277340, 277351-277362 (**)	0 0%	1 <0.1%	2 <0.1%	0 0%	0 0%	3 <0.1%	10 0.1%	11 0.1%	7 0.1%	0 0.0%	4 <0.1%	32 0.1%
300252 – 300263 Diagnostische artroscopie met of zonder afname voor biopsie - Arthroscopie diagnostique avec ou sans prélèvement biopsique	2 <0.1%	0 0%	1 <0.1%	0 0%	3 <0.1%	6 <0.1%	5 <0.1%	4 <0.1%	0 0.0%	1 <0.1%	1 <0.1%	11 <0.1%
300274 – 300285 Diagnostische arthroscopie met gebruik van taster, inclusief de eventuele biopsie, het spoelen en de kleine manipulaties die geen deel uitmaken van de andere arthroscopische verstrekkings - Arthroscopie diagnostique avec utilisation d'un palpeur, y compris la biopsie éventuelle, le rinçage et les petites manipulations non incluses dans les autres prestations arthroscopiques	34 0.1%	31 0.1%	24 0.1%	19 0.1%	14 0.1%	122 0.1%	21 0.2%	24 0.2%	24 0.2%	22 0.2%	23 0.2%	114 0.2%

Source: TCT data 2015-2020. (*) More than one intervention could have been performed during the same hospitalisation. (**) 277336-277340 Plastie van één of beide gekruiste knieligamenten met tendineus, cutaan, aponeurotisch, of synthetisch materiaal ongeacht de techniek - Plastie par matériel tendineux, cutané, aponévrotique ou synthétique d'un ou des ligaments croisés du genou, quelle que soit la technique. 277351-277362 Hechten van één of beide gekruiste knieligamenten, ongeacht de techniek - Sutures d'un ou des ligaments croisés du genou, quelle que soit la technique



Table 42 – Physiotherapy nomenclature (art.7) in patients with knee osteoarthritis as principal or secondary diagnosis, per year, TCT data 2016-2020: number of stays per year

RIZIV – INAMI code	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
N stays	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	10 212	61 676
N coupled stays	24 725	25 527	25 882	26 096	19 336	121 566	12 428	12 329	12 298	11 850	9 726	58 631
% of N stays	97.5%	97.6%	97.1%	96.9%	97.3%	97.26%	95.7%	95.6%	95.0%	93.7%	95.2%	95.1%
N with physiotherapy (art.7) (% coupled stays)	17 168	17 735	18 179	17 970	12 607	83 659	5 807	5 710	5 735	5 597	4 565	27 414
Denominator of % per code= N coupled stays (*)	69.4%	69.5%	70.2%	68.9%	65.2%	68.8%	46.7%	46.3%	46.6%	47.2%	46.9%	46.8%
-560501 Individuele kinesitherapiezing van 30 minuten (567206 mag niet meer aangerekend worden in het jaar, ziekenhuis opgenomen rechthebbenden.)/ Séance individuelle de kinésithérapie de 30 minutes (567206 ne peut plus être attestée dans l'année, bénéficiaires hospitalisés)	16 551 66.9%	17 245 67.6%	17 692 68.4%	17 529 67.2%	12 334 63.8%	81 351 66.9%	5 291 42.6%	5 281 42.8%	5 124 41.7%	5 060 42.7%	4 178 43.0%	24 934 42.5%
-560523 Individuele kinesitherapiezing van 15 minuten/ Séance individuelle de kinésithérapie de 15 minutes	740 3.0%	655 2.6%	535 2.1%	548 2.1%	273 1.4%	2 751 2.3%	483 3.9%	456 3.7%	454 3.7%	366 3.1%	280 2.9%	2 039 3.5%
-561245 Individuele kinesitherapiezing van 30 minuten (E-lijst zware aandoeningen)/ Séance individuelle de kinésithérapie de 30 minutes (pathologies lourdes liste E)	4 <0.1%	32 0.1%	156 0.6%	70 0.3%	78 0.4%	340 0.3%	24 0.2%	53 0.4%	131 1.1%	92 0.8%	103 1.1%	403 0.7%
-561260 Individuele kinesitherapiezing van 15 minuten (E-lijst zware aandoeningen) / Séance individuelle de kinésithérapie de 15 minutes (pathologies lourdes liste E)	0 0.0%	3 <0.1%	3 <0.1%	1 <0.1%	0 0.0%	7 <0.1%	2 <0.1%	5 <0.1%	12 0.1%	5 <0.1%	3 <0.1%	27 <0.1%
-561282 Individuele kinesitherapiezing van 15 minuten heeft : 2de zitting van de dag (E-lijst zware aandoeningen) / Séance individuelle de kinésithérapie de 15 minutes : 2ème séance de la journée (pathologies lourdes liste E)	1 <0.1%	1 <0.1%	14 0.1%	1 <0.1%	3 <0.1%	20 <0.1%	1 <0.1%	5 <0.1%	6 <0.1%	3 <0.1%	3 <0.1%	18 <0.1%



-561540 Individuele kinesitherapiezing 15 minuten heeft; 2e zitting van de dag (intensieve zorgen, pasgeboren, ...) / Séance individuelle de kinésithérapie de 15 minutes : 2e séance de la journée (soins intensifs, nouveaux-nés...)	1573 6.4%	1617 6.3%	1399 5.4%	1324 5.1%	924 4.8%	6 837 5.6%	140 1.1%	176 1.4%	67 0.5%	64 0.5%	55 0.6%	502 0.9%
-561702 Individuele kinesitherapiezing van 30 minuten (perinatale zorg) / Séance individuelle de kinésithérapie de 30 minutes (soins périnataux)	0 0.0%	0 0.0%	0 0.0%	4 <0.1%	1 <0.1%	5 <0.1%	0 0.0%	0 0.0%	1 <0.1%	2 <0.1%	0 0.0%	3 <0.1%
-564701 Individuele kinesitherapiezing van 30 minuten; 2e zitting van de dag (intensieve zorgen, pasgeboren, ...) / Séance individuelle de kinésithérapie de 30 minutes : 2e séance de la journée (soins intensifs, nouveaux-nés...)	0 0.0%	65 0.3%	256 1.0%	26 0.1%	14 0.1%	361 0.3%	0 0.0%	16 0.1%	112 0.9%	128 1.1%	113 1.2%	369 0.6%
560114 - Individuele kinesitherapiezing van 30 minuten (567055 mag niet meer aangerekend worden in het jaar, praktijkkamer in een ziekenhuis) / Séance individuelle de kinésithérapie 30 minute (567055 ne peut plus être attestée dans l'année, cabinet dans un hôpital)	1 <0.1%	3 <0.1%	0 0.0%	0 0.0%	1 <0.1%	5 <0.1%	5 <0.1%	10 0.1%	7 0.1%	7 0.1%	4 <0.1%	33 0.1%
560195 - Consultatief kinesitherapeutisch onderzoek van de patiënt / Examen du patient par le kinésithérapeute à titre consultatif	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 <0.1%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 <0.1%
560534 – 560545 individuele kinesitherapiezing van 30 minuten (567232-567243 mag niet meer aangerekend worden in het jaar, revalidatiecentra met een overeenkomst) / Séance individuelle de kinésithérapie de 30 minutes (567232-567243 ne peut plus être attestée dans l'année, centres de rééducation fonctionnelle conventionnés,)	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 <0.1%	0 0.0%	1 <0.1%
561315 – 561326 Individuele kinesitherapiezing van 30 minuten (E-lijst zware aandoeningen, revalidatiecentra met een overeenkomst) / Séance individuelle de kinésithérapie de 30 minutes (pathologies	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 <0.1%	2 <0.1%	2 <0.1%	1 <0.1%	1 <0.1%	7 <0.1%



lourdes liste E, centres de rééducation fonctionnelle conventionnés)												
564255 - Individuele kinesithérapie zitting van 15 minuten (daghospitalisatie)/ Séance individuelle de kinésithérapie de 15 minutes (hospitalisation de jour)	99 0.4%	45 0.2%	47 0.2%	35 0.1%	37 0.2%	263 0.2%	303 2.4%	234 1.9%	306 2.5%	310 2.6%	185 1.9%	1 338 2.3%
639590 – 639601 Manuele lymfedrainage van 120 minuten heeft (E-lijst zware aandoeningen)/ Drainage lymphatique manuel de 120 minutes (pathologies lourdes liste E)	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 <0.1%	1 <0.1%	2 <0.1%	0 0.0%	1 <0.1%	5 <0.1%

Table 43 – Full nomenclature code explanation Table 42

Full nomenclature code text

560501 Als de zitting 567206 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen: **individuele kinesithérapie zitting** waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **30 minuten** heeft/ Lorsque la séance 567206 ne peut être attestée compte tenu des limitations prévues au § 10 du présent article : **séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **30 minutes**

-560523 Individuele kinesithérapie zitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **15 minuten** heeft / **Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **15 minutes**

-561245 Individuele kinesithérapie zitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **30 minuten** heeft / **Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **30 minutes**

-561260 Individuele kinesithérapie zitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **15 minuten** heeft / **Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **15 minutes**

-561282 Individuele kinesithérapie zitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **15 minuten** heeft : **2de zitting** van de dag overeenkomstig de bepalingen van **§11 / Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **15 minutes : 2ème séance** de la journée conformément aux dispositions du **§11**

-561540 Individuele kinesithérapie zitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **15 minuten** heeft; **2e zitting** van de dag overeenkomstig de bepalingen van **§ 12 / Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **15 minutes : 2e séance** de la journée conformément aux dispositions du **§ 12**

-561702 Individuele kinesithérapie zitting waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **30 minuten** heeft / **Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **30 minutes**



-564701 Individuele kinesitherapiezing waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **30 minuten** heeft; **2e zitting** van de dag overeenkomstig de bepalingen van **§ 12 / Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **30 minutes : 2e séance** de la journée conformément aux dispositions du **§ 12**

560114 - Als de zitting 567055 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : **individuele kinesitherapiezing** waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **30 minuten** heeft / Lorsque la séance 567055 ne peut être attestée compte tenu des limitations prévues au § 10 du présent article : **séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **30 minute**

560195 - Consultatief kinesitherapeutisch onderzoek van de patiënt / **Examen** du patient par le **kinésithérapeute à titre consultatif**

560534 – 560545 Als de zitting 567232-567243 niet mag worden geattesteerd, rekening houdende met de in § 10 van dit artikel vastgestelde beperkingen : **individuele kinesitherapiezing** waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **30 minuten** heeft / Lorsque la séance 567232 - 567243 ne peut être attestée compte tenu des limitations prévues au § 10 du présent article : **Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **30 minutes**

561315 – 561326 Individuele kinesitherapiezing waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **30 minuten** heeft / **Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **30 minutes**

564255 - Individuele kinesitherapiezing waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een globale gemiddelde duur van **15 minuten** heeft/ **Séance individuelle de kinésithérapie** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée globale moyenne de **15 minutes**

639590 – 639601 Individuele kinesitherapiezing die voornamelijk bestaat uit **manuele lymfedrainage** waarbij de persoonlijke betrokkenheid van de kinesitherapeut per rechthebbende een minimumduur van **120 minuten** heeft / **Séance individuelle de kinésithérapie** constituée essentiellement de **drainage lymphatique manuel** dans laquelle l'apport personnel du kinésithérapeute par bénéficiaire atteint une durée minimum de **120 minutes**



Table 44 – Rehabilitation sessions nomenclature (art. 22) in patients with knee osteoarthritis as principal or secondary diagnosis, per year, TCT data 2016-2020: number of stays per year

RIZIV – INAMI code	Principal diagnosis						Secondary diagnosis					
	2016	2017	2018	2019	2020	Total	2016	2017	2018	2019	2020	Total
N stays	25 368	26 155	26 646	26 944	19 880	124 993	12 986	12 891	12 945	12 642	10 212	61 676
N coupled stays	24 725	25 527	25 882	26 096	19 336	121 566	12 428	12 329	12 298	11 850	9 726	58 631
% of N stays	97.5%	97.6%	97.1%	96.9%	97.3%	97.26%	95.7%	95.6%	95.0%	93.7%	95.2%	95.1%
N with rehabilitation session (% coupled stays)	19 001	19 286	19 926	19 737	14 277	91 927	3 954	3 970	3 863	3 868	3 296	18 951
Denominator of % per code= N coupled stays (*)	76.9%	75.6%	75.8%	75.6%	73.8%	75.6%	31.8%	32.2%	31.4%	32.6%	33.9%	32.3%
558950 – 558961 Intakeonderzoek / Examen d'admission	13 199 53.4%	13 850 54.3%	13 938 53.9%	14 003 53.7%	10 759 55.6%	65 749 54.1%	1 234 9.9%	1 169 9.5%	1 248 10.1%	1 222 10.3%	1 098 11.3%	5 971 10.2%
558810 – 558821 Multidisciplinaire revalidatiezitting met een minimumduur van 60 minuten / Séance de rééducation multidisciplinaire avec une durée de 60 minutes	657 2.7%	857 3.4%	1317 5.1%	1 662 6.4%	1 022 5.3%	5 515 4.5%	239 1.9%	255 2.1%	269 2.2%	272 2.3%	251 2.6%	1 286 2.2%
558014 – 558025 Multidisciplinaire revalidatiezitting met een minimumduur van 90 minuten / Séance de rééducation multidisciplinaire avec une durée de 90 minutes	17 019 68.8%	17 866 70.0%	17 904 69.2%	18 144 69.5%	13 026 67.4%	83 959 69.1%	971 <0.1%	950 <0.1%	979 <0.1%	997 <0.1%	756 <0.1%	4 653 <0.1%
558832 – 558843 Multidisciplinaire revalidatiezitting met een minimumduur van 120 minuten. / Séance de rééducation multidisciplinaire avec une durée de 120 minutes.	87 0.4%	94 0.4%	107 0.4%	77 0.3%	58 0.3%	423 0.3%	696 5.6%	697 5.7%	724 5.9%	618 5.2%	589 6.1%	3 324 5.7%
558795 – 558806 Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken de eerste 18 zittingen / Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques) - les 18 premières séances	3 931 15.9%	3 157 12.4%	3 305 12.8%	3 271 12.5%	2 044 10.6%	15 708 12.9%	2 417 19.4%	2 445 19.8%	2 293 18.6%	2 503 21.1%	2 098 21.6%	11 756 20.1%
558423 Revalidatie die behalve oefentherapie tenminste één extra techniek omvat per zitting / Rééducation qui, outre la gymnastique médicale comporte au moins une technique par séance	130 0.5%	118 0.5%	58 0.2%	30 0.1%	19 0.1%	355 0.3%	379 3.0%	438 3.6%	375 3.0%	417 3.5%	321 3.3%	1 930 3.3%



558434 – 558445 Revalidatie samen met ergotherapie na het beëindigen van een pluridisciplinaire revalidatie behandeling / Rééducation associée à de l'ergothérapie après la fin d'un traitement de rééducation pluridisciplinaire	7 <0.1%	8 <0.1%	7 <0.1%	9 <0.1%	7 <0.1%	38 <0.1%	15 0.1%	16 0.1%	23 0.2%	16 0.1%	14 0.1%	84 0.1%
558390 Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting - van de 19e tot 48e zitting inbegrepen / Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées - de la 19e à la 48e séance incluse	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	1 <0.1%	0 0%	0 0%	0 0%	0 0%	1 <0.1%

Table 45 – Full nomenclature code explanation Table 44

Full nomenclature code text

558950 - 558961 Intakeonderzoek met opmaak van het behandelingsdossier en van een gedetailleerd behandelingsplan in functie van de aandoening en aangepast aan de patiënt - **Examen d'admission au traitement** avec établissement du dossier de traitement et d'un plan de traitement détaillé en fonction de l'affection et adapté au patient

558810 – 558821 Multidisciplinaire revalidatiezitting met een minimumduur van **60 minuten** waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad. / **Séance de rééducation multidisciplinaire** avec une durée de **60 minutes** au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine

558014 – 558025 Multidisciplinaire revalidatiezitting met een minimumduur van **90 minuten** waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad. / **Séance de rééducation multidisciplinaire** avec une durée de **90 minutes** au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine

558832 – 558843 Multidisciplinaire revalidatiezitting met een minimumduur van **120 minuten** waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad. / **Séance de rééducation multidisciplinaire avec une durée de 120 minutes** au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou



kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine.

558795 – 558806 Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - de eerste **18 zittingen** / **Rééducation qui, outre la gymnastique médicale comporte au moins une** des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - les 18 premières séances

558423 Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthese / **Rééducation qui, outre la gymnastique médicale comporte au moins une** des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses

558434 – 558445 Revalidatie samen met ergotherapie na het beëindigen van een pluridisciplinaire revalidatie behandeling (558810 - 558821, 558014 - 558025, 558832 - 558843, 558994 -) voor een aandoening op de limitatieve lijst ter optimalisering en behoud van het bereikte resultaat / **Rééducation associée à de l'ergothérapie** après la fin d'un traitement de rééducation pluridisciplinaire (558810 - 558821, 558014 - 558025, 558832 - 558843, 558994 -) pour une affection de la liste limitative, en vue d'optimiser et de conserver le résultat obtenu

558390 Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - van de 19e tot 48e zitting inbegrepen - **Rééducation qui, outre la gymnastique médicale comporte au moins une** des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - de la 19e à la 48e séance incluse

Table 46 – Physiotherapy nomenclature (art. 22) for patients admitted for knee osteoarthritis (principal diagnosis): average number of sessions per stay, by hospitalisation type TCT data 2016-2020

Codes	Label	N stays	% stays	Quantity	Average quantity
Inpatient (N = 122 288 stays)					
(558950) – 558961	Intakeonderzoek - Examen d'admission	65 749	55.1%	66 207	1.0
(558810) - 558821	Multidisciplinaire revalidatiezitting met een minimumduur van 60 minuten / Séance de rééducation multidisciplinaire avec une durée de 60 minutes	5 515	4.6%	8 500	1.5
(558014) – 558025	Multidisciplinaire revalidatiezitting met een minimumduur van 90 minuten / Séance de rééducation multidisciplinaire avec une durée de 90 minutes	83 953	70.3%	446 075	5.3
(558832) - 558843	Multidisciplinaire revalidatiezitting met een minimumduur van 120 minuten. / Séance de rééducation multidisciplinaire avec une durée de 120 minutes.	423	0.4%	4 588	10.8



(558795) - 558806	Revalidatie die behalve oefentherapie tenminste één extra techniek de eerste 18 zittingen / Rééducation qui, outre la gymnastique médicale comporte au moins une extra technique - les 18 premières séances	15 540	13.0%	36518	2.4
558423	Revalidatie die behalve oefentherapie tenminste één extra techniek omvat per zitting / Rééducation qui, outre la gymnastique médicale comporte au moins une technique par séance	355	0.3%	1 577	4.4
(558434) - 558445	Revalidatie samen met ergotherapie na het beëindigen van een pluridisciplinaire revalidatie behandeling / Rééducation associée à de l'ergothérapie après la fin d'un traitement de rééducation pluridisciplinaire	38	<0.1%	534	14.1
Day care (N = 2 705 stays)					
558795 – (558806)	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - de eerste 18 zittingen / Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - les 18 premières séances	168	7.9%	168	1.0
558014 – (558025)	Multidisciplinaire revalidatiezitting met een minimumduur van 90 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad / Séance de rééducation multidisciplinaire avec une durée de 90 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscined	6	0.3%	6	1
558950 – (558961)	Intakeonderzoek met opmaak van het behandelingsdossier en van een gedetailleerd behandelingsplan in functie van de aandoening en aangepast aan de patiënt / Examen d'admission au traitement avec établissement du dossier de traitement et d'un plan de traitement détaillé en fonction de l'affection et adapté au patient	5	0.2%	5	1

Source: TCT data 2015-2020. *



Table 47 – MZG – RHM registration of anaesthesia in case of primary knee replacement (*): values and number of stays for patients admitted for knee osteoarthritis (principal diagnosis), TCT data 2016-2020

Code	Description	Number of stays (N=115 068)	Percentage (100%)
0	Anesthesie, maar methode onbekend / Anesthésie, mais méthode inconnue	182	0.2%
1	Geen anesthesie / Pas d'anesthésie	1 014	0.9%
2	Lokale anesthesie / Anesthésie locale	45	0.0%
3	Locoregionale anesthesie / Anesthésie locorégionale	1 064	0.9%
4	Algemene anesthesie / Anesthésie générale	57 467	49.9%
5	Rachi-anesthesie / Rachianesthésie	22 938	19.9%
6	Peridurale anesthesie / Péridurale	3 200	2.8%
7	Sedatie / Sédation	51	0.0%
8	Algemene + peridurale / Générale + péridurale	1 969	1.7%
9	Algemene + locoregionale / Générale + locorégionale	19 972	17.4%
A	Andere / Autre	7 142	6.2%
H	Hypnose / Hypnose	0	0.0%
P	Perifeer blok / Bloc périphérique	60	0.1%

(*) ICD-10-BE procedure code beginning with "0SRC" or "0SRD" (Knee joint replacement, Right or Left).



APPENDIX 2. DETAILS SEARCH QUALITY INDICATOR LITERATURE

Appendix 2.1. Medline search

Executed first on 6 September 2022, and updated last on 28 July 2023

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions <1946 to July 27, 2023>

Search Strategy:

-
- 1 exp Osteoarthritis/ (77433)
 - 2 osteoarthr\$.tw. (91593)
 - 3 (degenerative adj2 arthritis).tw. (1558)
 - 4 arthrosis.tw. (5677)
 - 5 1 or 2 or 3 or 4 (118951)
 - 6 exp Knee/ (16113)
 - 7 exp Knee Joint/ (72260)
 - 8 exp Hip/ (12571)
 - 9 exp Hip Joint/ (30049)
 - 10 hip\$.tw. (404610)
 - 11 knee\$.tw. (181137)
 - 12 exp Arthroplasty, Replacement/ (71195)
 - 13 exp Knee Prosthesis/ or exp Arthroplasty, Replacement, Knee/ or Arthroplasty, Replacement, Hip/ (65050)
 - 14 exp Hip Prosthesis/ (25617)
 - 15 6 or 7 or 8 or 9 or 10 or 11 (578695)
 - 16 12 or 13 or 14 (88781)
 - 17 Quality of Health Care/ (77517)

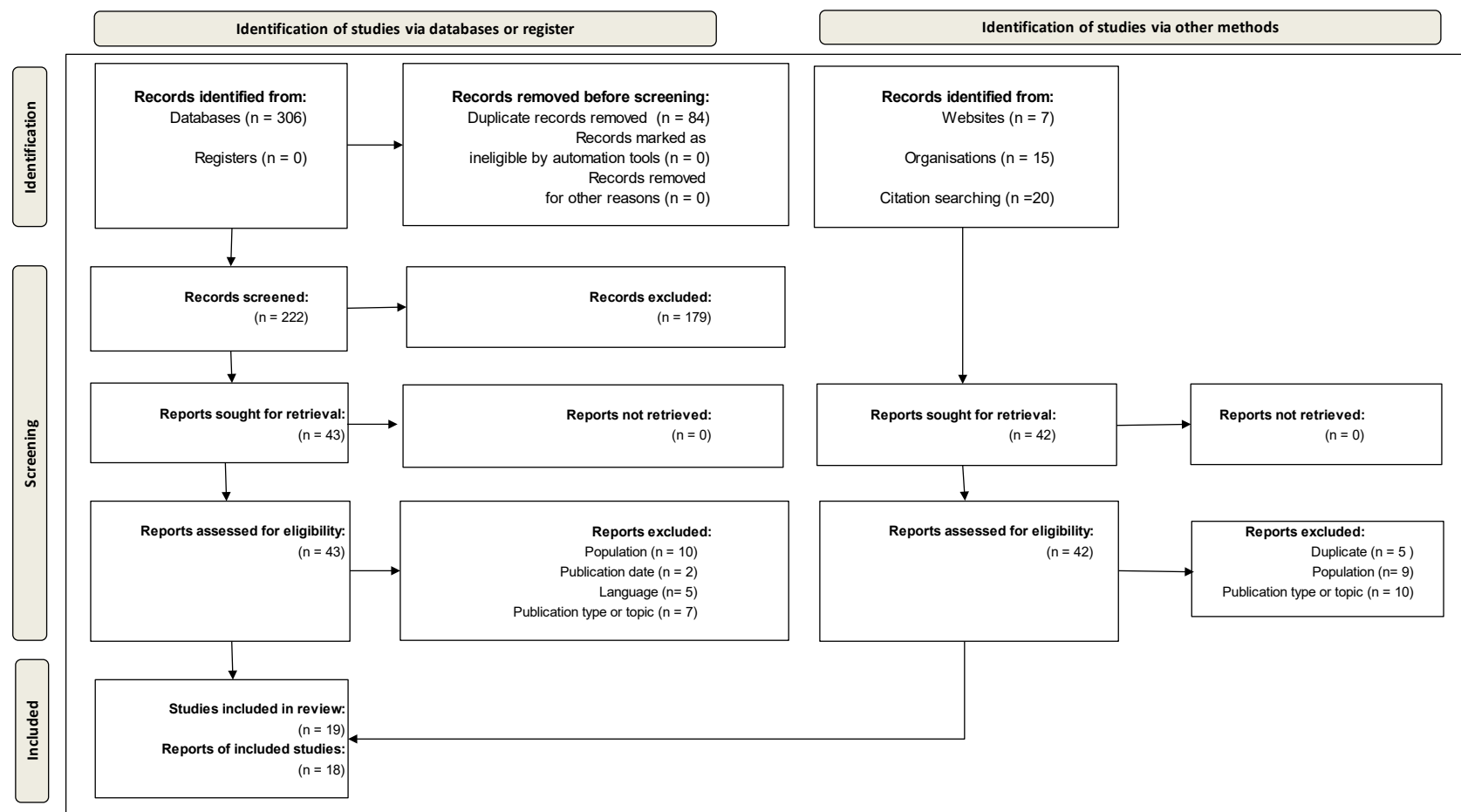


- 18 Patient Care Management/ (4744)
- 19 organization.mp. and administration/ (14709)
- 20 Quality Assurance, Health Care/ (56895)
- 21 Quality Indicators, Health Care/ (17403)
- 22 (quality adj5 (healthcare or (health adj5 care))).tw. (38663)
- 23 (quality adj3 indicator?).tw. (17150)
- 24 pattern\$ of care.mp. (3074)
- 25 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 (204747)
- 26 5 and 15 (62751)
- 27 5 and 16 (20591)
- 28 25 and 26 (218)**
- 29 25 and 27 (88)**



Appendix 2.2. PRISMA Flowchart

Figure 7 – PRISMA Flowchart





Appendix 2.3. Included peer-reviewed literature and reports for quality indicator/indicator identification

Table 48 – Included peer-reviewed publications or reports for quality indicator/indicator identification

Author or Agency	Publication Year	Reference
Peer-reviewed publications from Medline, manual reference searching or expert referral		
Arslan ²³	2021	Quality indicators for knee and hip osteoarthritis care: a systematic review. RMD Open. 2021;7(2).
Edwards ³⁶	2015	Quality indicators for the primary care of osteoarthritis: a systematic review. Ann Rheum Dis. 2015;74(3):490-8.
MacLean ³⁷	2007	Quality indicators for the care of osteoarthritis in vulnerable elders. J Am Geriatr Soc. 2007;55 Suppl 2:S383-91.
Wiedermann ³⁸	2023	Patient-Reported Quality of Care for Osteoarthritis in General Practice in South Tyrol, Italy: Protocol for Translation, Validation and Assessment of the OsteoArthritis Quality Indicator Questionnaire (OA-QI). Methods Protoc. 2023, 6, 28.
Grypdonck ²⁰	2014	Development of quality indicators for an integrated approach of knee osteoarthritis. J Rheumatol. 2014;41(6):1155-62.
		Also implemented in: Spitaels D, Hermens R, Van Assche D, Verschueren S, Luyten F, Vankrunkelsven P. Are physiotherapists adhering to quality indicators for the management of knee osteoarthritis? An observational study. Musculoskeletal Science and Practice. 2017;27:112-23. Spitaels D, Vankrunkelsven P, Grypdonck L, Duser FR, Aertgeerts B, Luyten FP, et al. Quality of Care for Knee Osteoarthritis in Primary Care: A Patient's Perspective. Arthritis Care Res. 2020;72(10):1358-66.
Spitaels ¹⁷	2017	Spitaels D, Hermens R, Van Assche D, Verschueren S, Luyten F, Vankrunkelsven P. Are physiotherapists adhering to quality indicators for the management of knee osteoarthritis? An observational study. Musculoskeletal Science and Practice. 2017;27:112-23.
Spitaels ¹⁶	2020	Spitaels D, Vankrunkelsven P, Grypdonck L, Duser FR, Aertgeerts B, Luyten FP, et al. Quality of Care for Knee Osteoarthritis in Primary Care: A Patient's Perspective. Arthritis Care Res. 2020;72(10):1358-66.
Peter ⁴⁰	2013	Quality indicators for physiotherapy care in hip and knee osteoarthritis: development and clinimetric properties. Musculoskeletal Care. 2013;11(4):193-202.
Peter ³⁹	2016	Healthcare Quality Indicators for Physiotherapy Management in Hip and Knee Osteoarthritis and Rheumatoid Arthritis: A Delphi Study. Musculoskeletal Care. 2016;14(4):219-32.
Osteras ⁴⁶ , updated publication ⁴⁷	2013	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.
		Also implemented in:



Author or Agency	Publication Year	Reference
		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 Services Research. 2014;14:598.
		Ingelsrud LH, Roos EM, Gromov K, Jensen SS, Troelsen A. Patients report inferior quality of care for knee osteoarthritis prior to assessment for knee replacement surgery - a cross-sectional study of 517 patients in Denmark. Acta Orthopaedica. 2020;91(1):82-7.
Westby ⁴¹	2018	Development of quality indicators for hip and knee arthroplasty rehabilitation. Osteoarthritis Cartilage. 2018;26(3):370-82.
Pencharz ⁴²	2004	Measuring quality in arthritis care: the Arthritis Foundation's Quality Indicator set for osteoarthritis. Arthritis Rheum. 2004;51(4):538-48.
Van Schie ⁴⁴	2022	A more comprehensive evaluation of quality of care after total hip and knee arthroplasty: combining 4 indicators in an ordered composite outcome. Acta Orthopaedica. 2022;93:138-45.
Rolfson ⁴³	2016	Defining an International Standard Set of Outcome Measures for Patients With Hip or Knee Osteoarthritis: Consensus of the International Consortium for Health Outcomes Measurement Hip and Knee Osteoarthritis Working Group. Arthritis Care Res (Hoboken). 2016;68(11):1631-9.
		Also available from: International Consortium for Health Outcomes Measurement. Hip & knee osteoarthritis data collection reference guide. 2022. Available from: https://www.ichom.org/portfolio/hip-knee-osteoarthritis/
Blackburn ⁴⁹	2016	Blackburn S, Higginbottom A, Taylor R, Bird J, Osteras N, Hagen KB, et al. Patient-reported quality indicators for osteoarthritis: a patient and public generated self-report measure for primary care. Res Involv Engagem. 2016;2:5.
Teo ⁴⁵	2020	Patient-reported quality indicators to evaluate physiotherapy care for hip and/or knee osteoarthritis- development and evaluation of the QUIPA tool. BMC Musculoskeletal Disorders. 2020;21(1):202.
Ingelsrud ⁵¹	2020	Patients report inferior quality of care for knee osteoarthritis prior to assessment for knee replacement surgery - a cross-sectional study of 517 patients in Denmark. Acta orthopaedica. 2020;91(1):82-7.
Gronhaug ⁵⁰	2014	Quality of hip and knee osteoarthritis management in primary health care in a Norwegian county: a cross-sectional survey. BMC Health Services Research. 2014;14:598.
Li ⁵²	2011	Quality of nonpharmacological care in the community for people with knee and hip osteoarthritis. J Rheumatol. 2011;38(10):2230-7.
Oomen ⁴⁸	2022	Quality of knee osteoarthritis care in the Netherlands: a survey on the perspective of people with osteoarthritis. BMC Health Services Research. 2022;22(1):631.
Jansen ⁵⁵	2010	Quality indicators indicate good adherence to the clinical practice guideline on "Osteoarthritis of the hip and knee" and few prognostic factors influence outcome indicators: a prospective cohort study. Eur J Phys Rehab Med. 2010;46(3):337-45.



Author or Agency	Publication Year	Reference
Smink ⁵⁶	2014	Non-surgical care in patients with hip or knee osteoarthritis is modestly consistent with a stepped care strategy after its implementation. <i>International Journal for Quality in Health Care</i> . 2014;26(4):490-8.
Van Schie ⁵⁷	2023	Effectiveness of a multifaceted quality improvement intervention to improve patient outcomes after total hip and knee arthroplasty: a registry nested cluster randomised controlled trial. <i>BMJ Qual Saf</i> . 2023;32(1):34-46.
Cai ⁵⁴	2012	Are African American patients more likely to receive a total knee arthroplasty in a low-quality hospital? <i>Clin Orthop Rel Res</i> . 2012;470(4):1185-93.
Gustavsson ⁵³	2023	No major difference in perceived quality of care in patients with hip or knee osteoarthritis assessed in a physical therapy-led triage compared with standard care: a randomized controlled trial. <i>BMC Musculoskelet Disord</i> . 2023 Jun 29;24(1):530. doi: 10.1186/s12891-023-06659-5. PMID: 37386368; PMCID: PMC10308718.
Reports other than clinical guidelines		
EUMusc.net	2008	EUMUSC.net. Musculoskeletal conditions health care quality indicators (WP6). We can only be sure to improve what we can actually measure? Health care quality indicators OA. [Web page].2008 [cited 13/04/2023]. Available from: http://eumusc.net/workpackages_wp6.cfm
Zorginstituut Nederland, the Netherlands	2022	Zorginstituut Nederland. Indicatorenset Knieprothese. Uitvraag ziekenhuizen/ZBC's over verslagjaar 2022. Versie, maart 2022. 2022. Available from: https://www.lroi.nl/downloads/228/indicatorenengids-knieprothese-tnp-verslagjaar-2022.pdf
For a healthy Belgium Belgian Health Care knowledge Centre, Belgium	2019	For a healthy Belgium. Health System Performance Assessment. Quality of healthcare. Safety of care. [Web page].2019. Available from: https://www.healthybelgium.be/en/health-system-performance-assessment/quality-of-care/security-of-care#QS-3 Devos Carl CA, Lefèvre Mélanie, Obyn Caroline, Renard Françoise, Bouckaert Nicolas, Gerkens Sophie, Maertens de Noordhout Charline, Devleeschauwer Brecht, Haelterman Margareta, Léonard Christian, Meeus Pascal,. Performance of the Belgian health system – Report 2019. 2019. Available from: https://kce.fgov.be/node/1783
Federal Government Public health (Pay for Performance (P4P) Program), Belgium	2022	Federale overheidsdienst. Volksgezondheid, veiligheid van de voedselketen en leefmilieu. Programma Pay for Performance (P4P) voor algemene ziekenhuizen [Web page].2022. Available from: https://www.health.belgium.be/nl/programma-pay-performance-p4p-voor-algemene-ziekenhuizen
National Institutes of Health, United States of America	2003	NIH Consensus Indicator on total knee replacement. NIH consensus and state-of-the-science indicators. 2003;20(1):1-34.
Agency for Health Care Quality and Research, AHRQ, United States of America	2022	Agency for Healthcare Research and Quality. Patient Safety Indicators Resources. [Web page].2022. Available from: https://qualityindicators.ahrq.gov/measures/psi_resources https://qualityindicators.ahrq.gov/Downloads/Modules/PSI/PSI_Composite_Development.pdf



Author or Agency	Publication Year	Reference
Belgian Health Care Knowledge Centre, Belgium	2017	Vlayen Joan BN, Robays Jo. Routine preoperative testing in adults undergoing elective non-cardiothoracic surgery. Good Clinical Practice (GCP). KCE Reports 280. . 2017. Available from: https://kce.fgov.be/en/publications/all-reports/routine-preoperative-testing-in-adults-undergoing-elective-non-cardiothoracic-surgery
Belgian Health Care Knowledge Centre, Belgium	2009	Vrijens France, De Gauquier Kristel, Cécile. C. The volume of surgical interventions and its impact on the outcome: feasibility study based on Belgian data. 2009. KCE Reports 113C Available from: https://kce.fgov.be/en/publications/all-reports/the-volume-of-surgical-interventions-and-its-impact-on-the-outcome-feasibility-study-based-on
National Institute for Public Health and the Environment, The Netherlands	2007	M.L.G. de Vos MK, W.C. Graafmans,. RIVM rapport 260101003/2007. Kwaliteitsindicatoren voor de orthopedie. Ontwikkeling en toepassing van een set indicatoren. 2007. Available from: https://rivm.openrepository.com/bitstream/handle/10029/16490/260101003.pdf;jsessionid=2517270654B128A1B975EDD0CDC65670?sequence=1
Haute Autorité de Santé, France	2021 (update 2022)	Haute Autorité de Santé. Indicateurs pour la mesure nationale des complications en chirurgie orthopédique [Web page].2021. Available from: https://www.has-sante.fr/jcms/p_3216705/fr/indicateurs-pour-la-mesure-nationale-des-complications-en-chirurgie-orthopedique



APPENDIX 3. AGREE INSTRUMENT

Table 49 – AGREE II instrument

Critical appraisal of clinical practice guidelines - AGREE II

Domain 1. Scope and Purpose

1. The overall objective(s) of the guideline is (are) specifically described.
2. The health question(s) covered by the guideline is (are) specifically described.
3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.

Domain 2. Stakeholder Involvement

4. The guideline development group includes individuals from all the relevant professional groups.
5. The views and preferences of the target population (patients, public, etc.) have been sought.
6. The target users of the guideline are clearly defined.

Domain 3. Rigour of Development

7. Systematic methods were used to search for evidence.
8. The criteria for selecting the evidence are clearly described.
9. The strengths and limitations of the body of evidence are clearly described.
10. The methods for formulating the recommendations are clearly described.
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.
12. There is an explicit link between the recommendations and the supporting evidence.
13. The guideline has been externally reviewed by experts prior to its publication.
14. A procedure for updating the guideline is provided.

Domain 4. Clarity of Presentation

15. The recommendations are specific and unambiguous.
16. The different options for management of the condition or health issue are clearly presented.
17. Key recommendations are easily identifiable.

Domain 5. Applicability

18. The guideline describes facilitators and barriers to its application.
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.

**Critical appraisal of clinical practice guidelines - AGREE II**

20. The potential resource implications of applying the recommendations have been considered.

21. The guideline presents monitoring and/ or auditing criteria.

Domain 6. Editorial Independence

22. The views of the funding body have not influenced the content of the guideline.

23. Competing interests of guideline development group members have been recorded and addressed.



APPENDIX 4. GUIDELINES RETRIEVED

Appendix 4.1. Retrieved guidelines for AGREE evaluation

Table 50 – Retrieved guidelines diagnosis and non-surgical management of knee osteoarthritis

Country/Organisation	Reference	Search limits	date
International / OARSI (Osteoarthritis Research Society International)	Bannuru et al. OARSI guidelines for the non-surgical management of knee, hip, and polyarticular osteoarthritis. Osteoarthritis and Cartilage, Volume 27, Issue 11, November 2019, Pages 1578-1589 OARSI guidelines for the non-surgical management of knee, hip, and polyarticular osteoarthritis - ScienceDirect	through 2018	July
Europe / ESCEO (European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases)	Bruyère et al. An updated algorithm recommendation for the management of knee osteoarthritis from the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO). Seminars in Arthritis and Rheumatism, Volume 49, Issue 3, December 2019, Pages 337-350. https://www.sciencedirect.com/science/article/pii/S0049017219300435	2014 through to September 30, 2018	
USA / American College of Rheumatology/Arthritis Foundation (ACR / AF)	Kolasinski et al. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. Arthritis Rheumatol. 2020 Feb;72(2):220-233. doi: 10.1002/art.41142. https://onlinelibrary.wiley.com/doi/10.1002/art.41142	through August 2018	
Europe / EULAR (European League Against Rheumatism)	Geenen et al. 2018 EULAR recommendations for the health professional's approach to pain management in inflammatory arthritis and osteoarthritis. Ann Rheum Dis 2018;77:797–807. doi:10.1136/annrheumdis-2017-212662 EULAR recommendations for the health professional's approach to pain management in inflammatory arthritis and osteoarthritis Annals of the Rheumatic Diseases (bmj.com)	2015	
Europe / EULAR (European League Against Rheumatism)	Uson et al. EULAR recommendations for intra-articular therapies. https://ard.bmj.com/content/80/10/1299 based on the systematic review by Rodriguez et al. Efficacy and safety of intra-articular therapies in rheumatic and musculoskeletal diseases: an overview of systematic reviews. Efficacy and safety of intra-articular therapies in rheumatic and musculoskeletal diseases: an overview of systematic reviews - PubMed (nih.gov)	July 2020	
UK / NICE (National Institute for Health and Care Excellence) and National Clinical Guideline Centre	Osteoarthritis in over 16s: diagnosis and management. https://www.nice.org.uk/guidance/ng226	October 2022	
US / AAOS (American Academy of Orthopedic Surgeons)	Clinical Practice Guideline on Management of Knee osteoarthritis (Non-Arthroplasty) (2021 3 rd Edition) https://www.aaos.org/quality/quality-programs/lower-extremity-programs/osteoarthritis-of-the-knee/	March 2019	
The Netherlands / KNGF (Koninklijk Nederlands Genootschap voor Fysiotherapie)	Kinesitherapeutische richtlijn artrose heup-knie 2018 revisie 2021 een leidraad voor de kinesitherapeut bij de behandeling van mensen met artrose van de heup en/of knie, inclusief de pre- en postoperatieve fase rondom een gewrichtsvervangende operatie.	2017	



Australia / RACGP (Royal Australian College of General Practitioners)	Guideline for the management of knee and hip osteoarthritis. 2nd edn. 2018. RACGP 2018 PDF and RACGP - Guideline for the management of knee and hip osteoarthritis	2005 - August 2017
Canada	The Ottawa panel clinical practice guidelines for the management of knee osteoarthritis. Part one: introduction, and mind-body exercise programs https://pubmed.ncbi.nlm.nih.gov/28183188/ Part two: strengthening exercise programs https://pubmed.ncbi.nlm.nih.gov/28183213/ Part three: aerobic exercise programs https://pubmed.ncbi.nlm.nih.gov/28183194/	May 2016

Table 51 – Retrieved guidelines surgical management of knee osteoarthritis

Country/Organisation	Reference	Search date limits
UK / NICE (National Institute for Health and Care Excellence) and National Clinical Guideline Centre	Joint replacement (primary): hip, knee and shoulder. 2020 https://www.nice.org.uk/guidance/ng157 The clinical areas covered are: • Information needs and shared decision-making. • Preoperative rehabilitation. • Anaesthesia. • Tranexamic acid to reduce blood loss. • Preventing infection through the use of wound irrigation and the type of operating room ventilation. • Reducing incorrect implant selection errors. • Aspects of surgery specific to hip, knee or shoulder joint replacement. • Inpatient and outpatient postoperative rehabilitation. • Long-term follow-up and surveillance.	2019
	Surgical site infections: prevention and treatment https://www.nice.org.uk/guidance/ng125 This guideline will be updated for evidence concerning whether oral antibiotics alone or a combination of oral antibiotics and mechanical bowel preparation should be provided to people undergoing colorectal surgery in order to reduce the incidence of surgical site infection.	2018
	Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism. https://www.nice.org.uk/guidance/ng89	2017
US / AAOS (American Academy of Orthopedic Surgeons)	Surgical management of Knee osteoarthritis 2022 Surgical Management of Knee osteoarthritis - Clinical Practice Guideline (CPG) American Academy of Orthopaedic Surgeons (aaos.org)	September 2021
The Netherlands / Federatie Medisch Specialisten Richtlijndatabase NL	Totale knieprothese https://richtlijndatabase.nl/richtlijn/totale_knieprothese/startpagina_-_totale_knieprothese_tkp.html This guideline specifies the indications for surgery.	?
Australia / RACGP (Royal Australian College of General Practitioners)	Guideline for the management of knee and hip osteoarthritis. 2nd edn. 2018. RACGP 2018 PDF and RACGP - Guideline for the management of knee and hip osteoarthritis Limited to arthroscopy referral by GPs.	2005 – August 2017
International / ERAS (Enhanced Recovery After Surgery)	Wainwright et al .2020 Society consensus guidelines for perioperative care in THA and TKA: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7006728/pdf/IORT_91_1683790.pdf Guidelines - ERAS® Society (erassociety.org)	October 2018



Appendix 4.2. Retrieved guidelines not considered for AGREE evaluation.

The following guidelines were considered out of date due to search strategies before 2015.

- Europe / EULAR (European League Against Rheumatism) Fernandes et al. EULAR recommendations for the non-pharmacological core management of hip and knee osteoarthritis. *Ann Rheum Dis* 2013;72:1125–1135. doi:10.1136/annrheumdis-2012-202745 <https://ard.bmj.com/content/annrheumdis/72/7/1125.full.pdf>
- Europe / EULAR (European League Against Rheumatism) Zhang et al. EULAR evidence-based recommendations for the diagnosis of knee osteoarthritis. *Ann Rheum Dis*. 2010 Mar;69(3):483-9. doi: 10.1136/ard.2009.113100. <https://ard.bmj.com/content/69/3/483.long>

The following guidelines were considered out of scope.

- Veteran affairs US. The nonsurgical management of knee and hip OA (v2 2020). <https://www.healthquality.va.gov/guidelines/cd/oa/index.asp> Mayo Clin Proc 2021 Sep;96(9):2435-2447. doi: 10.1016/j.mayocp.2021.03.017. This guideline focuses on rheumatoid arthritis.

- American College of Rheumatology/American Association of Hip and Knee Surgeons (ACR/AAHKS) guideline on perioperative management of antirheumatic medication in patients with rheumatic diseases undergoing elective total hip or total knee arthroplasty. The focus of this guideline is on rheumatic disease rather than osteoarthritis. [ACR/AAHKS 2022 Feb 24 PDF](#)
- Beaufils Ph et al. Surgical management of degenerative meniscus lesions: the 2016 ESSKA meniscus consensus. *Knee Surg Sports Traumatol Arthrosc*. 2017; 25(2): 335–346. <https://link.springer.com/article/10.1007/s00167-016-4407-4> The focus of this consensus document is on meniscus lesions.
- Europe / EULAR (European League Against Rheumatism) Sakellariou et al. EULAR recommendations for the use of imaging in the clinical management of peripheral joint osteoarthritis. *Ann Rheum Dis* 2017;76:1484–1494. doi:10.1136/annrheumdis-2016-210815 untitled (bmj.com). The following guideline's recommendations were not focused on the knee, covering all sites of osteoarthritis, and thus making extrapolations of the recommendations to the knee difficult. Instead, the recent NICE 2022 guideline reports on the use of imaging of the knee for osteoarthritis.



Appendix 4.3. Results AGREE evaluation

Table 52 – AGREE II scores

Country/ Organisation	Title	Standardised Score /100						Final Appraisal /10	Inclusion / exclusion
		Scope	Stakeholder involvement	Rigour of development	Clarity	Applicability	Editorial Independence		
Included guidelines									
USA / ACR - AF ⁷¹	American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. 2020	100	89	85	94	79	100	9.1	included
UK / NICE ⁵	Osteoarthritis in over 16s: diagnosis and management 2022	94	94	83	83	96	100	9.2	included
US / AAOS ⁷²	Clinical Practice Guideline on Management of Knee osteoarthritis (Non-Arthroplasty) (2021 3 rd Edition)	100	83	98	100	100	100	9.7	included
The Netherlands / KNGF ²²	Kinesitherapeutische richtlijn artrose heup-knie 2018 revision 2021	100	100	90	78	67	83	8.6	included
Australia / RACGP ⁶	Guideline for the management of knee and hip osteoarthritis. 2 nd edition. 2018.	100	83	85	94	75	100	9.0	included
UK / NICE ⁷³	Joint replacement (primary): hip, knee and shoulder. 2020	89	100	83	61	88	100	8.7	included
UK / NICE ⁷⁴	Surgical site infections: prevention and treatment. 2020	100	89	92	94	100	100	9.6	included
UK / NICE ⁷⁵	Venous thromboembolism in over 16s: reducing the risk of hospital- acquired deep vein thrombosis or pulmonary embolism. 2018	100	100	83	100	92	100	9.6	included



US / AAOS ⁷⁶	Surgical management of Knee osteoarthritis. 2022	100	83	98	100	100	100	9.7	included
International / ERAS ⁷⁷	2020 Society consensus guidelines for perioperative care in THA and TKA:	83	72	65	83	67	100	7.8	included
Excluded guidelines									
International / OARSI ⁷⁰	OARSI guidelines for the non-surgical management of knee, hip, and polyarticular osteoarthritis. 2019	89	61	63	100	33	92	7.3	excluded
Europe / ESCEO ⁶⁹	An updated algorithm recommendation for the management of knee osteoarthritis from the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases. 2019	78	50	85	94	71	67	7.4	excluded
Europe / EULAR ¹¹⁰	EULAR recommendations for the health professional's approach to pain management in inflammatory arthritis and osteoarthritis. 2018	94	67	73	78	46	67	7.1	excluded
Europe / EULAR ¹¹¹	EULAR recommendations for intra-articular therapies. 2021	72	83	73	50	58	83	7.0	excluded
Canada ¹¹²	The Ottawa panel clinical practice guidelines for the management of knee osteoarthritis.	94	61	69	78	21	100	7.0	excluded
The Netherlands / Federatie Medisch Specialisten ¹¹³	Totale knieprothese. 2021	72	78	58	44	33	58	5.7	excluded



APPENDIX 5. EXPERT CONSULTATION

Appendix 5.1. Document for written consultation

EXPERT CONSULTATION 'QUALITY OF KNEE OSTEOARTRITIS'

Introduction

You will find below the quality statements formulated based on either Recommendations or Indicators (indicated in the heading of the column) from the systematic literature search (details will be in the final report). The guidelines were selected for their quality as evaluated by AGREE. You find the references of the guidelines and indicator publications at the end of the document. Thank you for forwarding any other relevant publications that may have been missed out.

The quality statements are ordered under headings with sub-topics in line with a patient with knee osteoarthritis' care path.

First, please rate each quality statement according to how important you believe it is for the respective healthcare person to implement in managing people with knee osteoarthritis. You should assume that a patient is managed in an 'ideal situation' and constraints are not existing. Give a **priority score** on a **11-point scale**:

- 0 not a priority,
- 2 low priority,
- 4 somewhat priority,
- 5 neutral priority,
- 7 moderate priority,
- 9 high priority,
- 10 essential priority

Please answer 'no opinion' (NA) if you are unfamiliar with the topic.

Second, you can comment and give your opinion e.g. which are current constraints (political, financial, ethical, workload, tasks, local etc.) to reach this quality statement, why you agree or not, if you believe the importance would increase if the quality statement was reformulated and write a suggestion, or comment on any other aspect related to the topic. It is possible that a statement's priority differs by background of the health professional involved. The comments will give provide further insights and will be helpful in the discussion phase.

Finally, you can add suggestions for a different or new quality statement and comment on the importance or add any other remarks; both in the last section.

The following table is an Example with a fictitious score and comments from KCE:



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
4.1.1	Drug-based intervention: Medication	NICE 2022 ⁵	If pharmacological treatments are needed to manage osteoarthritis, use them: • alongside non-pharmacological treatments and to support therapeutic exercise, • at the lowest effective dose for the shortest possible time.		5	In my opinion, the highest effective dose should be used whenever medication is needed. I agree with the first part and would give that a 10.
9.3.2	Preoperative: Antibiotics	2019 P4P program ¹¹⁴		The percentage of hospital stays for total knee replacement during which antibiotics prophylaxis occurred according to antibiotics guidelines.	7	I agree with the first part of the statement, but we apply our own hospital guidance as the BABCOG guidance is not up to date.

Quality statements

A. Diagnosis, initial assessments, and follow-up

N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
1.1.1	Diagnosis	NICE 2022 ⁵ KNGF 2018 ²²	Diagnose osteoarthritis clinically without imaging in people who: • are 45 or over, and • have activity-related joint pain, and • have either no morning joint-related stiffness or morning stiffness that lasts no longer than 30 minutes.			
1.2.1	Assessment	Arsilan 2021 and others ²³ 115, 20, 39, 45, 47, 48, 50-52		Assess and document the effect of osteoarthritis at initial and follow-up consultations on the person's • function, • quality of life, • occupation, • mood, • relationships,		



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
					• and leisure activities and assess the person's • health education needs, • health beliefs, • and motivation to self-manage.		
1.3.1	Follow-up	NICE 2022 ⁵	Consider patient-initiated follow-up for most people with osteoarthritis, • unless their individual needs and preferences suggest follow-up should be planned, • advise to seek follow-up within an agreed follow-up time if the planned management is not working or patients have difficulties with agreed approaches.				

B. Information and advice patients and training professionals

N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
2.1.1	Info	NICE 2022 ⁵ AAOS 2021 ⁸¹ KNGF 2018 ²²	Adults with (knee) osteoarthritis are given information about their condition and its management at diagnosis and follow-up appointments. Information is • tailored to the individual needs (such as language and culture), • in an accessible format (oral, written, online,..), Information is delivered • in a way that enables the patient to participate actively,				



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
			• putting shared decision-making into practice, • providing an approach to care that takes account of multimorbidity.			
2.1.2		Arslan 2021 ²³ and other ^{23, 39, 40, 45, 47, 48, 50-52, 58}		The provided education and information topics include • pathology of osteoarthritis, • joint protection and the use of aids, • lifestyle and physical activity, • self-management strategies, • advice about body weight and joint pain, • work advice, • footwear advice, • treatment in general, • exercise core therapy, • medication with risks of medication use and screening for side effects, • resources and tools while waiting for an appointment.		
2.2.1	Diet	NICE 2022 ⁵ AAOS 2021 ⁸¹ RACGP 2018 ⁶	For a person with (knee) osteoarthritis who is living with overweight or obesity: • advise that weight loss will improve the quality of life and physical function, and reduce pain, • provide support to choose a weight loss goal, • explain that any amount of weight loss is likely to be beneficial but losing 10% of			



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
			body weight is likely to be better than 5%.				
2.3.1	Training	Eumusc.net ⁵ 8			All professionals managing patients at a primary healthcare centre should have continuous access to education on important preventive and therapeutic strategies in the management of osteoarthritis.		

C. Non-drug and non-operative based interventions

N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
3.1.1	Core treatment	NICE 2022 ⁵ AAOS 2021 ⁸¹ RACGP 2018 ⁶	The core treatment for knee osteoarthritis, regardless of age, structural disease severity, functional status or pain levels, to improve pain and function consists of a combination of (supervised) therapeutic exercise tailored to the patient's need (e.g. local muscle strengthening, general aerobic fitness), - self-management programs, - weight loss for people who are living with overweight.				
3.2.1	Exercise	Arsilan 2021 and other ²³ , 39, 40, 45, 47, 48, 50-52, 115			Prescribe and recommend a personalised exercise and a physical activity program according to - needs, - preferences, - self-motivation, - and ability to perform exercises. Exercises can be in the form of - strengthening exercises, - aerobic exercises,		



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
					- functional exercises, - walking exercises. Combine exercise therapy with education and self-management interventions.		
3.2.2		Ingelsrud 2020 ⁵¹			Assess the extent to which the physiotherapy treatment goals were achieved		
3.2.3		Arsilan 2021 ²³ and 39, 48, 50-52			Review the treatment frequency of physiotherapy		
3.2.4		ACR 2019 ⁷¹	Tai chi is strongly recommended for patients with knee osteoarthritis.				
3.3.1	Other treatment	ACR 2019 ⁷¹ NICE 2022 ⁵ AAOS 2021 ⁸¹	Cane use and tibiofemoral braces are recommended for patients with knee osteoarthritis in whom disease in 1 or both knees is causing a sufficiently large impact on ambulation, joint stability, or pain to warrant use of an assistive device.				
3.3.2		NICE 2022 ⁵ KNGF 2018 ²² ACR 2019 ⁷¹	Do not offer any of the following electrotherapy treatments to people with osteoarthritis because there is insufficient evidence of benefit: - transcutaneous electrical nerve stimulation (TENS); - ultrasound therapy; - interferential therapy; - laser therapy; - pulsed short-wave therapy; - neuromuscular electrical stimulation (NMES).				
3.3.3		NICE 2022 ⁵	Do not offer acupuncture or dry needling to manage osteoarthritis.				



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
3.3.4		AAOS 2021 ⁸¹	Lateral wedge insoles are not recommended for patients with knee osteoarthritis				
3.3.5		Arslan 2021 ²³			Do not prescribe interventions 'recommended against'.		

D. Drug-based interventions

N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
4.1.1	Medication	NICE 2022 ⁵	If pharmacological treatments are needed to manage osteoarthritis, use them: • alongside non-pharmacological treatments and to support therapeutic exercise, • at the lowest effective dose for the shortest possible time.				
4.1.2		NICE 2022 ⁵ AAOS 2021 ⁸¹ ACR 2019 ⁷¹	Offer a topical NSAID to people with knee osteoarthritis. If topical NSAIDs are ineffective or unsuitable, consider an oral NSAID taking account of: • potential gastrointestinal, renal, liver, and cardiovascular toxicity, • any risk factors the person may have, including age, pregnancy, current medication, and comorbidities, • offer a gastroprotective treatment.				
4.1.3		NICE 2021 ⁵ ACR 2019 ⁷¹	Consider intra-articular corticosteroid injections when other pharmacological treatments are				



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
		AAOS 2021 ⁸¹	ineffective or unsuitable, or to support therapeutic exercise. Explain to the person that these only provide short-term relief (2 to 10 weeks).			
4.1.4		NICE 2022 ⁵	Do not routinely offer paracetamol or weak opioids unless: - they are only used infrequently for short-term pain relief and - all other pharmacological treatments are contraindicated, not tolerated or ineffective.			
4.1.5		NICE 2022 ⁵ AAOS 2021 ⁸¹ ACR 2019 ⁷¹	Do not offer intra-articular hyaluronan injections to manage osteoarthritis.			
4.1.6		AAOS 2021 ⁸¹ NICE 2022 ⁵ RACGP 2018 ⁶	Do not offer oral narcotics (strong or weak opioids), including tramadol (weak opioid), as they result - in a significant increase of adverse events and - are not effective at improving pain or function for treatment of osteoarthritis of the knee.			
4.1.7		ACR 2019 ⁷¹ RACGP 2018 ⁶ NICE 2022 ⁵	The following medications are strongly recommended against in patients with knee osteoarthritis - glucosamine, - chondroitine sulfate, - combination products that include glucosamine and chondroitin sulfate, - bisphosphonates, - hydroxychloroquine,			



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
			• methotrexate, • platelet-rich plasma, • stem cell injections, • IL-1 inhibitors, • FGF (fibroblast growth factor) treatment, • doxycycline, • strontium ranelate.				
4.1.8		Arslan 2021 and other ²³ , 39, 47, 48, 50, 51, 58			'Number' of prescription of • first-line medication therapy, • steroid injection, • medication with a recommendation 'against' such as opioids Provision of information about risks of medication use and screening for side effects.		

E. Surgical non-replacement interventions

N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
5.1.1	Non replacement surgery	AAOS 2021 ⁸¹ NICE 2022 ⁵ RACGP 2018 ⁶	Arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis is not recommended.				
5.1.2		Arslan 2021 ²³			Number of arthroscopic interventions of the knee per hospital.		
5.1.3		AAOS 2021 ⁸¹	Free-floating (un-fixed) interpositional devices in patients with symptomatic medial compartment osteoarthritis of the knee are not recommended.				



F. Experience and utilisation of care

N°	Topic	Source	Quality statement	from	Quality statement from Indicator	Score	Comment
6.1.1	Experience	Arslan 2021 ²³			Evaluate healthcare providers' and patients' experiences and satisfaction with the provided healthcare.		
6.2.1	Utilisation of care	Rolfson 2016 ⁴³			Record the type of healthcare provider(s) consulted by the patient including • health educator/peer support group, • dietician, • physical therapist, • general practitioner, • rheumatologist, • orthopaedic surgeon, • alternative health practitioner, • or other.		

G. Referral interventions

N°	Topic	Source	Quality statement	from	Quality statement from Indicator(s)	Score	Comment
7.1.1	Joint replacement referral	NICE 2022 ⁵	Consider referring people with knee osteoarthritis for joint replacement if: • their joint symptoms (such as pain, stiffness, reduced function, or progressive joint deformity) are substantially impacting their quality of life, and • non-surgical management (for example, therapeutic exercise, weight loss, pain relief) offered for at least 3 months is ineffective or unsuitable. Adults with osteoarthritis are supported with non-surgical core treatments for at least 3 months				



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
			before any referral for consideration of joint surgery.			
7.1.2		NICE 2022 ⁵ AAOS 2022 ⁷⁶	Do not exclude people with osteoarthritis from referral for joint replacement because of: • age, • sex or gender, • smoking, • comorbidities, • overweight or obesity, based on measurements such as body mass index. Healthcare professionals do not use scoring tools to identify which adults with osteoarthritis are eligible for referral for consideration of joint surgery.			
7.2.1	Referral other	Teo ⁴⁵		Referral for depression		
7.2.2		Arslan 2021 ²³ and ^{45, 50-52, 82}		Referral for exercise therapy, and other programmes and activities for osteoarthritis		
7.2.3		Arslan 2021 ²³		Referral to a weight loss service		
7.2.4		Arslan 2021 ²³ and ^{48, 50, 51, 58}		Time from referral to first appointment to orthopaedic surgeon		
7.2.5		Arslan 2021 ²³		Referral for laboratory tests for patients with NSAID prescription for 6 months or longer		



H. Replacement surgery optimisation

N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
8.1.1	Education preop	Westby 2018 ⁴¹ NIPH Netherlands 2007 ¹¹⁶			Multidisciplinary preoperative education that uses appropriate delivery formats (in-person, video, telehealth, print), provides an opportunity for questions to be addressed, allows participation of a family member or other support and addresses (at a minimum): • Surgical procedure • Risks and benefits • Patient expectations • Pain management strategies • Home preparation • Assistive devices • Postoperative care and rehabilitation Should be documented preoperatively.		
8.2.1	Physical function	Westby 2018 ⁴¹			A health professional with training in musculoskeletal exam skills performs and documents a physical examination of the lower limbs and lumbo-pelvic region using standardised methods and including (at a minimum): • Gait pattern and use of walking aids • Standing posture and lower limb alignment • Bilateral passive & active knee and hip range of motion • Bilateral lower limb soft tissue flexibility/contractures • Bilateral lower limb strength • Static and dynamic balance		
8.2.2		Westby 2018 ⁴¹			A health professional with training in musculoskeletal exam skills assesses and documents the physical functioning • with a standardised self-report tool • AND a standardised performance-based test(s) with a minimum of		



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
					○ Fast or self-paced walk (walking speed) ○ 30-s Chair Stand Test ○ Stair Climb Test		
8.2.3		Westby 2018 ⁴¹ ERAS 2020 ⁷⁷			Initiate at least 8 weeks prior to surgery an individualised, structured, and progressive exercise program to allow a physiologic training effect (no effect on enhanced recovery) that includes at a minimum: • Upper extremity strength training (in preparation for use of walking aids and transfers) • Lower extremity functional strength training as tolerated • Lower extremity range of motion exercises • Gait training with instruction on use of walking aids • Guidance on remaining physically active		
8.3.1	Patient reported outcomes	I. Knieprothese NL 2022 ⁶⁵			Collect preoperative patient reported outcome measures (PROM) with validated health questionnaires.		
8.4.1	Comorbidities	Westby 2018 ⁴¹ AAOS 2022 ⁷⁶			Document type and severity of comorbidities including • cardiovascular disease • high blood pressure • chronic kidney disease • obesity (BMI ≥ 30 kg/m²) • lung disease • diabetes • malnutrition • back pain or other lower limb joint involvement/pain • anxiety and depression • opioid tolerance		



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
					cognitive impairment		
8.4.2		ERAS 2020 ⁷⁷	Preoperative anaemia should be identified, investigated, and corrected prior to knee replacement to <u>enhance recovery after surgery</u> .				
8.4.3		ERAS 2020 ⁷⁷	Four weeks or more smoking cessation is recommended before knee replacement for <u>enhanced recovery after surgery</u> .				
8.4.4		ERAS 2020 ⁷⁷	Alcohol cessation programs are recommended before knee replacement to <u>enhance recovery after surgery</u> .				
8.5.1	Social activity	Westby 2018 ⁴¹			Assessment of social participation including - care-giving activities, - paid/unpaid work, - leisure and sporting activities. Assessment of social functioning in a non-residential care setting including - support, - access to safe and efficient transportation (prior to and after surgery), - home safety and fall risk factors, - guidance on preparing the home environment to promote safety, accessibility, and independent day-to-day function, - need for assistive devices, equipment, and mobility aids.		



I. Preoperative

N°	Topic	Source	Quality statement from	Quality statement from Indicator(s)	Score	Comment
9.1.1	Preop lab	KCE report 280 2016 ⁶⁷	Routing tests to be performed in adults prior to elective total joint replacement: ASA Grade of patient 1 (Normal Health): • Offer full blood count tests • Offer kidney function tests ASA Grade 2 (Mild Systemic Disease), Grade 3 (Severe Systemic Disease), and grade 4 (Severe Systemic disease Constant Threat to Life): • Offer full blood count tests • Offer kidney function tests • Offer Resting ECG (in case of clinical risk factors according to cardiac risk index) • Consider Resting ECG (if older than 65 yrs old) • Consider urine culture • Consider haemostatis tests (in case of a chronic liver disease or a history of abnormal bleeding, spontaneous, or after trauma or surgery) • Consider non-invasive cardiac stress imaging Routine tests not recommended in adults prior to elective total knee replacement surgery: • resting echocardiography • cardiopulmonary exercise testing (CPET) • chest x-ray • polysomnography			



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
			• lung function tests (incl blood gas analysis) • glycated haemoglobin test • liver function test • coronary ct angiography			
9.2.1	Thrombosis	NICE 2018 ⁷⁵ ERAS 2020 ⁷⁷	Offer venous thromboembolism (VTE) prophylaxis undergoing elective knee replacement surgery • when the VTE risk outweighs the risk of bleeding • in accordance with local policy			
9.2.2		NICE 2018 ⁷⁵ ERAS 2020 ⁷⁷	For people who are at increased risk of VTE, give them and their family members or carers verbal and written information on the following before offering VTE prophylaxis: • the person's risks and possible consequences of VTE • the importance of VTE prophylaxis and its possible side effects – for example, pharmacological prophylaxis can increase bleeding risk • the correct use of VTE prophylaxis – for example, anti-embolism stockings, intermittent pneumatic compression • how people can reduce their risk of VTE (such as keeping well hydrated and, if possible, exercising and becoming more mobile). Ensure that people who need anti-embolism stockings have their legs measured and that they are provided with the correct size of stocking. Anti-embolism stockings should be fitted,			



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
			and patients shown how to use them by staff trained in their use.			
9.3.1	Antibiotics	NICE 2018 ⁷⁵ ERAS 2020 ⁷⁷	Patients should receive systemic antimicrobial prophylaxis in accordance with local policy and availability. Do not use wound irrigation to reduce the risk of surgical site infection.			
9.3.2		2019 P4P program ¹¹⁴		The percentage of hospital stays for total knee replacement during which antibiotics prophylaxis occurred according to antibiotics guidelines.		
9.4.1	Anaesthesia	AAOS 2022 ⁷⁶	The intake of clear fluids until 2 hours before the induction of anaesthesia, and a 6-hour fast for solid food is recommended.			
9.4.2		ERAS 2020 ⁷⁷ AAOS 2022 ⁷⁶	Standardised anaesthetic protocol - the routine administration of sedatives to reduce anxiety preoperatively is not recommended. - spinal opioids are not recommended for routine use because of the potential for adverse effects which delay recovery - epidural analgesia is not recommended for routine use in			
9.4.3		NICE 2020 ⁷⁴ AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	Offer a choice of: regional anaesthesia in combination with local infiltration analgesia (LIA) or general anaesthesia in combination with LIA			



N°	Topic	Source	Quality statement from Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
			add a peripheral nerve block provided it does not delay surgery significantly as it may delay early and safe mobilisation				
9.4.4		AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	Aim for optimisation of - perioperative glucose control (<126mg/dl) - postoperative nausea and vomiting - screening preop - give paracetamol prophylactically				
9.5.1	Tranexamic	NICE 2020 ⁷⁴ AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	For reduced postoperative blood loss, give if no renal impairment - intravenous tranexamic acid AND 1 g to 2 g of topical intra-articular tranexamic acid diluted in saline after the final wash-out and before wound closure AND - total combined dose of tranexamic acid does not exceed 3 g If renal impairment, give a reduced dose of intravenous tranexamic acid on its own				
9.6.1	Tourniquet	ERAS 2020 ⁷⁷ AAOS 2022 ⁷⁶	The routine use of a tourniquet is not recommended (no enhanced recovery after surgery, no difference in outcomes, function, pain, or blood transfusions).				



J. Intraoperative and operative in general

N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
10.1.1	General operation	NICE 2020 ⁷⁴ NIH 2003 ¹¹⁶	Use ultra-clean air ventilation in operating theatres for primary knee elective joint replacement.			
10.1.2		ERAS 2020 ⁷⁷	Normal body temperature should be maintained peri- and postoperatively through prewarming and the active warming of patients intraoperatively to <u>enhance recovery after surgery.</u>			
10.1.3		ERAS 2020 ⁷⁷	The routine use of urinary catheters is not recommended and does not <u>enhance recovery after surgery.</u>			
10.2.1	Surgical technique	AAOS 2022 ⁷⁶	Surgical technique aspects • cemented femoral and tibial components versus cementless femoral and tibial components, • cemented femoral and tibial components versus hybrid fixation (cementless femur), • navigation versus conventional techniques, • kinematic versus mechanical alignment principles • cruciate retaining versus posterior stabilised total knee arthroplasty designs do not influence functional outcomes, complications, pain, and reoperations.			



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
10.2.2		AAOS 2022 ⁷⁶	Patient specific technology (e.g., guides, cutting blocks) should not be used. There is no significant difference in patient outcomes, function, or pain as compared to conventional total knee arthroplasty. Additionally, it does not reduce operating time, blood loss, length of stay, and/or complications.			
10.2.3		ERAS 2020 ⁷⁷	Surgical technique i.e. • type of approach, • use of a minimally invasive technique, • prosthesis choice, • cemented or cementless, • or use of computer navigation or robot, does not influence <u>recovery after surgery and the time to discharge.</u>			
10.2.4		AAOS 2022 ⁷⁶ NICE 2020 ⁷³	Offer a choice of partial or total knee replacement to people with isolated medial compartmental osteoarthritis. Discuss the potential benefits and risks of each option with the person.			
10.2.5		AAOS 2022 ⁷⁶ NICE 2020 ⁷³	Both patellar resurfacing and non-patellar resurfacing in total knee arthroplasty is accepted.			
10.2.6		AAOS 2022 ⁷⁶ ERAS 2020 ⁷⁷	Drains should not be used with total knee arthroplasty because there is no significant difference in complications or outcomes.			



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
10.3.1	Care pathway	Westby 2018 ⁴¹			Use of a standardised clinical care pathway should be documented during the acute care stay.		
10.4.1	Hospital structure	Indicatorenset Knieprothese Nederland 2022 ⁶⁵			Volume per hospital • number total knee arthroplasties • number unilateral knee arthroplasties • number knee revisions caused by (suspicion of) infection • number knee revisions without (suspicion of) infection • revision of the fixed components within 3 years • number of surgeons performing knee arthroplasty • number of surgeons performing knee revisions		
10.4.2		I. Knieprothese NL 2022 ⁶⁵ NIPH NL 2007 ¹¹⁶ Arslan 2021 ^{23, 116}			Audit and data registration • completeness registration in the orthopaedic dataset (Netherlands) • operating room time • presence of intake and discharge protocol • average length of stay		
10.4.3		ERAS 2020 ⁷⁷	Routine internal and/or external audit of process measures, clinical outcomes, cost-effectiveness, patient satisfaction/experience, and changes to the pathway is recommended				

K. Postoperative



N°	Topic	Source	Quality statement from	Quality statement from Indicator(s)	Score	Comment
11.1.1	Medication postop	ERAS 2020 ⁷⁷	Multimodal analgesia for <u>enhanced recovery</u> - the routine use of paracetamol is recommended - the routine use of NSAIDS is recommended for patients without contraindications - gabapentinoids are not currently recommended as an adjunct in a multimodal analgesia regime to enhance recovery after surgery although further studies are indicated			
11.1.2		ERAS 2020 ⁷⁷	Postoperative intravenous fluid is discouraged in favour of early oral intake for <u>enhanced recovery</u> .			
11.2.1	Mobilise	NICE 2020 ⁷³ ERAS 2020 ⁷⁷ KNGF 2018 ²²	Patients should be mobilised as soon as possible post-surgery. A physiotherapist or occupational therapist should offer rehabilitation - on the day of surgery if possible and no more than 24 hours after knee replacement, advice on managing activities of daily living and home exercise programmes and mobilisation, AND - before the person leaves hospital, advice on self-directed rehabilitation meaning a clear understanding of their rehabilitation goals and the importance of doing the exercises prescribed to achieve these goals, and a point of contact for advice and support.			



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
11.2.2		Westby 2018 ⁴¹			When patient has NO medical contra-indications, start physiotherapist-supervised daily exercise therapy and document • mobilisation on postoperative day 1 • including (at a minimum): ○ active range of motion of lower limbs ○ isometric and small movement isotonic lower limb strengthening ○ bed mobility and transfer training ○ balance and gait training (level ground and on stairs if appropriate) • or the reason patient cannot be mobilised • If the patient can actively move the surgical knee THEN continuous passive motion should NOT be used This statement does not preclude a second session of exercise therapy supervised by a rehab assistant or other trained health professional.		
11.3.1	Discharge criteria	Westby 2018 ⁴¹			If there were no significant perioperative complications, THEN achievement of the following functional outcomes (at a minimum): • Transfer independently in/out of bed and on/off chair and toilet • Ambulate safely with an appropriate assistive device on level surfaces and stairs (if appropriate for home situation) • Perform basic activities of daily living independently using related equipment • Demonstrate independence in home exercise program These factors should be documented by the occupational therapist or physiotherapist prior to discharge to home from the acute care hospital.		



N°	Topic	Source	Quality statement from Recommendation(s)	Quality statement from Indicator(s)	Score	Comment
11.3.2		ERAS 2020 ⁷⁷	Objective discharge criteria should be used to facilitate patient discharge directly to their home.			
11.3.3		NIPH NL 2007 ¹¹⁶		Patient participation in the discharge trajectory.		
11.4.1	Complication	I. Knieprothese NL 2022 ⁶⁵		Percentage of deep postoperative wound infections within 90 days or within 365 days		
11.4.2		KCE report 313, 2019 ¹¹⁷		Incidence of postoperative pulmonary embolism or deep vein thrombosis, after knee replacement (/100 000 knee surgery discharges)		
11.4.3		NIPH NL 2007 ¹¹⁶ AHRQ 2022 ¹¹⁸ Rolfson US 2016 ⁴³		Number of patients with • decubitus • urine infection • postop respiratory failure • iatrogenic pneumothorax • postop sepsis • postop wound dehiscence • postop haemorrhage or haematoma • accidental puncture or laceration • postop metabolic derangements • death, all cause 30-day mortality • readmission, all cause 30-day		
11.4.4		NICE 2020 ⁷³	Primary care practitioners should refer people who develop new or worsening pain, limp or loss of function related to their joint replacement to an orthopaedic surgical service.			
11.5.1	Patient reported outcomes	I. Knieprothese NL 2022 ⁶⁵		Collect postoperative patient reported outcome measures (PROM) on the knee problem with validated health questionnaires • at 6 months AND		



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
		Westby 2018 ⁴¹			at 12 months and compare with the preop PROMs.		
11.5.2		2019 P4P program ¹¹⁴ Westby 2018 ⁴¹			Indicator of patient satisfaction with the hospital stay (C- beds) and day hospital care		
11.6.1	Rehabilitation	NICE 2020 ⁷³ KNGF 2018 ²²	Offer supervised group or individual outpatient rehabilitation to people who: - have difficulties managing activities of daily living or - have ongoing functional impairment leading to specific rehabilitation needs or - find that self-directed rehabilitation is not meeting their rehabilitation goals.				
11.6.2		Westby 2018 ⁴¹			Assess and document at baseline and prior to discharge from rehabilitation - the health-related quality of life (HRQoL) using a standardised tool, - the cognitive status when there are clinical indications of cognitive impairment, - surgical knee pain using a standardised tool. To return to work, assess social participation including - care-giving activities, - paid/unpaid work, - leisure and sporting activities. To resume a physically active lifestyle - assess the social functioning, - assess sedentary behaviour,		



N°	Topic	Source	Quality statement from Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
					• advice physical activity level for health benefit, • advice on available community-based physical activity or exercise programs appropriate for individuals with total knee arthroplasty, • advice on helpful resources (print, Internet, telephone support) and/or self-monitoring devices (pedometer, accelerometer) to support regular physical activity.		
11.7.1	Physical function postop	Westby 2018 ⁴¹			A health professional with training in musculoskeletal exam skills performs and documents a physical examination of the lower limbs and lumbo-pelvic region including (at a minimum): • Surgical knee effusion (knee circumference) • Muscle recruitment/voluntary activation of quadriceps • Gait pattern and use of walking aids • Standing posture and lower limb alignment • Bilateral passive & active knee and hip range of motion • Bilateral lower limb strength, soft tissue flexibility/contractures • Static and dynamic balance		
11.7.2		Westby 2018 ⁴¹			A health professional with training in musculoskeletal exam skills assesses and documents the physical functioning • with a standardised self-report tool • AND a standardised performance-based test(s) with a minimum of ◦ Fast or self-paced walk (walking speed)		



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
					○ 30-s Chair Stand Test ○ Stair Climb Test		
11.7.3		Westby 2018 ⁴¹ Arslan 2022 ^{23, 39}			The physiotherapist provides and documents (standardised approach e.g., class attendances, exercise log, online health journal) prior to discharge from post-acute rehabilitation • physiotherapy (including therapeutic exercise) that is individualised to the patient's functional needs, supervised, appropriately dosed, regularly progressed, at least 6 weeks in duration and monitored for adherence AND includes the following components (at a minimum): ○ Pain management strategies ○ Active knee range of motion exercise ○ Progressive resistance training for lower limb muscles ○ Static and dynamic balance training ○ Postural and core stability training ○ Gait training (including use of walking aids and differing walking surfaces) ○ Functional exercises (including stair climbing, rising/lowering to chair) ○ Provision of a home exercise program and education on how to progress exercises		
11.8.1	Document	Westby 2018 ⁴¹			Document (transfer form, discharge letter) that the event took place or was cancelled, declined or other for ○ follow-up appointment, ○ transfer of care to another rehabilitation provider or setting (e.g., transfer from acute care to outpatient care setting),		



N°	Topic	Source	Quality statement Recommendation(s)	from	Quality statement from Indicator(s)	Score	Comment
					o referral to another rehabilitation provider (e.g., referral to physiotherapy or occupational therapy)		

L. Suggestions other quality statements and remarks box

Quality statement	Comment
-------------------	---------

Remarks



Appendix 5.2. Document for discussion prioritisation meeting

high scoring - measurable or partially measurable

Diagnosis, initial assessments, and follow-up

None

Information and advice patients and training professionals

None

Non-drug and non-operative based interventions

None measurable.

Drug-based interventions

μ	Theme	Quality statement	Measurability	Definition
4.1.8	Drug-based intervention	'Number' of prescriptions of • first-line medication therapy, • steroid injection, • medication with a recommendation 'against' such as opioids.* Provision of information about risks of medication use and screening for side effects.	Probably measurable (without second part) on IMA data– Only operated patients can be identified on IMA data. Number of prescriptions should be replaced by number of patients with prescription per prescribing physician. Condition: first-line pharmaceuticals must be reimbursed to be identified. No information is available on provision of information.	Percentage of patients with knee replacement intervention (denominator) with opioids (ATC=N02A) , or steroid injection in the 36 weeks/months before their knee replacement intervention, per prescribing physician (IMA data)

DISCUSSION: The medications that we can identify are limited to the opioids and the steroid injections. We therefore propose to focus on the opioids which should preferably not be prescribed.

PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with a prescription for opioids (ATC=N02A) in the 36 months before their knee replacement intervention, per prescribing physician (IMA data).

QUESTION 1: do you agree with this proposal?

*There is overlap with the quality statement 4.1.6 (medium score measurable): Do not offer oral narcotics (strong or weak opioids), including tramadol (weak opioid), as they result in a significant increase of adverse events and are not effective at improving pain or function for treatment of osteoarthritis of the knee.



Surgical non-replacement interventions

ID	Theme	Quality statement	Measurability	Definition
5.1.1	Surgical non-replacement intervention	Arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis is not recommended.	Measurable on MZG – RHM or TCT data, or IMA data- Arthroscopy can be identified, therefore this is only measurable on population admitted with osteoarthritis as denominator (MZG – RHM or TCT data). Lavage and/or debridement should be translated into ICD-10-BE or nomenclature codes. See table below.	Percentage of patients hospitalised with a principal diagnosis of knee osteoarthritis (denominator) having an arthroscopy with lavage and/or debridement (identified by nomenclature of ICD-10-BE codes) during their hospitalisation, per hospital (TCT data).

DISCUSSION: The nomenclature codes are for diagnostic arthroscopy. No other codes were identified.

QUESTION 2: do you agree with this definition proposal?

Arthroscopy reimbursement codes ... (ID 5.1.1.)

Codes	Label in Dutch	Label in French	Creation date	Key letter	Fee	A 2021	Nb 2021	H 2021	Nb
300252 - 300263	Diagnostische arthroscopie met of zonder afname voor biopsie	Arthroscopie diagnostique avec ou sans prélèvement biopsique	1985-04-01	N 65	61.83		63		37
300274 - 300285	Diagnostische arthroscopie met gebruik van taster, inclusief de eventuele biopsie, het spoelen en de kleine manipulaties die geen deel uitmaken van de andere arthroscopische verstrekkingen	Arthroscopie diagnostique avec utilisation d'un palpeur, y compris la biopsie éventuelle, le rinçage et les petites manipulations non incluses dans les autres prestations arthroscopiques	1985-04-01	N 90	85.61		335		225

Arthroscopy ICD-10-BE codes : arthroscopy & debridement (ID 5.1.1.)

Section: 0 Medical and Surgical
Body System: S Lower Joints
Operation: J Inspection Visually and/or manually exploring a body part
Code Description: 0SJ Lower Joints, Inspection

Body Part	Approach	Device	Qualifier
☐ 0 Lumbar Vertebral Joint			
☐ 2 Lumbar Vertebral Disc			
☐ 3 Lumbosacral Joint			
☐ 4 Lumbosacral Disc			
☐ 5 Sacrococcygeal Joint			
☐ 6 Coccygeal Joint			
☐ 7 Sacroiliac Joint, Right			
☐ 8 Sacroiliac Joint, Left			
☐ 9 Hip Joint, Right			
☐ B Hip Joint, Left			
☒ C Knee Joint, Right	☐ 0 Open	☒ Z No Device	☒ Z No Qualifier
☒ D Knee Joint, Left	☐ 3 Percutaneous		
	☐ 4 Percutaneous Endoscopic		
	☐ X External		
☐ F Ankle Joint, Right			
☐ G Ankle Joint, Left			
☐ H Tarsal Joint, Right			
☐ J Tarsal Joint, Left			
☐ K Metatarsal-Tarsal Joint, Right			
☐ L Metatarsal-Tarsal Joint, Left			
☐ M Metatarsal-Phalangeal Joint, Right			
☐ N Metatarsal-Phalangeal Joint, Left			
☐ P Toe Phalangeal Joint, Right			
☐ Q Toe Phalangeal Joint, Left			

Section: 0 Medical and Surgical
Body System: S Lower Joints
Operation: B Excision Cutting out or off, without replacement, a portion of a body part
Code Description: 0SB Lower Joints, Excision

Body Part	Approach	Device	Qualifier
☐ 0 Lumbar Vertebral Joint			
☐ 2 Lumbar Vertebral Disc			
☐ 3 Lumbosacral Joint			
☐ 4 Lumbosacral Disc			
☐ 5 Sacrococcygeal Joint			
☐ 6 Coccygeal Joint			
☐ 7 Sacroiliac Joint, Right			
☐ 8 Sacroiliac Joint, Left			
☐ 9 Hip Joint, Right			
☐ B Hip Joint, Left			
☒ C Knee Joint, Right	☐ 0 Open	☒ Z No Device	☒ X Diagnostic
☒ D Knee Joint, Left	☐ 3 Percutaneous		☐ Z No Qualifier
	☐ 4 Percutaneous Endoscopic		
☐ F Ankle Joint, Right			
☐ G Ankle Joint, Left			
☐ H Tarsal Joint, Right			
☐ J Tarsal Joint, Left			
☐ K Tarsometatarsal Joint, Right			
☐ L Tarsometatarsal Joint, Left			
☐ M Metatarsal-Phalangeal Joint, Right			
☐ N Metatarsal-Phalangeal Joint, Left			
☐ P Toe Phalangeal Joint, Right			
☐ Q Toe Phalangeal Joint, Left			

+ 2 codes available for Lavage : 3E1U38X/Z Irrigation of joints using Irrigating substance, Percutaneous approach, Diagnostic / No qualifier



Experience and utilisation of care

None

Referral interventions

None

Optimisation

None

Preoperative

ID	Theme	Quality statement	Measurability	Definition
9.2.1	Preop	Offer venous thromboembolism (VTE) prophylaxis undergoing elective knee replacement surgery - when the VTE risk outweighs the risk of bleeding - in accordance with local policy	Medication for VTE prophylaxis measurable on TCT or IMA data Risks and benefits not measurable	Percentage of patients with knee replacement intervention (denominator) with at least one of listed pharmaceuticals (Apixaban, Dabigatran, Rivaroxaban, Enoxaparine, Nadroparine, calcium, Tinzaparine, natrium, Fondaparinux) given at the time of the knee replacement intervention, per prescribing physician (TCT (during hospitalisation) or IMA data (on the day of the intervention and the next days))

DISCUSSION: The use of prophylaxis might be hampered by two aspects: the absence of Belgian guidance and the reimbursement restrictions.

The Belgian Society on Thrombosis and Haemostasis (BSTH) will shortly discuss if guidance will be developed on this topic. They are currently working on an online tool for perioperative antithrombotic treatment and the topic could possibly be included. Aspects that may be clarified are the preference of DOAC versus LMWH, the place of aspirin, the duration of medication. The medication as presented by BCFI is summarised in the table below with the reimbursement criteria explained under the table.

QUESTION 3: would guidance improve an aligned prophylaxis uptake? Would a change in reimbursement criteria improve prophylaxis uptake?

Generic drug name	Type	Dose	Cost
Apixaban	DOAC	5 mg p.d. in 2 doses for 10-14 days	Eliquis® * 20x2.5mg=50.27€ (1 box needed for 10 days) Remgeld 12.10€ (7.53€ verhoogde tegemoetkoming)
Dabigatran	DOAC	- normal dose: 220 mg p.d. in 1 dose for 10 days - reduced dose: 150 mg p.d. in 1 dose: if ≥75 years, moderate renal impairment or concomitant use of amiodarone or verapamil	Pradaxa®** 10x75mg=15.7€ (2 boxes needed for 10 days) Remgeld 3.65€ (2.19€) Reimbursed only for 75+ years and max 10 days
Rivaroxaban	DOAC	10 mg daily in one dose for 2 weeks	Xarelto®*** 10x10mg=34.12€ (1 box for 10 days)



Remgeld 8.87€ (5.28€) max 1 box			
Enoxaparine	LMWH	Dosage for prevention DVT: ^a 2.000 IE anti-Xa p.d. in 1 injectie; bij hoog risico: 4.000 IE anti-Xa p.d. in 1 injectie	Clexane® 10x2000IE=23.67€; (remgeld 6.41 (4.82)) 10x4000IE=38.82€ (remgeld 9.98 (5.93)) Enoxaparine Becat® 10x2000IE=21.02€ (remgeld 5.44 (3.26)) 10x4000IE=34.06 (remgeld 8.86€ (5.27€)) Ghemaxan® 10x2000IE=21.02€ (remgeld 5.44€ (3.26€)) 10x4000IE=34.06€ (remgeld 8.86€ (5.27€))
Nadroparine, calcium	LMWH	Dosage for prevention DVT: ^a 2.850 IE anti-Xa p.d. in 1 injectie; bij hoog risico tot max. 5.700 IE anti-Xa p.d. in 1 injectie (i.f.v. lichaamsgewicht, zie SKP)	Fraxiparine® 10x2850IE=27.53€ (remgeld 7.32€ (4.35€)) 10x5700IE=43.48€ (remgeld 11.08€ (6.58€))
Tinzaparine, natrium	LMWH	Dosage for prevention DVT: ^a 3.500 IE anti-Xa p.d. in 1 injectie; bij hoog risico: 4.500 IE anti-Xa p.d. in 1 injectie	Innohep® 10x3500IE=29.89€ (remgeld 7.87€ (4.68€)) 10x4500IE=38.16€ (remgeld 9.82€ (5.84€))
Fondaparinux	inhibitor van factor Xa.	Dosage for prevention DVT in low-risk patient: 2,5 mg p.d. in 1 injection iv or sc	Arixtra® 10x2.5mg=51.41€ (remgeld 12.10€ (7.69€))

^a The dose given with each product is that for the treatment of deep venous thrombosis and pulmonary embolism, and for the prevention of venous thromboembolism in low-risk patients. In pronounced risk of venous thromboembolism, the dose is higher. There is no consensus whether in surgical procedures the first dose should be administered before or after surgery. [BCFI | Parenterale anticoagulantia](#)

*[BCFI | Terugbetaling](#) : primaire preventie veneuze trombo-embolische aandoeningen na heup- of knie vervangende operatie

a) De volgende specialiteit wordt vergoed als ze toegediend is met een dosis van 5 mg per dag, ingenomen als 2 maal een tablet van 2,5 mg, voor de primaire preventie van veneuze trombo-embolische aandoeningen bij volwassen patiënten die een geprogrammeerde -heupvervangende operatie ondergaan,-knievervangende operatie ondergaan.

b) De terugbetaling is beperkt tot een periode van maximum 38 dagen aansluitend op de heupvervangende operatie en van maximum 14 dagen aansluitend op de knievervangende operatie.

c) De machtiging tot vergoeding zal worden afgeleverd door de adviserend geneesheer op basis van een aanvraagformulier, waarvan het model is hernomen in

bijlage A van deze paragraaf, en waarop de geneesheer attesteert dat de betrokken patiënt zich op het moment van de aanvraag in de hierboven vermelde situatie bevindt .

d) Op basis van dit aanvraagformulier vervolledigd volgens de voorwaarden hierboven gestipuleerd, reikt de adviserend geneesheer aan de rechthebbende de machtiging uit waarvan het model is vastgesteld onder "e" van bijlage III van dit besluit, waarvan het aantal terugbetaalbare verpakkingen bepaald wordt in functie van de operatie, en waarvan de geldigheidsduur beperkt is rekening houdend met de bepalingen van het punt b).

** [BCFI | Terugbetaling](#) preventie VTE (150 mg) 75+ years

a) De specialiteit wordt vergoed als ze toegediend is aan een dosis van 150 mg per dag, ingenomen als 2 capsules van 75 mg, voor de primaire preventie van veneuze trombo-embolische aandoeningen bij volwassen patiënten die een geprogrammeerde -heupvervangende operatie hebben ondergaan,-knievervangende operatie hebben ondergaan.



De rechthebbende voldoet aan een van de vier volgende criteria : -- ouder dan 75 jaar; -- lijdend aan matige nierinsufficiëntie; -- behandeld met amiodarone; -- behandeld met verapamil.

b) De terugbetaling is beperkt tot een periode van maximum 35 dagen aansluitend op de heupvervangende operatie en van maximum 10 dagen aansluitend op de knieervangende operatie.

c) De machtiging tot vergoeding zal worden afgeleverd door de adviserend geneesheer op basis van een aanvraagformulier, waarvan het model is hernomen in bijlage A van deze paragraaf, en waarop de geneesheer attesteert dat de betrokken patiënt zich op het moment van de aanvraag in de hierboven vermelde situatie bevindt.

d) Op basis van dit aanvraagformulier vervolledigd volgens de voorwaarden hierboven gestipuleerd, reikt de adviserend geneesheer aan de rechthebbende de machtiging uit waarvan het model is vastgesteld onder "e" van bijlage III van dit besluit, waarvan het aantal terugbetaalbare verpakkingen bepaald wordt in functie van de operatie, en waarvan de geldigheidsduur beperkt is rekening houdend met de bepalingen van het punt b).

A a) De specialiteit wordt vergoed als ze toegediend is met een dosis van 10 mg per dag, voor de postoperatieve preventie van veneuze trombo-embolie (VTE) bij volwassen patiënten die -electief een heupvervangende operatie hebben ondergaan, -electief een knieervangende operatie hebben ondergaan.

b) De terugbetaling is beperkt tot een periode van maximum 5 weken aansluitend op de electieve heupvervangende operatie en van maximum 2 weken aansluitend op de electieve knieervangende operatie.

c) De machtiging tot vergoeding zal worden afgeleverd door de adviserend geneesheer op basis van een aanvraagformulier, waarvan het model is hernomen in bijlage A van deze paragraaf, en waarop de geneesheer attesteert dat de betrokken patiënt zich op het moment van de aanvraag in de hierboven vermelde situatie bevindt.

d) Op basis van dit aanvraagformulier vervolledigd volgens de voorwaarden hierboven gestipuleerd, reikt de adviserend geneesheer aan de rechthebbende de machtiging uit waarvan het model is vastgesteld onder "e" van bijlage III van dit besluit, waarvan het aantal terugbetaalde verpakkingen bepaald wordt in functie van de operatie, en waarvan de geldigheidsduur beperkt is rekening houdend met de bepalingen van punt b).

*** [BCFI | Terugbetaling](#) preventie VTE

ID	Theme	Quality statement	Measurability	Definition
9.4.2	Preop	Standardised anaesthetic protocol - the routine administration of sedatives to reduce anxiety preoperatively is not recommended. - spinal opioids are not recommended for routine use because of the potential for adverse effects which delay recovery - epidural analgesia is not recommended for routine use	Probably measurable on TCT data Warning from expert on the validity of anesthesia information recorded in MZG – RHM data. See table below.	Percentage of patients with knee replacement intervention (denominator) with (a) reimbursed sedative(s) on the day of the intervention (pharmaceuticals to be defined) per hospital, or (b) spinal opioid's injection (pharmaceuticals to be defined) per hospital, or (c) epidural analgesia as recorded in MZG - RHM (TCT data – a) and b) also measurable on IMA data when reimbursed)
9.4.3	Preop	"Offer a choice of: regional anaesthesia in combination with local infiltration analgesia (LIA) or general anaesthesia in combination with LIA	Probably measurable on TCT data Anesthesia information recorded in MZG – RHM data is shown below in the table.	



-
- add a peripheral nerve block provided it does not delay surgery significantly as it may delay early and safe mobilisation"
-

DISCUSSION: Are the sedatives for anxiety used preop?

PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with a reimbursed sedative on the day of the intervention (pharmaceuticals to be defined) per hospital

QUESTION 4: Which sedatives are used for anxiety preop?

DISCUSSION: The descriptions used in the MZG-RHM codes are not fitting with the recommendations for an anaesthetic protocol.

PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with (a) spinal opioid's injection (pharmaceuticals to be defined) per hospital, or (b) epidural analgesia as recorded in MZG - RHM (TCT data – (a) also measurable on IMA data when reimbursed)

QUESTION 5: Would a change of the descriptions in the MZG-RHM (the data would then become more reliable) help to improve the registration?



Anesthesia for Knee replacement in coded in MZG-RHM (2016-2020) (9.4.2. & 9.4.3.)

CODE	OMSCHRIJVING	DESCRIPTION	M2_CODE_ANEST			
			Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	Anesthesie, maar methode onbekend	Anesthésie, mais méthode inconnue	186	0.16	186	0.16
1	Geen anesthesie	Pas d'anesthésie	1023	0.88	1209	1.04
2	Lokale anesthesie	Anesthésie locale	46	0.04	1255	1.08
3	Locoregionale anesthesie	Anesthésie locorégionale	1071	0.92	2326	2.00
4	Algemene anesthesie	Anesthésie générale	58208	50.04	60534	52.04
5	Rachi-anesthesie	Rachianesthésie	23017	19.79	83551	71.82
6	Peridurale anesthesie	Péridurale	3273	2.81	86824	74.64
7	Sedatie	Sédation	51	0.04	86875	74.68
8	Algemene + peridurale	Générale + péridurale	1998	1.72	88873	76.40
9	Algemene + locoregionale	Générale + locorégionale	20091	17.27	108964	93.67
A	Andere	Autre	7302	6.28	116266	99.95
H	Hypnose	Hypnose				
P	Perifeer blok	Bloc périphérique	60	0.05	116326	100.00

All MZG – RHM records with a KNEE JOINT REPLACEMENT procedure beginning with ("0SRC", "0SRD") of patients admitted for osteoarthritis (principal diagnosis)

9.4.4a	Preop	Aim for optimisation of perioperative glucose control (<126mg/dl)	Partially measurable on TCT or IMA data - Perioperative glucose 'measurement' is identifiable but if action was undertaken is more difficult to verify.	Percentage of patients with knee replacement intervention (denominator) with glucose control (nomenclature code to defined) on day of operation and after their knee replacement intervention, per hospital (TCT or IMA data)
--------	-------	---	---	---

DISCUSSION: The quality statement was divided into two sections (see a and b). The action of taking a sample for glucose can be followed-up in the data. To verify if action was undertaken is more difficult.

QUESTION 6: Is it sufficient for quality that a sample for glucose measurement was taken? Have hospitals a standard operating procedure to follow glucose postop?



9.4.4b	Preop	Aim for optimisation of	Not measurable: Paracetamol not reimbursed outside chronic pain.	NA
		• postoperative nausea and vomiting		
		○ screening preop		
		○ give paracetamol prophylactically		

DISCUSSION: Paracetamol currently has no indication for postoperative vomiting.

QUESTION 7: Is paracetamol currently been used for this indication? Would it be given intravenously during the operation? Should the indication be added by BCFI?

Intraoperative and operative in general

ID	Theme	Quality statement	Measurability	Definition
10.1.3	Intraoperative	The routine use of urinary catheters is not recommended and does not <u>enhance recovery after surgery</u> .	Measurable on MZG –RHM – Urinary catheters are identifiable in ICD-10-BE but may be undercoded	Percentage of patients with knee replacement intervention (denominator) with ICD-10-BE urinary catheterisation code (0T9B00Z, 0T9B30Z, 0T9C00Z, 0T9C30Z) on the day of the knee replacement intervention, per hospital (MZG - RHM)

QUESTION 8: do you agree with the definition?



Urinary catheterization ICD-10-BE codes (ID 10.1.3.)

Section	0 Medical and Surgical ▼		
Body System	T Urinary System ▼		
Operation	9 Drainage ▼ Taking or letting out fluids and/or gases from a body part		
Code Description 0T9 Urinary System, Drainage			
Body Part	Clear	Approach	Clear
☐ 0 Kidney, Right ☐ 1 Kidney, Left ☐ 3 Kidney Pelvis, Right ☐ 4 Kidney Pelvis, Left ☐ 6 Ureter, Right ☐ 7 Ureter, Left ☐ 8 Ureters, Bilateral ☒ B Bladder ☐ C Bladder Neck ☐ D Urethra		☐ 0 Open ☐ 3 Percutaneous ☐ 4 Percutaneous Endoscopic ☐ 7 Via Natural or Artificial Opening ☐ 8 Via Natural or Artificial Opening Endoscopic ☐ X External	☐ 0 Drainage Device ☐ Z No Device
			☐ X Diagnostic ☐ Z No Qualifier

10.2.5	Intraoperative	Both patellar resurfacing and non-patellar resurfacing in total knee arthroplasty is accepted	Resurfacing can be measured with (ICD-10-BE codes, see table below) (TCT or IMA data) but measuring this will not tell anything.	Percentage of patients with knee replacement intervention (denominator) with a resurfacing code (ICD-10-BE) (TCT or IMA data)
---------------	----------------	---	--	--

DISCUSSION: From the comments we received we learned that patellar resurfacing and/or non-patellar resurfacing should be performed during the primary total knee arthroplasty intervention. Therefore, it is NOT necessary to perform a second intervention for resurfacing (patellar or other). We therefore propose to change the quality statement with a new proposal for definition (see below).

PROPOSAL DEFINITION QI: Percentage of patients with a primary knee replacement intervention (denominator) with a second operation of resurfacing (ICD-10-BE) (TCT or IMA data)

QUESTION 9: do you agree with this new quality indicator (statement) proposal?



Resurfacing ICD-10-BE codes (ID 10.2.5.)

Section 0 Medical and Surgical			
Body System S Lower Joints			
Operation U Supplement Putting in or on biological or synthetic material that physically reinforces and/or augments the function of a portion of a body part			
Code Description 0SU Lower Joints, Supplement			
Body Part Clear	Approach Clear	Device Clear	Qualifier Clear
☐ 0 Lumbar Vertebral Joint ☐ 2 Lumbar Vertebral Disc ☐ 3 Lumbosacral Joint ☐ 4 Lumbosacral Disc ☐ 5 Sacrococcygeal Joint ☐ 6 Coccygeal Joint ☐ 7 Sacroiliac Joint, Right ☐ 8 Sacroiliac Joint, Left ☐ 9 Hip Joint, Right ☐ A Hip Joint, Acetabular Surface, Right ☐ B Hip Joint, Left ☐ C Knee Joint, Right ☐ D Knee Joint, Left ☐ E Hip Joint, Acetabular Surface, Left ☐ F Ankle Joint, Right ☐ G Ankle Joint, Left ☐ H Tarsal Joint, Right ☐ J Tarsal Joint, Left ☐ K Tarsometatarsal Joint, Right ☐ L Tarsometatarsal Joint, Left ☐ M Metatarsal-Phalangeal Joint, Right ☐ N Metatarsal-Phalangeal Joint, Left ☐ P Toe Phalangeal Joint, Right ☐ Q Toe Phalangeal Joint, Left ☐ R Hip Joint, Femoral Surface, Right ☐ S Hip Joint, Femoral Surface, Left ☐ T Knee Joint, Femoral Surface, Right ☐ U Knee Joint, Femoral Surface, Left ☐ V Knee Joint, Tibial Surface, Right ☐ W Knee Joint, Tibial Surface, Left	☐ 0 Open ☐ 3 Percutaneous ☐ 4 Percutaneous Endoscopic	☐ 7 Autologous Tissue Substitute ☐ 9 Liner ☐ B Resurfacing Device ☐ J Synthetic Substitute ☐ K Nonautologous Tissue Substitute	☐ C Patellar Surface ☐ Z No Qualifier



Postoperative

ID	Theme	Quality statement	Measurability	Definition
11.2.1	Postoperative	Patients should be mobilised as soon as possible post-surgery. A physiotherapist or occupational therapist should offer rehabilitation - on the day of surgery if possible and no more than 24 hours after knee replacement, advice on managing activities of daily living and home exercise programmes and mobilisation, AND - before the person leaves hospital, advice on self-directed rehabilitation meaning a clear understanding of their rehabilitation goals and the importance of doing the exercises prescribed to achieve these goals, and a point of contact for advice and support.	Probably not measurable (second part not measurable) - This should be available in the electronic medical file.	NA
11.2.2	Postoperative	When patient has NO medical contra-indications, start physiotherapist-supervised daily exercise therapy and document - mobilisation on postoperative day 1 - including (at a minimum): - active range of motion of lower limbs - isometric and small movement isotonic lower limb strengthening - bed mobility and transfer training - balance and gait training (level ground and on stairs if appropriate) - or the reason patient cannot be mobilised - If the patient can actively move the surgical knee THEN continuous passive motion should NOT be used This statement does not preclude a second session of exercise therapy supervised by a rehab assistant or other trained health professional.	Probably not measurable as such – Medical contraindications not documented. + document? Measure of daily physiotherapy possible? Measurable if the indicator is modified – date of start of physiotherapy available in TCT data or IMA data	NA

PROPOSAL NEW 11.2.1a: Start physiotherapist-supervised exercise therapy on day 1 or day 2

PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with ICD-10-BE F07etc... or art.22 nomenclature codes (to be defined; see also the table with generic codes in paragraph 2.3) on the day of the knee replacement or the day after (D1 or D2), per hospital (TCT data)

QUESTION 10: do you agree with this new quality indicator (statement) proposal?



Inhospital Mobilisation, exercises, ... ICD-10-BE codes ((ID 11.2.1. , 11.2.2. and 11.7.3.)

Section				F Physical Rehabilitation and Diagnostic Audiology ▼			
Section Qualifier				0 Rehabilitation ▼			
Type				7 Motor Treatment ▼ Exercise or activities to increase or facilitate motor function			
Code Description F07 Physical Rehabilitation and Diagnostic Audiology, Rehabilitation, Motor Treatment							
Body System / Region		Clear		Type Qualifier		Clear	
☐ 0 Neurological System - Head and Neck ☐ 1 Neurological System - Upper Back / Upper Extremity ☐ 2 Neurological System - Lower Back / Lower Extremity ☐ 3 Neurological System - Whole Body ☐ 4 Circulatory System - Head and Neck ☐ 5 Circulatory System - Upper Back / Upper Extremity ☐ 6 Circulatory System - Lower Back / Lower Extremity ☐ 7 Circulatory System - Whole Body ☐ 8 Respiratory System - Head and Neck ☐ 9 Respiratory System - Upper Back / Upper Extremity ☐ B Respiratory System - Lower Back / Lower Extremity ☐ C Respiratory System - Whole Body ☐ D Integumentary System - Head and Neck ☐ F Integumentary System - Upper Back / Upper Extremity ☐ G Integumentary System - Lower Back / Lower Extremity ☐ H Integumentary System - Whole Body ☐ J Musculoskeletal System - Head and Neck ☐ K Musculoskeletal System - Upper Back / Upper Extremity ☒ L Musculoskeletal System - Lower Back / Lower Extremity ☐ M Musculoskeletal System - Whole Body ☐ N Genitourinary System ☐ Z None				☐ 0 Range of Motion and Joint Mobility ☐ 1 Muscle Performance ☐ 2 Coordination/Dexterity ☐ 3 Motor Function ☐ 4 Wheelchair Mobility ☐ 5 Bed Mobility ☐ 6 Therapeutic Exercise ☐ 7 Manual Therapy Techniques ☐ 8 Transfer Training ☐ 9 Gait Training/Functional Ambulation		☐ B Physical Agents ☐ C Mechanical ☐ D Electrotherapeutic ☐ E Orthosis ☐ F Assistive, Adaptive, Supportive or Protective ☐ G Aerobic Endurance and Conditioning ☐ H Mechanical or Electromechanical ☐ U Prosthesis ☐ Y Other Equipment ☐ Z None	
						● Z None	

11.4.1	Postoperative	Percentage of deep postoperative wound infections within 90 days or within 365 days	Measurable on TCT data in surgical admission or readmissions (TCT data)	Percentage of patients with knee replacement intervention (denominator) with ICD-10-BE deep postoperative wound infections (ICD-10-BE T8... to be defined as principal or secondary diagnosis) in the 90 days after their knee replacement intervention, per hospital (TCT data)
--------	---------------	---	---	---

QUESTION 11: Is a time window up to 90 days sufficient?

**Medium scoring - MEASURABLE OR PARTIALLY MEASURABLE**

Diagnosis, initial assessments, and follow-up

ID	Theme	Quality statement	Measurability	Definition
1.1.1	Diagnosis	Diagnose osteoarthritis clinically without imaging in people who: • are 45 or over, and • have activity-related joint pain, and • have either no morning joint-related stiffness or morning stiffness that lasts no longer than 30 minutes.	Probably measurable (modified definition) on IMA data – % Patient 45 years operated with no imaging in a certain period before surgery	Percentage patients 45 years or older with knee replacement intervention (denominator) with imaging (RX or/and MRI) in the X months (depending on setting) before the intervention (IMA data) per healthcare provider

DISCUSSION: A difference exist between primary and secondary care for the indication for an XR or MRI in patients with osteoarthritis of the knee (see also guideline BSR* which will be updated in the coming years by a revision of the European Guideline and available online (personal communication BSR). This is not clear in the current statement. It seems therefore indicated to have two quality statements, one for the primary care setting and one for secondary care.

PROPOSAL DEFINITION QI:

1^{ary} care: Percentage patients 45 years or older with knee replacement intervention (denominator) with XR imaging in the 36 months before the intervention (IMA data) per healthcare provider

2nd care: Percentage patients 45 years or older with knee replacement intervention (denominator) with MRI imaging in the 12 months before the intervention (IMA data) per healthcare provider

QUESTION 12: do you agree with the separated statement by level of care? Do you agree with the new quality indicator (statements) proposals? Should this quality indicator (statements) be upgraded?

*guidelines BSR: [Guidelines | Belgian Society of Radiology \(BSR\) \(bsr-web.be\)](#) also on the website : <https://www.inami.fgov.be/fr/themes/qualite-soins/imagerie-medicale/Pages/default.aspx>



Problème clinique	Examen	Recommandation [grade]	Commentaires	Dose
Gonalgies sans blocages ni limitation des mouvements (évoquant cliniquement une gonarthrose, ou une pathologie para articulaire....) 19 D	RS	Non indiqué initialement [C]	Les radiographies simples permettent d'identifier et de quantifier les arthroses fémoro-tibiales et fémoro-patellaires et leurs éventuelles complications. Elles sont indispensables dans le cas d'un bilan préopératoire. En cas de suspicion d'ostéonécrose aseptique du condyle médial, la stratégie diagnostique peut être identique à celle des fractures de fatigue (<i>voir 24K</i>). L'échographie identifie facilement les pathologies para-articulaires (tendinopathies, bursites....)	I
Gonalgies avec blocages (évoquant cliniquement une lésion méniscale, ou chondrale, ou un corps étranger....) 20 D	RS	Indiqué [C]	Les radiographies simples permettent une évaluation globale de l'articulation et des parties molles péri-articulaires.	I
	IRM ou arthro CT	Examen spécialisé [B]	L'IRM et l'arthro-scanner permettent de faire le bilan des lésions cartilagineuses, méniscales et/ou ligamentaires, notamment en préopératoire.	0 I

Information and advice patients and training professionals

None are measurable.

Non-drug and non-operative based interventions

ID	Theme	Quality statement	Measurability	Definition
3.3.2	Non-drug/operative intervention	Do not offer any of the following electrotherapy treatments to people with osteoarthritis because there is insufficient evidence of benefit: - transcutaneous electrical nerve stimulation (TENS); - ultrasound therapy; - interferential therapy; - laser therapy; - pulsed short-wave therapy; - neuromuscular electrical stimulation (NMES).	Probably not measurable - No specific RIZIV – INAMI code exists. The treatments belong to generic billing codes including several therapies. See the list below in the table.	NA

QUESTION13: Do physiotherapists have sufficient knowledge not to offer the treatments as advised in the guidelines? Should a specific code be created to improve future data collection on these treatments?



Codes	Label in Dutch	Label in French	Fee
- 558423	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie , ergotherapie, oefeningen met prothesen en/of orthese	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou	18.52€
558014 - 558025	Multidisciplinaire revalidatiezitting met een minimumduur van 90 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie , mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad	Séance de rééducation multidisciplinaire avec une durée de 90 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique , mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	55.56€
558390 -	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie , ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - van de 19e tot 48e zitting inbegrepen	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique , ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - de la 19e à la 48e séance incluse	18.52€
558795 - 558806	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie , ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - de eerste 18 zittingen	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique , ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - les 18 premières séances	24.69€
558810 - 558821	Multidisciplinaire revalidatiezitting met een minimumduur van 60 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie , mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad.	Séance de rééducation multidisciplinaire avec une durée de 60 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées: rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique , mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	37.04€
558832 - 558843	Multidisciplinaire revalidatiezitting met een minimumduur van 120 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie , mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad.	Séance de rééducation multidisciplinaire avec une durée de 120 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique , mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine.	74.08



Drug-based interventions

ID	Theme	Quality statement	Measurability	Definition
4.1.1	Drug-based intervention	If pharmacological treatments are needed to manage osteoarthritis, use them: • alongside non-pharmacological treatments and to support therapeutic exercise, • at the lowest effective dose for the shortest possible time.	Partially measurable – for patients with a chronic pain attestation , Request form for chronic pain reimbursement	Number of patients with paracetamol attestation per prescribing physician (Chapter IV drugs)

DISCUSSION: Paracetamol is only reimbursed for patients with a chronic pain attestation (installed 01/2022) (link [NL](#) or [FR](#)). It is unlikely that the information of the number of patients with an attestation is related to quality unless there is unawareness of this new attestation and patients are therefore missing out.

QUESTION 14: is it useful to follow-up this number of patients with a chronic pain attestation reimbursement? Should this quality indicator (statements) be upgraded?

Surgical non-replacement interventions

ID	Theme	Quality statement	Measurability	Definition
5.1.3	Surgical non-replacement intervention	Free-floating (un-fixed) interpositional devices in patients with symptomatic medial compartment osteoarthritis of the knee are not recommended.	Probably not measurable - Are free-floating interpositional devices included in our knee implants or procedure/RIZIV codes? (=166854 – 166865 AB-impregnated spacer??) + symptomatic medial compartment OA?	?

DISCUSSION: The devices are still under research and patients should be informed about this.

QUESTION 15: are the existing RIZIV codes 166854 – 166865 AB-impregnated spacer (wrongly) used for this intervention? Are the ICD-10 codes in the table below used? Should this quality indicator (statements) be upgraded?

ICd-10 code	ICDXTEN
0SPC08Z	Removal of Spacer from Right Knee Joint, Open Approach
0SPC0EZ	Removal of Articulating Spacer from Right Knee Joint, Open Approach
0SPC38Z	Removal of Spacer from Right Knee Joint, Percutaneous Approach
0SPC48Z	Removal of Spacer from Right Knee Joint, Percutaneous Endoscopic Approach
0SPD08Z	Removal of Spacer from Left Knee Joint, Open Approach
0SPD0EZ	Removal of Articulating Spacer from Left Knee Joint, Open Approach
0SPD38Z	Removal of Spacer from Left Knee Joint, Percutaneous Approach
0SPD48Z	Removal of Spacer from Left Knee Joint, Percutaneous Endoscopic Approach



0SRC0EZ	Replacement of Right Knee Joint with Articulating Spacer, Open Approach
0SRD0EZ	Replacement of Left Knee Joint with Articulating Spacer, Open Approach
0SWC08Z	Revision of Spacer in Right Knee Joint, Open Approach
0SWC38Z	Revision of Spacer in Right Knee Joint, Percutaneous Approach
0SWC48Z	Revision of Spacer in Right Knee Joint, Percutaneous Endoscopic Approach
0SWCX8Z	Revision of Spacer in Right Knee Joint, External Approach
0SWD08Z	Revision of Spacer in Left Knee Joint, Open Approach
0SWD38Z	Revision of Spacer in Left Knee Joint, Percutaneous Approach
0SWD48Z	Revision of Spacer in Left Knee Joint, Percutaneous Endoscopic Approach
0SWDX8Z	Revision of Spacer in Left Knee Joint, External Approach

Experience and utilisation of care

None

Referral interventions

ID	Theme	Quality statement	Measurability	Definition
7.2.2	Referral	Referral for exercise therapy, and other programmes and activities for osteoarthritis	Probably measurable (modified definition) on IMA data – % operated patients with multidisciplinary “K nomenclature” in a certain period before surgery. See table below.	Percentage of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the 36 months before their intervention, per prescribing physician (IMA data)

DISCUSSION: The art 22 definition is very broad and not specific.

QUESTION 16: Is this useful knowing that it is not specific? What would be a good timeframe? Should this quality indicator (statements) be upgraded?

Codes	Label in Dutch	Label in French	Fee
- 558423	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthese	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou	18.52€



558014 - 558025	Multidisciplinaire revalidatiezitting met een minimumduur van 90 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad	Séance de rééducation multidisciplinaire avec une durée de 90 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	55.56€
558390 -	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - van de 19e tot 48e zitting inbegrepen	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - de la 19e à la 48e séance incluse	18.52€
558795 - 558806	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - de eerste 18 zittingen	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - les 18 premières séances	24.69€
558810 - 558821	Multidisciplinaire revalidatiezitting met een minimumduur van 60 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad.	Séance de rééducation multidisciplinaire avec une durée de 60 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées: rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	37.04€
558832 - 558843	Multidisciplinaire revalidatiezitting met een minimumduur van 120 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad.	Séance de rééducation multidisciplinaire avec une durée de 120 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec	74.08



prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine.

7.2.3	Referral	Referral to a weight loss service	Probably not measurable as a dietician intervention is included in the generic multidisciplinary codes	Percentage of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the 36 months before their intervention, per prescribing physician (IMA data)
-------	----------	-----------------------------------	--	---

QUESTION 17: Is this useful knowing that it is not specific? What would be a good timeframe? Should this quality indicator (statements) be upgraded?

Reimbursement codes for advise and support for overweight patients : see multidisciplinary art. 22 (ID 2.2.1.)

Codes	Label in Dutch	Label in French	Creation date	Key letter	Fee	A 2021	Nb 2021	H 2021	Nb 2021
- 558423	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen)	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou	2004-08-01	K 15	18.52€				109975
558014 - 558025	Multidisciplinaire revalidatiezitting met een minimumduur van 90 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad	Séance de rééducation multidisciplinaire avec une durée de 90 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi au moins deux par le mouvement, atteinte motrice, exercices avec complexes, hydrothérapie en piscine	2007-12-01	K 45	55.56€	129807			296953
558390 -	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - van de 19e tot 48e zitting inbegrepen	Rééducation q des techniques électrostimulat ergothérapie, techniques cor de la 19e à la 4							
558795 - 558806	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - de eerste 10 zittingen	Rééducation q des techniques électrostimulat ergothérapie, techniques complémentes, hydrothérapie en piscine							
558810 - 558821	Multidisciplinaire revalidatiezitting met een minimumduur van 60 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad	Séance de rééducation multidisciplinaire avec une durée de 60 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	1991-01-01	K 30	37.04€	87687			95264
558832 - 558843	Multidisciplinaire revalidatiezitting met een minimumduur van 120 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad	Séance de rééducation multidisciplinaire avec une durée de 120 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	1991-01-01	K 60	74.08	455305			596540

The disciplines referred to in articles 22 and 23 of the nomenclature are those of the physiotherapist, the occupational therapist, the speech therapist, the clinical psychologist, the dietician and the orthopaedic prosthetist, occupational therapists, speech therapists, clinical psychologists, dieticians and orthopaedic prosthetists.



Optimisation

ID	Theme	Quality statement	Measurability	Definition
8.2.3	Optimisation surgery	Initiate at least 8 weeks prior to surgery an individualised, structured, and progressive exercise program to allow a physiologic training effect (no effect on enhanced recovery) that includes at a minimum: • Upper extremity strength training (in preparation for use of walking aids and transfers) • Lower extremity functional strength training as tolerated • Lower extremity range of motion exercises • Gait training with instruction on use of walking aids Guidance on remaining physically active	Probably measurable (modified definition) on IMA data – % operated patients with multidisciplinary “K nomenclature” in a certain period before surgery. See table below.	Percentage of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the 8 weeks before their intervention, per prescribing physician (IMA data)

DISCUSSION: The measurement is not specific for exercise only.

QUESTION 18: should this quality statement be upgraded?

Codes	Label in Dutch	Label in French	Fee
- 558423	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthese	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou	18.52€
558014 - 558025	Multidisciplinaire revalidatiezitting met een minimumduur van 90 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad	Séance de rééducation multidisciplinaire avec une durée de 90 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	55.56€
558390 -	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - van de 19e tot 48e zitting inbegrepen	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - de la 19e à la 48e séance incluse	18.52€



558795 - 558806	Revalidatie die behalve oefentherapie tenminste één van de hierna vermelde technieken omvat per zitting (psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, ergotherapie, oefeningen met prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad, tractietherapie) - de eerste 18 zittingen	Rééducation qui, outre la gymnastique médicale comporte au moins une des techniques visées ci-dessous par séance (thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, ergothérapie, exercices avec prothèses et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine, thérapie de traction) - les 18 premières séances	24.69€	
558810 - 558821	Multidisciplinaire revalidatiezitting met een minimumduur van 60 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad.	Séance de rééducation multidisciplinaire avec une durée de 60 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées: rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine	37.04€	
558832 - 558843	Multidisciplinaire revalidatiezitting met een minimumduur van 120 minuten waarbij tijdens elke zitting ten minste twee bijkomende professionele zorgverleners waaronder een ergotherapeut of kinesitherapeut aan de behandeling meewerken en minstens twee van de volgende technieken worden toegepast : revalidatie door beweging, psychomotore therapie, elektrostimulatie bij motorische uitval of antalgische elektrotherapie, mechanotherapie, oefeningen met externe prothesen en/of orthesen en/of complexe technische hulpmiddelen, hydrotherapie in zwembad.	Séance de rééducation multidisciplinaire avec une durée de 120 minutes au moins et au cours de laquelle, pour chaque séance, au moins deux prestataires de soins professionnels en complément assistent au traitement parmi lesquels un ergothérapeute ou kinésithérapeute, et où au moins deux des techniques suivantes sont appliquées : rééducation par le mouvement, thérapie psychomotrice, électrostimulation pour atteinte motrice ou électrothérapie antalgique, mécanothérapie, exercices avec prothèses externes et/ou orthèses et/ou aides techniques complexes, hydrothérapie en piscine.	74.08	
8.4.2	Optimisation surgery	Preoperative anaemia should be identified, investigated, and corrected prior to knee replacement to enhance recovery after surgery.	Partially measurable on TCT or IMA data - Perioperative haemoglobin 'measurement' is identifiable but if action was undertaken is more difficult to verify.	Percentage of patients with knee replacement intervention (denominator) with full blood count measurement (s) (nomenclature code to defined) 3 months before the day of operation, per hospital (TCT or IMA data)

QUESTION 19: should this statement (indicator) be upgraded?



Preoperative

ID	Theme	Quality statement	Measurability	Definition
9.3.1a	Preop	Patients should receive systemic antimicrobial prophylaxis in accordance with local policy and availability.	Probably measurable - Information on reimbursed AB prophylaxis available in TCT data (or IMA data) In accordance with local policy/availability	Percentage of patients with knee replacement intervention (denominator) with at least one of the (to be defined) listed pharmaceuticals / AB prophylactic pseudocode on the day of their knee replacement intervention, per hospital (TCT or IMA data).
DISCUSSION: The uptake of antibiotic prophylaxis is already above 90% for hip replacements. If this is similar for knee replacements then improvement gains will be low. The original statement has been divided into two statements (see below).				
QUESTION 20: should this statement (indicator) be upgraded?				
9.3.1b	Preop	Do not use wound irrigation to reduce the risk of surgical site infection.	Probably not measurable - wound irrigation RIZIV code? Possible undercoding of ICD-10-CM code? See table below	Percentage of patients with knee replacement intervention (denominator) with wound irrigation (ICD-10-CM 3E10? or nomenclature code?) on the day of the intervention, per hospital (MZG - RHM (or TCT or IMA?) data)
DISCUSSION: The original statement has been divided into two statements (see above).				
QUESTION 21: Is the ICD10-code used for wound irrigation or/and does a RIZIV code exist? should this statement (indicator) be upgraded?				



Wound irrigation (ID 9.3.1.)

Section		3 Administration	
Body System		E Physiological Systems and Anatomical Regions	
Operation		1 Irrigation Putting in or on a cleansing substance	
Code Description 3E1 Administration, Physiological Systems and Anatomical Regions, Irrigation			
Body System / Region	Clear	Approach	Clear
☒ 0 Skin and Mucous Membranes ☐ 9 Nose ☐ B Ear ☐ C Eye ☐ F Respiratory Tract ☐ G Upper GI ☐ H Lower GI ☐ J Biliary and Pancreatic Tract ☐ K Genitourinary Tract ☐ L Pleural Cavity ☐ M Peritoneal Cavity ☐ N Male Reproductive ☐ P Female Reproductive ☐ Q Cranial Cavity and Brain ☐ R Spinal Canal ☐ S Epidural Space ☐ U Joints ☐ Y Pericardial Cavity		☐ 3 Percutaneous ☐ 7 Via Natural or Artificial Opening ☐ 8 Via Natural or Artificial Opening Endoscopic ☒ X External	☐ 8 Irrigating Substance ☐ 9 Dialysate
			☐ X Diagnostic ☐ Z No Qualifier

9.5.1

Preop

For reduced postoperative blood loss, give

- if **no renal impairment**
 - intravenous tranexamic acid AND
 - 1 g to 2 g of topical intra-articular tranexamic acid diluted in saline after the final wash-out and before wound closure AND
 - total combined dose of tranexamic acid does not exceed 3 g
- If **renal impairment**, give a reduced dose of intravenous tranexamic acid on its own

Measurable on TCT data.

Renal impairment should be defined in ICD-10-CM diagnoses

Percentage of patients with knee replacement intervention (denominator) with (intravenous only?) tranexamic acid (ATC=B02AA02) on the day of the knee replacement intervention, per hospital (TCT or IMA data)

QUESTION 22: Is it sufficient to consider intravenous administration of tranexamic acid? do you agree with this proposal? should this statement (indicator) be upgraded?



Intraoperative and operative in general

ID	Theme	Quality statement	Measurability	Definition
10.2.6	Intraoperative	Drains should not be used with total knee arthroplasty because there is no significant difference in complications or outcomes.	Probably not measurable – Drains identifiable in ICD-10-BE codes (not identifiable in nomenclature?) Possible undercoding in ICD-10-CM? see table below.	Percentage of patients with knee replacement intervention (denominator) with drains (ICD-10-CM 0S9C.. or 0S9D) on the day of the intervention, per hospital (MZG - RHM data)

QUESTION 23: Is the ICD10-code for drains used? should this statement (indicator) be upgraded?

Drains (ID 10.2.6.)

Section	0 Medical and Surgical		
Body System	S Lower Joints		
Operation	9 Drainage Taking or letting out fluids and/or gases from a body part		
Code Description 0S9 Lower Joints, Drainage			
Body Part	Approach	Device	Qualifier
☐ 0 Lumbar Vertebral Joint			
☐ 2 Lumbar Vertebral Disc			
☐ 3 Lumbosacral Joint			
☐ 4 Lumbosacral Disc			
☐ 5 Sacrococcygeal Joint			
☐ 6 Coccygeal Joint			
☐ 7 Sacroiliac Joint, Right			
☐ 8 Sacroiliac Joint, Left			
☐ 9 Hip Joint, Right			
☐ B Hip Joint, Left			
☐ C Knee Joint, Right	☐ 0 Open	☐ 0 Drainage Device	☐ X Diagnostic
☐ D Knee Joint, Left	☐ 3 Percutaneous	☐ Z No Device	☐ Z No Qualifier
☐ F Ankle Joint, Right	☐ 4 Percutaneous Endoscopic		
☐ G Ankle Joint, Left			
☐ H Tarsal Joint, Right			
☐ J Tarsal Joint, Left			
☐ K Tarsometatarsal Joint, Right			
☐ L Tarsometatarsal Joint, Left			
☐ M Metatarsal-Phalangeal Joint, Right			
☐ N Metatarsal-Phalangeal Joint, Left			
☐ P Toe Phalangeal Joint, Right			
☐ Q Toe Phalangeal Joint, Left			



Postoperative

ID	Theme	Quality statement	Measurability	Definition
11.4.2	Postoperative	Incidence of postoperative pulmonary embolism or deep vein thrombosis, after knee replacement (/100 000 knee surgery discharges).	Measurable on TCT data. This can be applied to include the ambulatory postoperative patient including readmissions - IMA data if ambulatory care is also concerned – depends on the time window	(a) Percentage of patients with knee replacement intervention (denominator) with postoperative pulmonary embolism (code I26.0 or I26.9) or wound infection (? code T81?...) in the 90 days after intervention, per hospital? (TCT data) (b) Percentage of patients with knee replacement intervention (denominator) with DVT in the 90 days after intervention, per hospital? (IMA data, identification with or LMWH) NB: or coupling TCT-IMA data to capture admissions for DVT (or I.80...or ...I82.8...deep vein thrombosis)

DISCUSSION: Already an existing indicator for the time window of hospitalisation. See the AHRQ's Patient Safety Indicators (PSI) https://qualityindicators.ahrq.gov/measures/psi_resources and [Performance of the Belgian health system – report 2019 – Supplement: technical sheets for indicators \(healthybelgium.be\)](#)

The time window can be broadened to include the timeframe after discharge from hospital.

QUESTION 24: should this statement (indicator) be upgraded? per hospital or per prescribing physician?

11.4.3	Postoperative	- Number of patients with • decubitus • urine infection • postop respiratory failure • iatrogenic pneumothorax • postop sepsis • postop wound dehiscence • postop haemorrhage or haematoma • accidental puncture or laceration • postop metabolic derangements • death, all cause 30-day mortality • readmission, all cause 30-day	Several indicators. Depends on the bullet point. Some others may be measured on TCT data if admission required (postop sepsis, readmission or iatrogenic pneumothorax probably but not urine infection p.ex). All cause 30-D=IMA data. Readmissions 30 D=TCT data.	For a selection of indicators: Percentage of patients with knee replacement intervention (denominator) with (infection, mortality, readmission) in the 90 days after intervention, per hospital? (IMA data, identification with or LMWH) NB: or coupling TCT-IMA data to capture admissions for the selection (infection)
--------	---------------	---	--	---

DISCUSSION: The list of postoperative complications is long, and some are interlinked. It may therefore be good to focus on for example DVT, long embolism(see above indicator), infection, mortality, and readmission.

QUESTION 25: do you agree with the proposal to select for wound infection, mortality, readmission? Would you upgrade this quality statement (definition) proposition?



11.4.4	Postoperative	Primary care practitioners should refer people who develop new or worsening pain, limp or loss of function related to their joint replacement to an orthopaedic surgical service.	Probably measurable – referral in MZG – RHM (quality information?)	Percentage of patients with knee replacement intervention (denominator) addressed by GP (MZG – RHM: only measurable per hospital?). Calculation per GP is more complex (IMA data).
--------	---------------	---	--	---

QUESTION 26: should this statement (indicator) be upgraded?

Appendix 5.3. Finalisation discussion Belgian experts on clinical relevance of quality statements and indicators

General discussion points to be applied to agreed quality indicators

Importance of making a difference between primary and secondary care for most aspects discussed as possible quality indicator. The patient profile, the treatments and expectations are not the same. Specific examples are the use of medication i.e. opioids,

The finalisation and optimisation should happen in the next phase. To this extent, the timeframes and analysis per prescribing physician or hospital, of the definitions stated below are not always relevant and should be reviewed.

**high scoring - measurable or partially measurable**

Drug-based interventions

ID	Theme	Quality statement	Measurability	Definition
4.1.8	Drug-based intervention	'Number' of prescriptions of first-line medication therapy, steroid injection, medication with a recommendation 'against' such as opioids.* Provision of information about risks of medication use and screening for side effects.	Probably measurable (without second part) on IMA data– Only operated patients can be identified on IMA data. Number of prescriptions should be replaced by number of patients with prescription per prescribing physician. Condition: first-line pharmaceuticals must be reimbursed to be identified. No information is available on provision of information.	Percentage of patients with knee replacement intervention (denominator) with opioids (ATC=N02A) , or steroid injection in the 36 weeks/months before their knee replacement intervention, per prescribing physician (IMA data)

DISCUSSION: The medications that we can identify are limited to the opioids and the steroid injections. We therefore propose to focus on the opioids which should preferably not be prescribed.

PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with a prescription for opioids (ATC=N02A) in the 36 months before their knee replacement intervention, per prescribing physician (IMA data).

QUESTION 1: do you agree with this proposal?

Expert meeting: YES Agreement

Comments: should not include palliative treatments; distinction should be made between one-off and chronic treatments; distinction should be made between weak and strong opioids; the first prescribing physician should/could be analysed (1st versus 2nd line) in the calculation phase; in selected cases when patients are inoperable or kidney problems prohibit NSAID use, opioids, mostly weak, are used.

KCE comment: Note that a strong recommendation exists in recent guidelines against the use of opioids weak or strong (4.1.6): "Do not offer oral narcotics (strong or weak opioids), including tramadol (weak opioid), as they result in a significant increase of adverse events and are not effective at improving pain or function for treatment of osteoarthritis of the knee."



Surgical non-replacement interventions

ID	Theme	Quality statement	Measurability	Definition
5.1.1	Surgical non-replacement intervention	Arthroscopy with lavage and/or debridement in patients with a primary diagnosis of knee osteoarthritis is not recommended.	Measurable on MZG – RHM or TCT data, or IMA data- Arthroscopy can be identified, therefore this is only measurable on population admitted with osteoarthritis as denominator (MZG – RHM or TCT data). Lavage and/or debridement should be translated into ICD-10-BE or nomenclature codes. See table below.	Percentage of patients hospitalised with a principal diagnosis of knee osteoarthritis (denominator) having an arthroscopy with lavage and/or debridement (identified by nomenclature of ICD-10-BE codes) during their hospitalisation, per hospital (TCT data).

DISCUSSION: The nomenclature codes are for diagnostic arthroscopy. No other codes were identified.

QUESTION 2: do you agree with this definition proposal?

Expert meeting: YES Agreement but NOT measurable

The diagnostic codes are not the correct ones. The code for meniscectomy is mostly used. The quality of care could be improved if a separate code would exist for this activity. Patients with post-traumatic lesions and operations should not be included.

Preoperative

ID	Theme	Quality statement	Measurability	Definition
9.2.1	Preop	Offer venous thromboembolism (VTE) prophylaxis undergoing elective knee replacement surgery when the VTE risk outweighs the risk of bleeding in accordance with local policy	Medication for VTE prophylaxis measurable on TCT or IMA data Risks and benefits not measurable	Percentage of patients with knee replacement intervention (denominator) with at least one of listed pharmaceuticals (Apixaban, Dabigatran, Rivaroxaban, Enoxaparine, Nadroparine, calcium, Tinzaparine, natrium, Fondaparinux) given at the time of the knee replacement intervention, per prescribing physician (TCT (during hospitalisation) or IMA data (on the day of the intervention and the next days))

DISCUSSION: The use of prophylaxis might be hampered by two aspects: the absence of Belgian guidance and the reimbursement restrictions.

The Belgian Society on Thrombosis and Haemostasis (BSTH) will shortly discuss if guidance will be developed on this topic. They are currently working on an online tool for perioperative antithrombotic treatment and the topic could possibly be included. Aspects that may be clarified are the preference of DOAC versus LMWH, the place of aspirin, the duration of medication. The medication as presented by BCFI is summarised in the table below with the reimbursement criteria explained under the table.

QUESTION 3: would guidance improve an aligned prophylaxis uptake? Would a change in reimbursement criteria improve prophylaxis uptake?

Expert meeting: YES quality could be improved with this indicator but UNDECIDED agreement because no guidance available

The experts had the impression that prophylaxis was often to easily administered when not necessary. This was possibly mediated by the pharmaceutical industry and the high use in the American literature. A discrimination should be made between patients by risk profile. The utility of aspirin in a positive sense was mentioned for patients with a low risk profile. The indicator as presented is therefore not interesting.



KCE: Belgian guidance on the topic might be needed before deciding to use this topic as a quality indicator. Aspirin is an antiaggregant and will not prevent lung embolic events.

ID	Theme	Quality statement	Measurability	Definition
9.4.2	Preop	Standardised anaesthetic protocol - the routine administration of sedatives to reduce anxiety preoperatively is not recommended. - spinal opioids are not recommended for routine use because of the potential for adverse effects which delay recovery - epidural analgesia is not recommended for routine use	Probably measurable on TCT data Warning from expert on the validity of anesthesia information recorded in MZG – RHM data. See table below.	Percentage of patients with knee replacement intervention (denominator) with (a) reimbursed sedative(s) on the day of the intervention (pharmaceuticals to be defined) per hospital, or (b) spinal opioid's injection (pharmaceuticals to be defined) per hospital, or (c) epidural analgesia as recorded in MZG - RHM (TCT data – a) and b) also measurable on IMA data when reimbursed)
9.4.3	Preop	"Offer a choice of: regional anaesthesia in combination with local infiltration analgesia (LIA) or general anaesthesia in combination with LIA add a peripheral nerve block provided it does not delay surgery significantly as it may delay early and safe mobilisation"	Probably measurable on TCT data Anesthesia information recorded in MZG – RHM data is shown below in the table.	

DISCUSSION: Are the sedatives for anxiety used preop?

PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with a reimbursed sedative on the day of the intervention (pharmaceuticals to be defined) per hospital

QUESTION 4: Which sedatives are used for anxiety preop?

Expert meeting: NOT agreement

To general and not specific for knee osteoarthritis. Xanax was used and maybe still used by older anaesthetists.

DISCUSSION: The descriptions used in the MZG-RHM codes are not fitting with the recommendations for an anaesthetic protocol.

PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with (a) spinal opioid's injection (pharmaceuticals to be defined) per hospital, or (b) epidural analgesia as recorded in MZG - RHM (TCT data – (a) also measurable on IMA data when reimbursed)

QUESTION 5: Would a change of the descriptions in the MZG-RHM (the data would then become more reliable) help to improve the registration?

Expert meeting: rather YES agreement



A large variability exists between hospitals (between all experts present, only 1 in 4 applies the recommendations). Factors that affect the method applied: infrastructure (extra preop room), trained personnel, knowledge anaesthetist. The LIA allows for a patient to be on his feet 2 hours after the operation. This in contrast with spinal or rachi anaesthesia.

9.4.4a	Preop	Aim for optimisation of perioperative glucose control (<126mg/dl)	Partially measurable on TCT or IMA data - Perioperative glucose 'measurement' is identifiable but if action was undertaken is more difficult to verify.	Percentage of patients with knee replacement intervention (denominator) with glucose control (nomenclature code to defined) on day of operation and after their knee replacement intervention, per hospital (TCT or IMA data)
--------	-------	---	---	---

DISCUSSION: The quality statement was divided into two sections (see a and b). The action of taking a sample for glucose can be followed-up in the data. To verify if action was undertaken is more difficult.

QUESTION 6: Is it sufficient for quality that a sample for glucose measurement was taken? Have hospitals a standard operating procedure to follow glucose postop?

Expert meeting: Mixed agreement

General indicator of surgery that should be standard applied. Not specific for knee osteoarthritis.

9.4.4b	Preop	Aim for optimisation of - postoperative nausea and vomiting - screening preop - give paracetamol prophylactically	Not measurable: Paracetamol not reimbursed outside chronic pain.	NA
--------	-------	---	--	----

DISCUSSION: Paracetamol currently has no indication for postoperative vomiting.

QUESTION 7: Is paracetamol currently been used for this indication? Would it be given intravenously during the operation? Should the indication be added by BCFI?

Expert meeting: No

It is not used in Belgium. The working mechanism was questioned. KCE post-meeting information: Information from the guideline and publication is as follows is that the effect is mediated through superior pain control.

Text from guideline: "Postoperative nausea and vomiting (PONV) is distressing for patients and can lead to notable patient morbidity and an associated prolonged length of hospital stay. In general, female gender, a past history of motion sickness or PONV, and being a non-smoker are all risk factors for PONV (Apfel et al. 1999). Several classes of first-line medications are available: dopamine (D2) antagonists (e.g., droperidol), serotonin (5HT3) antagonists (e.g., ondansetron), and corticosteroids (e.g., dexamethasone). Studies have shown that combinations of the drugs enhance their efficacy (Eberhart et al. 2002, Apfel et al. 2004). Therefore, in patients with 1 to 2 risk factors a combination of 2 drugs is often recommended, and, in patients with higher risk, three drugs in combination. If rescue treatment is required despite prophylaxis, drugs from classes not yet used should be employed (Gan et al. 2014). Summary and recommendation—Evidence supports the use of screening for and multimodal PONV prophylaxis and treatment for patients undergoing hip and knee replacement. Evidence level—Moderate. Recommendation grade—Strong"

"Paracetamol is regularly prescribed perioperatively and within ERAS pathways. It reduces pain and morphine consumption over a 24-hour period in patients undergoing both hip and knee replacement (Sinatra et al. 2005). Although not specific to hip and knee replacement, paracetamol has been shown to reduce PONV if given prophylactically before surgery or arrival in the postoperative care unit and this correlated with a reduction in pain scores but not postoperative opioid use (Apfel et al. 2013). Paracetamol can reduce acute postoperative pain, has a favorable side-effect profile, and is a core component of multimodal analgesia in



all exemplar hip and knee ERAS pathways.” Summary and recommendations—The routine use of paracetamol is recommended. Evidence level—Moderate. Recommendation grade—Strong.”

Abstract:¹¹⁹ Opioids are a key risk factor for postoperative nausea and vomiting (PONV). As intravenous (i.v.) acetaminophen reduces postoperative pain and opioid requirements, one would expect i.v. acetaminophen to be associated with a lower incidence of opioid-induced side effects, including PONV. We conducted a systematic search using Medline and Cochrane databases supplemented with hand search of abstract proceedings to identify randomized-controlled trials of i.v. acetaminophen. Inclusion criteria were (a) randomized for i.v. acetaminophen vs a placebo control, (b) general anesthesia, and (c) reported or obtainable PONV outcomes. Primary outcome was postoperative nausea and secondary outcome was postoperative vomiting. We included 30 studies with 2364 patients (1223 in the acetaminophen group, 1141 in the placebo group). The relative risk (95% confidence interval) was 0.73 (0.60-0.88) for nausea and 0.63 (0.45-0.88) for vomiting. Data showed significant heterogeneity for both nausea ($P=0.02$, $I(2)=38\%$) and vomiting ($P=0.006$, $I(2)=47\%$), but were homogeneous when studies were grouped according to timing of first administration: i.v. acetaminophen reduced nausea when given prophylactically either before surgery, 0.54 (0.40-0.74), or before arrival in the postanesthesia care unit, 0.67 (0.55-0.83); but not when given after the onset of pain, 1.12 (0.85-1.48). When i.v. acetaminophen was given prophylactically, the reduction of nausea correlated with the reduction of pain (odds ratio 0.66, 0.47-0.93), but not with reduction in postoperative opioids (odds ratio 0.89, 0.64-1.22). Prophylactically administered i.v. acetaminophen reduced PONV, mainly mediated through superior pain control.

Intraoperative and operative in general

ID	Theme	Quality statement	Measurability	Definition
10.1.3	Intraoperative	The routine use of urinary catheters is not recommended and does not <u>enhance recovery after surgery</u> .	Measurable on MZG –RHM – Urinary catheters are identifiable in ICD-10-BE but may be undercoded	Percentage of patients with knee replacement intervention (denominator) with ICD-10-BE urinary catheterisation code (0T9B00Z, 0T9B30Z, 0T9C00Z, 0T9C30Z) on the day of the knee replacement intervention, per hospital (MZG - RHM)

QUESTION 8: do you agree with the definition?

Expert meeting: YES agreement

10.2.5	Intraoperative	Both patellar resurfacing and non-patellar resurfacing in total knee arthroplasty is accepted	Resurfacing can be measured with (ICD-10-BE codes, see table below) (TCT or IMA data) but measuring this will not tell anything.	Percentage of patients with knee replacement intervention (denominator) with a resurfacing code (ICD-10-BE) (TCT or IMA data)
--------	----------------	---	--	---

DISCUSSION: From the comments we received we learned that patellar resurfacing and/or non-patellar resurfacing should be performed during the primary total knee arthroplasty intervention. Therefore, it is NOT necessary to perform a second intervention for resurfacing (patellar or other). We therefore propose to change the quality statement with a new proposal for definition (see below).

PROPOSAL DEFINITION QI: Percentage of patients with a primary knee replacement intervention (denominator) with a second operation of resurfacing (ICD-10-BE) (TCT or IMA data)

QUESTION 9: do you agree with this new quality indicator (statement) proposal?

Expert meeting: NOT agreement

The original recommendation is correct. It is not relevant as an indicator in Belgium.



Postoperative

ID	Theme	Quality statement	Measurability	Definition
11.2.1	Postoperative	Patients should be mobilised as soon as possible post-surgery. A physiotherapist or occupational therapist should offer rehabilitation on the day of surgery if possible and no more than 24 hours after knee replacement, advice on managing activities of daily living and home exercise programmes and mobilisation, AND before the person leaves hospital, advice on self-directed rehabilitation meaning a clear understanding of their rehabilitation goals and the importance of doing the exercises prescribed to achieve these goals, and a point of contact for advice and support.	Probably not measurable (second part not measurable) - This should be available in the electronic medical file.	NA
11.2.2	Postoperative	When patient has NO medical contra-indications, start physiotherapist-supervised daily exercise therapy and document • mobilisation on postoperative day 1 • including (at a minimum): • active range of motion of lower limbs • isometric and small movement isotonic lower limb strengthening • bed mobility and transfer training • balance and gait training (level ground and on stairs if appropriate) • or the reason patient cannot be mobilised • If the patient can actively move the surgical knee THEN continuous passive motion should NOT be used This statement does not preclude a second session of exercise therapy supervised by a rehab assistant or other trained health professional.	Probably not measurable as such – Medical contraindications not documented. + document? Measure of daily physiotherapy possible? Measurable if the indicator is modified – date of start of physiotherapy available in TCT data or IMA data	NA
PROPOSAL NEW 11.2.1a: Start physiotherapist-supervised exercise therapy on day 1 or day 2				
PROPOSAL DEFINITION QI: Percentage of patients with knee replacement intervention (denominator) with ICD-10-BE F07etc... or art.22 nomenclature codes (to be defined; see also the table with generic codes in paragraph 2.3) on the day of the knee replacement or the day after (D1 or D2), per hospital (TCT data)				
QUESTION 10: do you agree with this new quality indicator (statement) proposal?				
Expert meeting: YES agreement				
It is very important that the patient is seen on the day of the operation (day 1) even late in the afternoon, after the operation. It should be known/measured if a physiotherapist visited the patient the same day.				
11.4.1	Postoperative	Percentage of deep postoperative wound infections within 90 days or within 365 days	Measurable on TCT data in surgical admission or readmissions (TCT data)	Percentage of patients with knee replacement intervention (denominator) with ICD-10-BE deep postoperative wound infections (ICD-10-BE T8... to be defined as principal or



secondary diagnosis) in the **90 days** after their knee replacement intervention, per hospital (TCT data)

QUESTION 11: Is a time window up to 90 days sufficient?

Expert meeting: YES agreement

Postoperative infection is important but often related to the characteristics of the patient. This factor can be corrected with case-mix adjustment when operationalised.

Medium scoring – measurable of partially measurable

Diagnosis, initial assessments, and follow-up

ID	Theme	Quality statement	Measurability	Definition
1.1.1	Diagnosis	Diagnose osteoarthritis clinically without imaging in people who: - are 45 or over, and - have activity-related joint pain, and - have either no morning joint-related stiffness or morning stiffness that lasts no longer than 30 minutes.	Probably measurable (modified definition) on IMA data – % Patient 45 years operated with no imaging in a certain period before surgery	Percentage patients 45 years or older with knee replacement intervention (denominator) with imaging (XR or/and MRI) in the X months (depending on setting) before the intervention (IMA data) per healthcare provider

DISCUSSION: A difference exist between primary and secondary care for the indication for an XR or MRI in patients with osteoarthritis of the knee (see also guideline BSR* which will be updated in the coming years by a revision of the European Guideline and available online (personal communication BSR). This is not clear in the current statement. It seems therefore indicated to have two quality statements, one for the primary care setting and one for secondary care.

PROPOSAL DEFINITION QI:

1^{ary} care: Percentage patients 45 years or older with knee replacement intervention (denominator) with XR or MRI imaging in the 36 months before the intervention (IMA data) per healthcare provider

2nd care: Percentage patients 45 years or older with knee replacement intervention (denominator) with MRI imaging in the 12 months before the intervention (IMA data) per healthcare provider

QUESTION 12: do you agree with the separated statement by level of care? Do you agree with the new quality indicator (statements) proposals? Should this quality indicator (statements) be upgraded?

Expert meeting: YES agreement for primary care; YES agreement for secondary care

Imaging is not necessary for a diagnosis of osteoarthritis in primary care. In secondary care, a clinical and radiographic (XR) investigation is necessary for diagnosis.



Non-drug and non-operative based interventions

ID	Theme	Quality statement	Measurability	Definition
3.3.2	Non-drug/operative intervention	Do not offer any of the following electrotherapy treatments to people with osteoarthritis because there is insufficient evidence of benefit: • transcutaneous electrical nerve stimulation (TENS); • ultrasound therapy; • interferential therapy; • laser therapy; • pulsed short-wave therapy; • neuromuscular electrical stimulation (NMES).	Probably not measurable - No specific RIZIV – INAMI code exists. The treatments belong to generic billing codes including several therapies. See the list below in the table.	NA

QUESTION13: Do physiotherapists have sufficient knowledge not to offer the treatments as advised in the guidelines? Should a specific code be created to improve future data collection on these treatments?

Expert meeting: YES agreement

This concerns mostly primary care when patients are referred by the GP to the physiotherapist. Physiotherapists generally are aware that the TENS is no longer good practice, but they continue to receive prescriptions. Thus, quality of care can be improved by measuring for TENS specifically.

Drug-based interventions

ID	Theme	Quality statement	Measurability	Definition
4.1.1	Drug-based intervention	If pharmacological treatments are needed to manage osteoarthritis, use them: • alongside non-pharmacological treatments and to support therapeutic exercise, • at the lowest effective dose for the shortest possible time.	Partially measurable – for patients with a chronic pain attestation . Request form for chronic pain reimbursement	Number of patients with paracetamol attestation per prescribing physician (Chapter IV drugs)

DISCUSSION: Paracetamol is only reimbursed for patients with a chronic pain attestation (installed 01/2022) (link [NL](#) or [FR](#)). It is unlikely that the information of the number of patients with an attestation is related to quality unless there is unawareness of this new attestation and patients are therefore missing out.

QUESTION 14: is it useful to follow-up this number of patients with a chronic pain attestation reimbursement? Should this quality indicator (statements) be upgraded?

Expert meeting: YES agreement

This is important for the patient who needs large quantities of paracetamol which is expensive when not reimbursed. This indicator will include patients with any type of osteoarthritis. This should be taken into account during operationalisation.



Surgical non-replacement interventions

ID	Theme	Quality statement	Measurability	Definition
5.1.3	Surgical non-replacement intervention	Free-floating (un-fixed) interpositional devices in patients with symptomatic medial compartment osteoarthritis of the knee are not recommended.	Probably not measurable - Are free-floating interpositional devices included in our knee implants or procedure/RIZIV codes? (=166854 – 166865 AB-impregnated spacer??) + symptomatic medial compartment OA?	

DISCUSSION: The devices are still under research and patients should be informed about this.

QUESTION 15: are the existing RIZIV codes 166854 – 166865 AB-impregnated spacer (wrongly) used for this intervention? Are the ICD-10 codes in the table below used? Should this quality indicator (statements) be upgraded?

Expert meeting: NOT agreement

The old devices for which the codes exist are no longer used. The newer models are still in research and are early days.

Referral interventions

ID	Theme	Quality statement	Measurability	Definition
7.2.2	Referral	Referral for exercise therapy, and other programmes and activities for osteoarthritis	Probably measurable (modified definition) on IMA data – % operated patients with multidisciplinary “K nomenclature” in a certain period before surgery. See table below.	Percentage of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the 36 months before their intervention, per prescribing physician (IMA data)

DISCUSSION: The art 22 definition is very broad and not specific.

QUESTION 16: Is this useful knowing that it is not specific? What would be a good timeframe? Should this quality indicator (statements) be upgraded?

Expert meeting: YES agreement for primary care; maybe YES for secondary care

It would be a good indicator if it was measurable. How can we capture this information. A good indicator could measure, if a patient has been referred by the general practitioner before been seen by a specialist.

Patients are referred by a general practitioner as well as a secondary care physician. All patients should see a physiotherapist at some point in their care trajectory. Exercise is the core treatment for osteoarthritis and although several patients are self-disciplined to follow exercise advice, a large group benefits from support with strengthening exercises. Views (by surgeons) are expressed that physiotherapist is overprescribed and -used. Patient representatives reflect that physiotherapist was/is beneficial at certain points in their ‘chronic illness’; the complexity of the chronic illness must be considered. A physiotherapist can advise the patient with several physical problems.

Who would take on the case management role for a patient with this chronic illness? Can a physiotherapist-coach be considered for this?

7.2.3	Referral	Referral to a weight loss service	Probably not measurable as a dietician intervention is included in the generic multidisciplinary codes	Percentage of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the
-------	----------	-----------------------------------	--	---



36 months before their intervention, per prescribing physician (IMA data)

QUESTION 17: Is this useful knowing that it is not specific? What would be a good timeframe? Should this quality indicator (statements) be upgraded?

Expert meeting: NOT agreement

Dietician's advice / referral is too specific. The totality of the patient with osteoarthritis is not addressed.

Optimisation

ID	Theme	Quality statement	Measurability	Definition
8.2.3	Optimisation surgery	Initiate at least 8 weeks prior to surgery an individualised, structured, and progressive exercise program to allow a physiologic training effect (no effect on enhanced recovery) that includes at a minimum: • Upper extremity strength training (in preparation for use of walking aids and transfers) • Lower extremity functional strength training as tolerated • Lower extremity range of motion exercises • Gait training with instruction on use of walking aids • Guidance on remaining physically active	Probably measurable (modified definition) on IMA data – % operated patients with multidisciplinary “K nomenclature” in a certain period before surgery. See table below.	Percentage of patients with knee replacement intervention (denominator) with art.22 nomenclature codes (to be defined) in the 8 weeks before their intervention, per prescribing physician (IMA data)

DISCUSSION: The measurement is not specific for exercise only.

QUESTION 18: should this quality statement be upgraded?

Expert meeting: UNDECIDED agreement but YES for more time before surgery

See previous discussion: a patient should have seen a physiotherapist before seeing the surgeon. But the recommendation is too strict focusing on the 8 weeks before.

It is important that the patient is not immediately operated / planned for surgery when seen by a surgeon at the consultation. Often the patient has an acute flare up and will get better in the coming weeks. Patients are operated to hastily and more time is needed before surgery is planned.

KCE: This describes the timing / indications for surgery.

8.4.2	Optimisation surgery	Preoperative anaemia should be identified, investigated, and corrected prior to knee replacement to enhance recovery after surgery.	Partially measurable on TCT or IMA data - Perioperative haemoglobin 'measurement' is identifiable but if action was undertaken is more difficult to verify.	Percentage of patients with knee replacement intervention (denominator) with full blood count measurement (s) (nomenclature code to be defined) 3 months
-------	----------------------	---	---	--



before the day of operation, per hospital (TCT or IMA data)

QUESTION 19: should this statement (indicator) be upgraded?

Expert meeting: YES agreement

Low haemoglobin is associated with infections and poor recovery. This is a must.

Preoperative

ID	Theme	Quality statement	Measurability	Definition
9.3.1a	Preop	Patients should receive systemic antimicrobial prophylaxis in accordance with local policy and availability.	Probably measurable - Information on reimbursed antibiotic prophylaxis available in TCT data (or IMA data) In accordance with local policy/availability	Percentage of patients with knee replacement intervention (denominator) with at least one of the (to be defined) listed pharmaceuticals on the day of their knee replacement intervention, per hospital (TCT or IMA data).

DISCUSSION: The uptake of antibiotic prophylaxis is already above 90% for hip replacements. If this is similar for knee replacements, then improvement gains will be low. The original statement has been divided into two statements (see below).

QUESTION 20: should this statement (indicator) be upgraded?

Expert meeting: YES agreement 100% should be reached.

9.3.1b	Preop	Do not use wound irrigation to reduce the risk of surgical site infection.	Probably not measurable - wound irrigation RIZIV code? Possible undercoding of ICD-10-CM code? See table below	Percentage of patients with knee replacement intervention (denominator) with wound irrigation (ICD-10-CM 3E10? or nomenclature code?) on the day of the intervention, per hospital (MZG - RHM (or TCT or IMA?) data)
--------	-------	--	--	--

DISCUSSION: The original statement has been divided into two statements (see above).

QUESTION 21: Is the ICD10-code used for wound irrigation or/and does a RIZIV code exist? should this statement (indicator) be upgraded?

Expert meeting: NOT agreement

This is part of the surgical procedures and very difficult to trace.

9.5.1	Preop	For reduced postoperative blood loss, give if no renal impairment - intravenous tranexamic acid AND 1 g to 2 g of topical intra-articular tranexamic acid diluted in saline after	Measurable on TCT data. Renal impairment should be defined in ICD-10-CM diagnoses	Percentage of patients with knee replacement intervention (denominator) with (intravenous only?) tranexamic acid (ATC=B02AA02) on the day of the knee replacement intervention, per hospital (TCT or IMA data)
-------	-------	---	---	--



- the final wash-out and before wound closure AND
- total combined dose of tranexamic acid does not exceed 3 g
- If **renal impairment**, give a reduced dose of intravenous tranexamic acid on its own

QUESTION 22: Is it sufficient to consider intravenous administration of tranexamic acid? do you agree with this proposal? should this statement (indicator) be upgraded?

Expert meeting: YES agreement

Important aspect and IV is sufficient or measurement of indicator.

Intraoperative and operative in general

ID	Theme	Quality statement	Measurability	Definition
10.2.6	Intraoperative	Drains should not be used with total knee arthroplasty because there is no significant difference in complications or outcomes.	Probably not measurable – Drains identifiable in ICD-10-BE codes (not identifiable in nomenclature?) Possible undercoding in ICD-10-CM? see table below.	Percentage of patients with knee replacement intervention (denominator) with drains (ICD-10-CM 0S9C.. or 0S9D) on the day of the intervention, per hospital (MZG - RHM data)

QUESTION 23: Is the ICD10-code for drains used? should this statement (indicator) be upgraded?

Expert meeting: NOT agreement Part of surgical procedures if used and not that relevant.



Postoperative

ID	Theme	Quality statement	Measurability	Definition
11.4.2	Postoperative	Incidence of postoperative pulmonary embolism or deep vein thrombosis, after knee replacement (/100 000 knee surgery discharges).	Measurable on TCT data. This can be applied to include the ambulatory postoperative patient including readmissions - IMA data if ambulatory care is also concerned – depends on the time window	(a) Percentage of patients with knee replacement intervention (denominator) with postoperative pulmonary embolism (code I26.0 or I26.9) or wound infection (? code T81?...) in the 90 days after intervention, per hospital? (TCT data) (b) Percentage of patients with knee replacement intervention (denominator) with DVT in the 90 days after intervention, per hospital? (IMA data, identification with or LMWH) NB: or coupling TCT-IMA data to capture admissions for DVT (or I.80...or ...I82.8...deep vein thrombosis)

DISCUSSION: Already an existing indicator for the time window of hospitalisation. See the AHRQ's Patient Safety Indicators (PSI) https://qualityindicators.ahrq.gov/measures/psi_resources and [Performance of the Belgian health system – report 2019 – Supplement: technical sheets for indicators \(healthybelgium.be\)](#)

The time window can be broadened to include the timeframe after discharge from hospital.

QUESTION 24: should this statement (indicator) be upgraded? per hospital or per prescribing physician?

Expert meeting: rather YES agreement

It is likely that embolic events are missed due to the short registration time while hospitalised. A longer follow-up of 90 days could increase the detection and improve the quality of care. Case-mix adjustments will be necessary.

KCE: In view of the recommendation on prophylaxis and the questions raised on the correct usage, this indicator might be of high relevance to the quality of care of patients.

11.4.3	Postoperative	Number of patients with • decubitus • urine infection • postop respiratory failure • iatrogenic pneumothorax • postop sepsis • postop wound dehiscence • postop haemorrhage or haematoma • accidental puncture or laceration • postop metabolic derangements • death, all cause 30-day mortality • readmission, all cause 30-day	Several indicators. Depends on the bullet point. Some others may be measured on TCT data if admission required (postop sepsis, readmission or iatrogenic pneumothorax probably but not urine infection p.ex). All cause 30-D=IMA data. Readmissions 30 D=TCT data.	For a selection of indicators: Percentage of patients with knee replacement intervention (denominator) with (infection, mortality, readmission) in the 90 days after intervention, per hospital? (IMA data, identification with or LMWH) NB: or coupling TCT-IMA data to capture admissions for the selection (infection)
--------	---------------	---	---	--

DISCUSSION: The list of postoperative complications is long, and some are interlinked. It may therefore be good to focus on for example DVT, long embolism (see above indicator), infection, mortality, and readmission.



QUESTION 25: do you agree with the proposal to select for wound infection, mortality, readmission? Would you upgrade this quality statement (definition) proposition?

Expert meeting: YES agreement

Orthopride registration included mortality and readmission preferably 90 days as this could be compared to international datasets (used in US based insurance). Please add the registration of revision as an indicator for late complication.

11.4.4	Postoperative	Primary care practitioners should refer people who develop new or worsening pain, limp or loss of function related to their joint replacement to an orthopaedic surgical service.	Probably measurable – referral in MZG – RHM (quality information?)	Percentage of patients with knee replacement intervention (denominator) addressed by GP (MZG – RHM: only measurable per hospital?). Calculation per GP is more complex (IMA data).
---------------	---------------	---	--	---

QUESTION 26: should this statement (indicator) be upgraded?

Expert meeting: NOT agreement

The patient is most likely to directly contact the specialist. This will not contribute to quality of care.

Expert meeting: EXTRA indicators

Revision in a time frame of 1 year of the replacement surgery as part of the complications.

A management pathway for patients with chronic osteoarthritis and chronic pain including which doctor or professional should coordinate. Typically, an orthopaedic surgeon works from intervention to intervention and from a patient perspective this results in sequential interventions instead of a pathway or a care programme. Example the Netherlands.

Expert meeting: non-measurable indicators with high rating should be considered further. Examples, education preop, advice etc see list with ratings



■ REFERENCES

1. Global, regional, and national burden of osteoarthritis, 1990-2020 and projections to 2050: a systematic analysis for the Global Burden of Disease Study 2021. *Lancet Rheumatol.* 2023;5(9):e508-e22.
2. Murphy L, Schwartz TA, Helmick CG, Renner JB, Tudor G, Koch G, et al. Lifetime risk of symptomatic knee osteoarthritis. *Arthritis Rheum.* 2008;59(9):1207-13.
3. Hunter DJ, Bierma-Zeinstra S. Osteoarthritis. *Lancet.* 2019;393(10182):1745-59.
4. Spitaels D, Mamouris P, Vaes B, Smeets M, Luyten F, Hermens R, et al. Epidemiology of knee osteoarthritis in general practice: a registry-based study. *BMJ Open.* 2020;10(1):e031734.
5. National Institute for Health and Care Excellence. Osteoarthritis in over 16s: diagnosis and management. NICE guideline [NG226]. 2022. Available from: <https://www.nice.org.uk/guidance/ng226>
6. The Royal Australian College of General Practitioners. Guideline for the management of knee and hip osteoarthritis. 2nd edn. East Melbourne, Vic: RACGP. 2018.
7. da Costa BR, Reichenbach S, Keller N, Nartey L, Wandel S, Jüni P, et al. Effectiveness of non-steroidal anti-inflammatory drugs for the treatment of pain in knee and hip osteoarthritis: a network meta-analysis. *Lancet.* 2017;390(10090):e21-e33.
8. Zeng C, Wei J, Persson MSM, Sarmanova A, Doherty M, Xie D, et al. Relative efficacy and safety of topical non-steroidal anti-inflammatory drugs for osteoarthritis: a systematic review and network meta-analysis of randomised controlled trials and observational studies. *Br J Sports Med.* 2018;52(10):642-50.
9. Jüni P, Hari R, Rutjes AW, Fischer R, Silletta MG, Reichenbach S, et al. Intra-articular corticosteroid for knee osteoarthritis. *Cochrane Database Syst Rev.* 2015;2015(10):Cd005328.



10. van Middelkoop M, Arden NK, Atchia I, Birrell F, Chao J, Rezende MU, et al. The OA Trial Bank: meta-analysis of individual patient data from knee and hip osteoarthritis trials show that patients with severe pain exhibit greater benefit from intra-articular glucocorticoids. *Osteoarthritis Cartilage*. 2016;24(7):1143-52.
11. Brignardello-Petersen R, Guyatt GH, Buchbinder R, Poolman RW, Schandelmaier S, Chang Y, et al. Knee arthroscopy versus conservative management in patients with degenerative knee disease: a systematic review. *BMJ Open*. 2017;7(5):e016114.
12. Siemieniuk RAC, Harris IA, Agoritsas T, Poolman RW, Brignardello-Petersen R, Van de Velde S, et al. Arthroscopic surgery for degenerative knee arthritis and meniscal tears: a clinical practice guideline. *Bmj*. 2017;357:j1982.
13. Higashi H, Barendregt JJ. Cost-effectiveness of total hip and knee replacements for the Australian population with osteoarthritis: discrete-event simulation model. *PLoS One*. 2011;6(9):e25403.
14. Ferket BS, Feldman Z, Zhou J, Oei EH, Bierma-Zeinstra SM, Mazumdar M. Impact of total knee replacement practice: cost effectiveness analysis of data from the Osteoarthritis Initiative. *Bmj*. 2017;356:j1131.
15. Spitaels D, Vankrunkelsven P, Desfosses J, Luyten F, Verschueren S, Van Assche D, et al. Barriers for guideline adherence in knee osteoarthritis care: A qualitative study from the patients' perspective. *Journal of evaluation in clinical practice*. 2017;23(1):165-72.
16. Spitaels D, Vankrunkelsven P, Grypdonck L, Duser FR, Aertgeerts B, Luyten FP, et al. Quality of Care for Knee Osteoarthritis in Primary Care: A Patient's Perspective. *Arthritis care & research*. 2020;72(10):1358-66.
17. Spitaels D, Hermens R, Van Assche D, Verschueren S, Luyten F, Vankrunkelsven P. Are physiotherapists adhering to quality indicators for the management of knee osteoarthritis? An observational study. *Musculoskeletal science & practice*. 2017;27:112-23.
18. Meeus P, Dalcq V, Beauport D, Declercq K, Hoekx L, Sierens K, et al. RIZIV – INAMI. Medical practice variations: Knee prosthesis. 2023. Available from: <https://www.healthybelgium.be/en/medical-practice-variations/musculoskeletal-system/lower-limbs/knee-prosthesis>
19. Busse R, Klazinga N, Panteli B, Quentin W. Improving healthcare quality in Europe. Characteristics, effectiveness and implementation of different strategies. The European Observatory on Health Systems and Policies and OECD. Health Policy Series No. 53. 2019. Available from: <https://eurohealthobservatory.who.int/publications/i/improving-healthcare-quality-in-europe-characteristics-effectiveness-and-implementation-of-different-strategies-study>
20. Grypdonck L, Aertgeerts B, Luyten F, Wollersheim H, Bellemans J, Peers K, et al. Development of quality indicators for an integrated approach of knee osteoarthritis. *The Journal of rheumatology*. 2014;41(6):1155-62.
21. Spitaels D, Hermens R, Luyten FP, Vandenuecker H, Aertgeerts B, Verschueren S, et al. Educational outreach visits to improve knee osteoarthritis management in primary care. *BMC medical education*. 2019;19(1):66.
22. Kampshoff CS, Peter WFH, van Doormaal MCM, Knoop J, Meerhoff GA, Vliet Vlieland TPM. KNGF-richtlijn Artrose heup-knie: Conservatieve, pre- en postoperatieve behandeling 2018. Available from: <https://www.kngf.nl/binaries/content/assets/kennisplatform/onbeveiligd/richtlijnen/artrose-heup-knie/downloads/kngf-richtlijn-artrose-heup-knie-2018.pdf>
23. Arslan IG, Rozendaal RM, van Middelkoop M, Stitzinger SAG, Van de Kerkhove MP, Voorbrood VMI, et al. Quality indicators for knee



- and hip osteoarthritis care: a systematic review. RMD open. 2021;7(2).
24. Bennett B, Coventry E, Greenway N, Minchin M. The NICE process for developing quality standards and indicators. Z Evid Fortbild Qual Gesundheitswes. 2014;108(8-9):481-6.
25. Australian Commission on Safety and Quality in Health Care. Osteoarthritis of the Knee Clinical Care Standard. 2017. Available from: <https://www.safetyandquality.gov.au/sites/default/files/migrated/Osteoarthritis-of-the-knee-Clinical-Care-Standard.pdf>
26. National Institute for Health and Care Excellence. Osteoarthritis in over 16s. Quality standard [QS87]. 2022. Available from: <https://www.nice.org.uk/guidance/qs87>
27. National Institute for Health and Care Excellence. Joint replacement (primary): hip, knee and shoulder. Quality standard [QS206]. 2022. Available from: <https://www.nice.org.uk/guidance/qs206/chapter/Quality-statements>
28. Litwic A, Edwards MH, Dennison EM, Cooper C. Epidemiology and burden of osteoarthritis. Br Med Bull. 2013;105:185-99.
29. Kellgren J, Lawrence J. Atlas of standard radiographs. The epidemiology of chronic rheumatism. Vol. 2. Blackwell Scientific Publications; Oxford: 1963.
30. Vlaamse Overheid. [cited October 8th 2023]. Available from: <https://www.zorg-en-gezondheid.be/Beleid/>
31. e-gezondheid portaal INAMI - RIZIV. QERMID©ORTHOpriide. 2022/01/18/14:05:51. Available from: <https://www.ehealth.fgov.be/nl/beroepsbeoefenaars-in-de-gezondheidszorg/diensten/qermidorthopriide>
32. OECD, European Union. Health at a Glance: Europe 2022. 2022.
33. ORTHOpriide. Belgian Hip and Knee Arthroplasty Register. Annual Report. 2022.
34. Donabedian A. The quality of care. How can it be assessed? Jama. 1988;260(12):1743-8.
35. Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan-a web and mobile app for systematic reviews. Syst Rev. 2016;5(1):210.
36. 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.
37. MacLean CH, Pencharz JN, Saag KG. Quality indicators for the care of osteoarthritis in vulnerable elders. Journal of the American Geriatrics Society. 2007;55 Suppl 2:S383-91.
38. Wiedermann CJ, Marino P, van der Zee-Neuen A, Mastrobuono I, Mahlknecht A, Barbieri V, et al. Patient-Reported Quality of Care for Osteoarthritis in General Practice in South Tyrol, Italy: Protocol for Translation, Validation and Assessment of the OsteoArthritis Quality Indicator Questionnaire (OA-QI). Methods Protoc. 2023;6(2).
39. Peter WF, Hurkmans EJ, van der Wees PJ, Hendriks EJ, van Bodegom-Vos L, Vliet Vlieland TP. Healthcare Quality Indicators for Physiotherapy Management in Hip and Knee Osteoarthritis and Rheumatoid Arthritis: A Delphi Study. Musculoskeletal care. 2016;14(4):219-32.
40. Peter WF, van der Wees PJ, Hendriks EJ, de Bie RA, Verhoef J, de Jong Z, et al. Quality indicators for physiotherapy care in hip and knee osteoarthritis: development and clinimetric properties. Musculoskeletal care. 2013;11(4):193-202.
41. Westby MD, Marshall DA, Jones CA. Development of quality indicators for hip and knee arthroplasty rehabilitation. Osteoarthritis and cartilage. 2018;26(3):370-82.



42. 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.
43. Rolfson O, Wissig S, van Maasakkers L, Stowell C, Ackerman I, Ayers D, et al. Defining an International Standard Set of Outcome Measures for Patients With Hip or Knee Osteoarthritis: Consensus of the International Consortium for Health Outcomes Measurement Hip and Knee Osteoarthritis Working Group. *Arthritis Care Res (Hoboken).* 2016;68(11):1631-9.
44. Van Schie P, Van Bodegom-Vos L, Van Steenbergen LN, Nelissen R, Marang-van de Mheen PJ, Iq Joint Study G. A more comprehensive evaluation of quality of care after total hip and knee arthroplasty: combining 4 indicators in an ordered composite outcome. *Acta Orthop.* 2022;93:138-45.
45. Teo PL, Hinman RS, Egerton T, Dziedzic KS, Kasza J, Bennell KL. Patient-reported quality indicators to evaluate physiotherapy care for hip and/or knee osteoarthritis- development and evaluation of the QUIPA tool. *BMC musculoskeletal disorders.* 2020;21(1):202.
46. Østerås N, Garratt A, Grotle M, Natvig B, Kjekken 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.
47. Østerås N, Tveter AT, Garratt AM, Svinøy OE, Kjekken I, Natvig B, et al. Measurement properties for the revised patient-reported OsteoArthritis Quality Indicator questionnaire. *Osteoarthritis Cartilage.* 2018;26(10):1300-10.
48. Oomen JMH, Peters YAS, van den Ende CH, Schers HJ, Assendelft WJJ, Vriezekolk JE, et al. Quality of knee osteoarthritis care in the Netherlands: a survey on the perspective of people with osteoarthritis. *BMC health services research.* 2022;22(1):631.
49. Blackburn S, Higginbottom A, Taylor R, Bird J, Østerås N, Hagen KB, et al. Patient-reported quality indicators for osteoarthritis: a patient and public generated self-report measure for primary care. *Res Involv Engagem.* 2016;2:5.
50. 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 services research.* 2014;14:598.
51. Ingelsrud LH, Roos EM, Gromov K, Jensen SS, Troelsen A. Patients report inferior quality of care for knee osteoarthritis prior to assessment for knee replacement surgery - a cross-sectional study of 517 patients in Denmark. *Acta orthopaedica.* 2020;91(1):82-7.
52. Li LC, Sayre EC, Kopec JA, Esdaile JM, Bar S, Cibere J. Quality of nonpharmacological care in the community for people with knee and hip osteoarthritis. *The Journal of rheumatology.* 2011;38(10):2230-7.
53. Gustavsson L, Mohaddes M, Samsson K, Beischer S. No major difference in perceived quality of care in patients with hip or knee osteoarthritis assessed in a physical therapy-led triage compared with standard care: a randomized controlled trial. *BMC Musculoskelet Disord.* 2023;24(1):530.
54. Cai X, Cram P, Vaughan-Sarrazin M. Are African American patients more likely to receive a total knee arthroplasty in a low-quality hospital? *Clinical orthopaedics and related research.* 2012;470(4):1185-93.
55. Jansen MJ, Hendriks EJ, Oostendorp RA, Dekker J, De Bie RA. Quality indicators indicate good adherence to the clinical practice guideline on "Osteoarthritis of the hip and knee" and few prognostic factors influence outcome indicators: a prospective cohort study. *European journal of physical and rehabilitation medicine.* 2010;46(3):337-45.
56. Smink AJ, Bierma-Zeinstra SM, Schers HJ, Swierstra BA, Kortland JH, Bijlsma JW, et al. Non-surgical care in patients with hip or knee osteoarthritis is modestly consistent with a stepped care strategy



- after its implementation. International journal for quality in health care : journal of the International Society for Quality in Health Care. 2014;26(4):490-8.
57. van Schie P, van Bodegom-Vos L, Zijdemans TM, Nelissen R, Marang-van de Mheen PJ, group IQJs. Effectiveness of a multifaceted quality improvement intervention to improve patient outcomes after total hip and knee arthroplasty: a registry nested cluster randomised controlled trial. *BMJ Qual Saf.* 2023;32(1):34-46.
58. EUMUSC.net. Musculoskeletal conditions health care quality indicators (WP6). We can only be sure to improve what we can actually measure? Health care quality indicators OA. [Web page].2008 [cited 13/04/2023]. Available from: http://eumusc.net/workpackages_wp6.cfm
59. Devos Carl CA, Lefèvre Mélanie, Obyn Caroline, Renard Françoise, Bouckaert Nicolas, Gerkens Sophie, Maertens de Noordhout Charline, Devleeschauwer Brecht, Haelterman Margareta, Léonard Christian, Meeus Pascal,. Performance of the Belgian health system – Report 2019. 2019. Available from: <https://kce.fgov.be/node/1783>
60. Federale overheidsdienst. Volksgezondheid vvdvel. Programma Pay for Performance (P4P) voor algemene ziekenhuizen [Web page].2022. Available from: <https://www.health.belgium.be/nl/programma-pay-performance-p4p-voor-algemene-ziekenhuizen>
61. Belgium Fah. Health System Performance Assessment. Quality of healthcare. Safety of care. [Web page].2019. Available from: <https://www.healthbelgium.be/en/health-system-performance-assessment/quality-of-care/security-of-care#QS-3>
62. Haute Autorité de Santé. Indicateurs pour la mesure nationale des complications en chirurgie orthopédique. 2021.
63. de Vos MLG, Kooistra M, Graafmans WC. RIVM rapport 260101003/2007. Kwaliteitsindicatoren voor de orthopedie. Ontwikkeling en toepassing van een set indicatoren. 2007. Available from: <https://rivm.openrepository.com/bitstream/handle/10029/16490/260101003.pdf;jsessionid=2517270654B128A1B975EDD0CDC65670?sequence=1>
64. Vrijens France DGK, Camberlin Cécile. . The volume of surgical interventions and its impact on the outcome: feasibility study based on Belgian data. 2009. KCE Reports 113C Available from: <https://kce.fgov.be/en/publications/all-reports/the-volume-of-surgical-interventions-and-its-impact-on-the-outcome-feasibility-study-based-on>
65. Zorginstituut Nederland. Indicatorenset Knieprothese. Uitvraag ziekenhuizen/ZBC's over verslagjaar 2022. Versie, maart 2022. 2022. Available from: <https://www.lroi.nl/downloads/228/indicatorenengids-knieprothese-tkp-verslagjaar-2022.pdf>
66. Quality AfHRA. Patient Safety Indicators Resources. [Web page].2022. Available from: https://qualityindicators.ahrq.gov/measures/psi_resources
https://qualityindicators.ahrq.gov/Downloads/Modules/PSI/PSI_Composite_Development.pdf
67. Vlayen Joan BN, Robays Jo. Routine preoperative testing in adults undergoing elective non-cardiothoracic surgery. Good Clinical Practice (GCP). KCE Reports 280. 2017. Available from: <https://kce.fgov.be/en/publications/all-reports/routine-preoperative-testing-in-adults-undergoing-elective-non-cardiothoracic-surgery>
68. Hoffmann-Eßer W, Siering U, Neugebauer EAM, Lampert U, Eikermann M. Systematic review of current guideline appraisals performed with the Appraisal of Guidelines for Research & Evaluation II instrument-a third of AGREE II users apply a cut-off for guideline quality. *J Clin Epidemiol.* 2018;95:120-7.



69. Bruyère O, Honvo G, Veronese N, Arden NK, Branco J, Curtis EM, et al. An updated algorithm recommendation for the management of knee osteoarthritis from the European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO). *Semin Arthritis Rheum*. 2019;49(3):337-50.
70. Bannuru RR, Osani MC, Vaysbrot EE, Arden NK, Bennell K, Bierma-Zeinstra SMA, et al. OARSI guidelines for the non-surgical management of knee, hip, and polyarticular osteoarthritis. *Osteoarthritis Cartilage*. 2019;27(11):1578-89.
71. Kolasinski SL, Neogi T, Hochberg MC, Oatis C, Guyatt G, Block J, et al. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. *Arthritis & Rheumatology*. 2020;72(2):220-33.
72. American Academy of Orthopaedic Surgeons. Management of Osteoarthritis of the Knee (NonArthroplasty) Evidence-Based Clinical Practice Guideline. 2021. Available from: <https://www.aaos.org/oak3cpg>
73. National Institute for Health and Care Excellence. Joint replacement (primary): hip, knee and shoulder. NICE guideline [NG157]. 2020. Available from: <https://www.nice.org.uk/guidance/ng157>
74. National Institute for Health and Care Excellence. Surgical site infections: prevention and treatment. NICE guideline [NG125]. 2020. Available from: <https://www.nice.org.uk/guidance/ng125>
75. National Institute for Health and Care Excellence. Venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism. NG89. 2018. Available from: www.nice.org.uk/guidance/ng89
76. American Academy of Orthopaedic Surgeons. Surgical Management of Osteoarthritis of the Knee. Clinical Practice Guideline. 2022. Available from: <https://www.aaos.org/quality/quality-programs/lower-extremity-programs/surgical-management-of-osteoarthritis-of-the-knee/>
77. Wainwright TW, Gill M, McDonald DA, Middleton RG, Reed M, Sahota O, et al. Consensus statement for perioperative care in total hip replacement and total knee replacement surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations. *Acta Orthop*. 2020;91(1):3-19.
78. The Healthcare Excellence Canada and Enhanced Recovery Canada. Clinical Pathway for Inpatient and Outpatient Hip and Knee Arthroplasty. 2021. Available from: https://www.healthcareexcellence.ca/media/k0mbozhc/erc_clinical_pathway_arthro_july2021_en.pdf
79. Leroy R DGC, Stordeur S, Silversmit G, Verleye L, Schillemans V, Savoye I, Vanschoenbeek K, Vlayen J, Van Eycken L, Beguin C, Dubois C, Carp L, Casselman J, Daisne JF, Deron P, Hamoir M, Hauben E, Lenssen O, Nuyts S, Van Laer C, Vermorken J, Grégoire V. Quality indicators for the management of head and neck squamous cell carcinoma – Short report. *KCE Reports 305Cs*. D/2019/10.273/03. . 2019. .
80. Kerr DR, Kohan L. Local infiltration analgesia: a technique for the control of acute postoperative pain following knee and hip surgery: a case study of 325 patients. *Acta Orthop*. 2008;79(2):174-83.
81. American Academy of Orthopaedic Surgeons. Management of Osteoarthritis of the Knee (Non Arthroplasty) Evidence-Based Clinical Practice Guideline. 2021. Available from: <https://www.aaos.org/oak3cpg>
82. Osteras N, Moseng T, van Bodegom-Vos L, Dziedzic K, Mdala I, Natvig B, et al. Implementing a structured model for osteoarthritis care in primary healthcare: A stepped-wedge cluster-randomised trial. *PLoS medicine*. 2019;16(10):e1002949.
83. Agency for Healthcare Research and Quality. Measures of Patient Safety Based on Hospital Administrative DataCThe Patient Safety



- Indicators. 2002. Available from: <https://archive.ahrq.gov/downloads/pub/evidence/pdf/psi/psi.pdf>
84. Intego. Barometers [Web page].2023. Available from: <https://www.intego.be/barometers>
85. Belgian Society of Radiology. Correct use of medical imaging [Web page].2010. Available from: <https://www.bsr-web.be/resources/guidelines>
86. Borck M, Wandrey JD, Höft M, Kastelik J, Perka C, Tafelski S, et al. Local infiltration analgesia versus peripheral nerve block anaesthesia in total knee arthroplasty: a pharmaco-economic comparison. *BMC Anesthesiol*. 2022;22(1):80.
87. Kerr D R. Local infiltration analgesia a technique to improve outcomes after hip, knee or lumbar spine surgery. London: Informa Healthcare. 2012.
88. Kastelik J, Fuchs M, Krämer M, Trauzeddel RF, Ertmer M, von Roth P, et al. Local infiltration anaesthesia versus sciatic nerve and adductor canal block for fast-track knee arthroplasty: A randomised controlled clinical trial. *Eur J Anaesthesiol*. 2019;36(4):255-63.
89. OECD. Healthcare Quality and Outcomes (HCQO) indicators 2022-23 Definitions. 2022. Available from: <https://www.oecd.org/els/health-systems/Definitions-of-Health-Care-Quality-Outcomes.pdf>
90. Camberlin C, Obyn C, Neyts M. Transversale Budget impact analyses: mogelijkheden bij het gebruik van administratieve databanken. Method. Brussel. Federaal Kenniscentrum voor de Gezondheidszorg (KCE). KCE Reports 369A. DOI: 10.57598/R369AS. 2023.
91. Leroy R, De Gendt C, Stordeur S, Silversmit G, Verleye L, Schillemans V, et al. Quality indicators for the management of head and neck squamous cell carcinoma. *Health Services Research (HSR)*. Brussels. Belgian Health Care Knowledge Centre (KCE). 2019. KCE Reports 305. DOI: 10.57598/R305C. 2019.
92. Grenier JP, Rothmund M, Missmann M. Variation in the utilisation of physiotherapy in patients with advanced knee osteoarthritis prior to total knee arthroplasty a systematic review. *Musculoskeletal Care*. 2023;21(2):338-54.
93. Hinman RS, Jones SE, Nelligan RK, Campbell PK, Hall M, Foster NE, et al. Absence of Improvement With Exercise in Some Patients With Knee Osteoarthritis: A Qualitative Study of Responders and Nonresponders. *Arthritis Care Res (Hoboken)*. 2023;75(9):1925-38.
94. Duong V, Hunter DJ, Nicolson PJA. Predictors and Measures of Adherence to Core Treatments for Osteoarthritis. *Clin Geriatr Med*. 2022;38(2):345-60.
95. World Health Organization. International Classification of Functioning, Disability and Health (ICF) [Web page].2001. Available from: <https://www.who.int/standards/classifications/international-classification-of-functioning-disability-and-health>
96. Kwaliteitscentrum Diagnostiek vzw. BelRAI-Revalidatie. 2023.
97. Steunpunt Welzijn VeG. Onderzoek voor de evaluatie van het BelRAI revalidatie instrument [Web page].2023. Available from: <https://www.steunpuntwvg.be/projecten/onderzoek-voor-de-evaluatie-van-het-belrai-revalidatie-instrument-deel-1>
98. Research Unit for Musculoskeletal Function and Physiotherapy. The Good Life with osteoArthritis in Denmark (GLA:D®)
99. Zywił M, Ellis K, Veillette CJH, Skou ST, McGlasson R. Implementation of the Good Life with osteoArthritis in Denmark (GLA:D) Program across Canada for the Management of Hip and Knee Osteoarthritis. *Healthc Q*. 2021;24(1):54-9.
100. Barton CJ, Kemp JL, Roos EM, Skou ST, Dundules K, Pazzinatto MF, et al. Program evaluation of GLA:D® Australia: Physiotherapist training outcomes and effectiveness of implementation for people with knee osteoarthritis. *Osteoarthr Cartil Open*. 2021;3(3):100175.



101. Canadian Institute for Health Information Organisation for Economic Co-operation and Development OECD. Patient-Reported Indicator Surveys (PaRIS) Initiative: Patient-Reported Outcome Measures (PROMs) for Hip and Knee Replacement Surgery — International Data Collection Guidelines. Ottawa, ON: CIHI; 2019.
102. Kuhns BD, Harris WT, Domb BG. Low Ceiling Effects of the Forgotten Joint Score Compared With Legacy Measures After Joint-Preserving Procedures: A Systematic Review. *Arthroscopy*. 2023;39(9):2086-95.
103. Desomer A Van den Heede Koen, Triemstra M, Paget J, De Boer D, Kohn L, Cleemput I. Use of patient-reported outcome and experience measures in patient care and policy. Health Services Research (HSR) Brussels: Belgian Health Care Knowledge Centre (KCE). 2018. KCE Reports 303. Available from: <https://kce.fgov.be/en/publications/all-reports/use-of-patient-reported-outcome-and-experience-measures-in-patient-care-and-policy>
104. OECD. Caring for quality in health: Lessons learnt from 15 reviews of health care quality. 2017. Available from: <https://www.oecd.org/els/health-systems/Caring-for-Quality-in-Health-Final-report.pdf>
105. Belgian Federal Public Health Service. Pay for Performance Program Indicator fiche patient experiences [Web page].2020. Available from: https://www.health.belgium.be/sites/default/files/4a_fiche_patiente_nervaringen_def.pdf
106. Rolfson O, Bohm E, Franklin P, Lyman S, Denissen G, Dawson J, et al. Patient-reported outcome measures in arthroplasty registries Report of the Patient-Reported Outcome Measures Working Group of the International Society of Arthroplasty Registries Part II. Recommendations for selection, administration, and analysis. *Acta Orthop*. 2016;87 Suppl 1(Suppl 1):9-23.
107. Bohm ER, Kirby S, Trepman E, Hallstrom BR, Rolfson O, Wilkinson JM, et al. Collection and Reporting of Patient-reported Outcome Measures in Arthroplasty Registries: Multinational Survey and Recommendations. *Clin Orthop Relat Res*. 2021;479(10):2151-66.
108. Martel-Pelletier J, Maheu E, Pelletier JP, Alekseeva L, Mkinsi O, Branco J, et al. A new decision tree for diagnosis of osteoarthritis in primary care: international consensus of experts. *Aging Clin Exp Res*. 2019;31(1):19-30.
109. Calders P, Van Ginckel A. Presence of comorbidities and prognosis of clinical symptoms in knee and/or hip osteoarthritis: A systematic review and meta-analysis. *Semin Arthritis Rheum*. 2018;47(6):805-13.
110. Geenen R, Overman CL, Christensen R, Åsenlöf P, Capela S, Huisinga KL, et al. EULAR recommendations for the health professional's approach to pain management in inflammatory arthritis and osteoarthritis. *Annals of the Rheumatic Diseases*. 2018;77(6):797-807.
111. Uson J, Rodriguez-García SC, Castellanos-Moreira R, O'Neill TW, Doherty M, Boesen M, et al. EULAR recommendations for intra-articular therapies. *Annals of the Rheumatic Diseases*. 2021;80(10):1299-305.
112. Brosseau L, Taki J, Desjardins B, Thevenot O, Fransen M, Wells GA, et al. The Ottawa panel clinical practice guidelines for the management of knee osteoarthritis. Part two: strengthening exercise programs. *Clin Rehabil*. 2017;31(5):596-611.
113. Federatie Medisch Specialisten. Totale knieprothese. 2021. Available from: https://richtlijnendatabase.nl/richtlijn/totale_knieprothese/startpagina_-_totale_knieprothese_tkp.html
114. Federale overheidsdienst. Volksgezondheid vvdvel. Programma Pay for Performance (P4P) voor algemene ziekenhuizen [Web page].2019. Available from:



<https://www.health.belgium.be/nl/programma-pay-performance-p4p-2019>

115. Teo PL, Hinman RS, Egerton T, Dziedzic KS, Bennell KL. Identifying and Prioritizing Clinical Guideline Recommendations Most Relevant to Physical Therapy Practice for Hip and/or Knee Osteoarthritis. *J Orthop Sports Phys Ther.* 2019;49(7):501-12.
116. M.L.G. de Vos MK, W.C. Graafmans,. RIVM rapport 260101003/2007. Kwaliteitsindicatoren voor de orthopedie. Ontwikkeling en toepassing van een set indicatoren. 2007. Available from:
<https://rivm.openrepository.com/bitstream/handle/10029/16490/260101003.pdf;jsessionid=2517270654B128A1B975EDD0CDC65670?sequence=1>
117. Devos C CA, Lefèvre M, Obyn C, Renard F, Bouckaert N, Gerken S, Maertens de Noordhout C, et al,. Performance of the Belgian health system – Report 2019. Health Services Research (HSR). Brussels. Belgian Health Care Knowledge Centre (KCE). KCE Reports 313. 2019.
118. Agency for Healthcare Research and Quality. Patient Safety Indicators Resources. [Web page].2022. Available from:
https://qualityindicators.ahrq.gov/measures/psi_resources
https://qualityindicators.ahrq.gov/Downloads/Modules/PSI/PSI_Composite_Development.pdf
119. Apfel CC, Turan A, Souza K, Pergolizzi J, Hornuss C. Intravenous acetaminophen reduces postoperative nausea and vomiting: a systematic review and meta-analysis. *Pain.* 2013;154(5):677-89.