Appendix

A. Literature search

PubMed search (last search April 12th 2023) strategy:

(prediction [title] OR prognostic model [title] OR risk calculator* [title] OR risk model [title] OR nomogram [title] OR risk score [title])

AND arthroplast* [tiab] AND (hip [tiab] OR knee [tiab])

AND (revision [tiab] OR failure [tiab] OR reoperation [tiab] OR mortality [tiab])

B. Frequency of predictors

Predictor	Frequency	LROI	% missing*	Variable definition
Age	29	Yes	0.01%	Standard / harmonized
Gender	21	Yes	0.01%	Standard
ASA	13	Yes	0.4%	Standard
BMI	11	Yes	4.6%	Standard / harmonized
Diabetes mellitus	9	No	-	-
Depression	6	No	-	-
Insurance type	6	No	-	-
Opioid use	6	No	-	-
Charlson comorbidity index	5	Yes	4%	Standard
Fracture	4	Yes	1.3%	Standard
Obesity	4	Yes	4.6%	Harmonized
Osteoarthritis	4	Yes	1.3%	Standard
Previous surgery	4	Yes	unknown	Depends on what surgeries are included in model
Smoking	4	Yes	3%	Standard, though smoking history is absent in LROI
Cancer	3	No	-	-
COPD	3	No	-	-
Drug abuse	3	No	-	-
Fixation	3	Yes	0.6%	Standard / harmonized
Head diameter	3	Yes	0.3%	Standard / harmonized
Operative time	3	No	-	-
Rheumatoid arthritis	3	Yes	1.3%	Standard

Approach	2	Yes	0.7%	Standard / harmonized
Comorbidities	2	No	-	-
C-reactive protein	2	No	-	-
Dementia	2	No	-	-
Electrolyte disorder	2	No	-	-
Hemoglobin	2	No	-	-
Hypertension	2	No	-	-
Morbid obesity	2	Yes	4.6%	Harmonized
Peripheral vascular disease	2	No	-	-
Preoperative anemia	2	No	-	-

* Based on yearly LROI reports, data available since 2017. Lowest validity percentage reported.

NB: only predictors that occurred in more than one model are included in this table.

C. Literature search results

Our literature search resulted in 54 hits, of which 16 papers did not include a prediction model, and 3 papers described a different population. These papers were therefore excluded from this overview. The remaining papers are listed below. The papers highlighted in blue are included in our proposal and can be externally validated using Dutch Arthroplasty Register data.

First author	Year	Cohort	Outcome	Predictors	Sample size	DOI	Reason
Buddhiraju	2023	revision TKA	nonhome discharge	age, BMI, revision for infection, perioperative transfusion, ASA	52,533	10.1016/j.arth.2023.02.054	Outcome + predictors not available in LROI
Klemt	2023	revision TKA	PJI	smoking, age, gender, medicare insurance, revision indication, depression, diabetes, extremity condition, obesity, drug abuse, >1 open procedure prior to revision TKA	1,432	10.1055/s-0043-1761259	not all predictors available in LROI
Cuthbert	2022	THA and TKA	time to revision	THA: femoral cement, patient depression, use of pain medication (opioids), gastro-oesophageal refux disease, gender, age and steroid responsive diseases TKA: age, use of pain medication (opioids), use of patella resurfacing, prosthesis stability, prosthesis bearing surface, and patient depression	321,945 + 151,113	10.1186/s12874-022-01644-3	not all predictors available in LROI
Klemt	2022	THA	revision within 2 years	Charlson comorbidity index, obesity, depression, nonprivate insurance, diabetes, age, gender	7,397	10.5435/JAAOS-D-21-01039	not all predictors available in LROI
Lu	2022	THA	1 year mortality	age, Charlson Comorbidity Index, ASA, urea, serum Ca2+, postoperative hemoglobin	246	10.3389/fsurg.2022.926745	not all predictors available in LROI

Onishchenko	2022	THA and TKA	Postoperative major adverse cardiac events	comorbidities: respiratory, cardiovascular, opthalmological, hypertensive, immune, hematologic, reproductive, central nervous system, all infections, injuries, respiratory infections, musculoskeletal, frailty, integumentary, metabolic, endocrine, digestive, psychiatric, bacterial infections, peripheral nervous system, fungal & infections, neoplasms, otic, allergies, developmental.	445,391	10.1161/J AHA.121.0 23745	not all predictors available in LROI
Pakarinen	2022	THA	revision for dislocation	mean corpuscular volume, age, gender, Charlson comorbidity index, use of anti-Parkinson drugs, psychiatric or neurological disease, femoral head size, serum creatinine level, ASA, BMI, acetabular fixation, primary reason for surgery, use of antiepileptic drugs, femoral fixation	16,454	10.1371/j ournal.po ne.027438 4	not all predictors available in LROI
Sancho	2022	DAIR	failed DAIR	serum CRP levels, positive blood cultures, indication for index arthroplasty other than osteoarthritis, not exchanging the modular components, use of immunosuppressive medication, late acute (haematogenous) infections, methicillin-resistant Staphylococcus aureus infection, overlying skin infection, polymicrobial infection, and age	64	10.3390/d iagnostics 12092097	Outcome + predictors not available in LROI
Wyles	2022	THA	dislocation	age, gender, BMI, neurologic disease, spine disease, spine procedure, THA indication, approach/liner/head size	29,349	10.2106/J BJS.21.011 71	not all predictors available in LROI
Xie	2022	TKA	90 day local complications	reoperation (including implant revision or removal for any reason and manipulation under anesthesia), infection, bleeding requiring ≥4 unit transfusion of red blood cells within 72 hours of surgery, and peripheral nerve injury	410	10.1177/2 32596712 11073331	Outcome + predictors not available in LROI
Andersen	2021	TKA	2 year revision	gender, BMI, age, pain rest, pain activity, diabetes mellitus, previous surgery in the knee, OKS, EQ-5D, length of stay, duration of surgery, number of comorbidities	538	10.1016/j. jor.2021.0 3.001	not all predictors available in LROI
Fassihi	2021	THA	30 day mortality	preoperative international normalized ratio, age, body mass index, operative time, and preoperative hematocrit	77,145	10.1016/j. jor.2021.1 1.013	not all predictors available in LROI

Garland	2021	THA	90 day mortality	Age, sex, ASA, cancer, CNS disease, kidney disease, obesity	53,099	10.1302/0301-620X.103B3.BJJ-2020-1249.R1	not all predictors available in LROI
Klemt	2021	revision TJA for PJI	reinfection	previous DAIR, previous surgeries, obesity, drug abuse, depression, smoking, presence of Enterococcus species	1081	10.1016/j.arth.2020.08.004	Outcome + predictors not available in LROI
Meyer	2021	THA and TKA	adverse events	hospital frailty score, operative time, gender, age, ASA	565	10.1007/s00264-021-05038-w	Outcome + predictors not available in LROI
Shah	2021	THA	complications	Malnutrition, dementia, cancer, COPD, Medicare, chronic arthrosclerosis, renal failure, other insurance, osteoarthritis, workers' compensation, skeletal disorders, Medi-Cal, rheumatoid arthritis, diabetes, morbid obesity, hospital volume, age	545	10.1016/j.arth.2020.12.040	Outcome + predictors not available in LROI
Venäläinen	2021	THA	Short-term revision for infection, revision for dislocation, revision for fracture, death	Infection: ASA, gender, BMI, anesthesia Dislocation: ASA, pre-op diagnosis, previous op, surgical approach, head diameter Fracture: ASA, age, fixation Death: ASA, age, preop diagnosis	25,919	10.2106/JBJS.OA.20.00091	included
Williams	2021	TKA	90 day mortality	age, gender, cancer, COPD, gout, heart failure, hypertension, kidney disease, osteoarthritis, diabetes mellitus type 2, opioid use, psycholeptics use	193,615	10.1007/s00167-021-06799-y	not all predictors available in LROI

Dibra	2020	THA and TKA	discharge destination	age, gender, ambulation, walking aids, use of community support, postoperative caregiver,	716	10.1016/j.arth.2020.05.057	Outcome + predictors not available in LROI
Meyer	2020	THA and TKA	adverse events	Hospital Frailty Risk Score, age, sex, ASA	8250	10.1016/j.arth.2020.06.087	Outcome + predictors not available in LROI
Zhang	2020	TKA	Mega prosthetic failure	motion mode (fixed/hinged), BMI, type of surgery (primary/revision), type of prosthesis, length of bone resection, operative time	214	10.1016/j.arth.2020.05.016	not all predictors available in LROI
Harris	2019	TKA and THA	30 day mortality	Age, ASA, functional health status, bleeding disorders, dialysis, disseminated cancer, sepsis, >10% loss body weight	107,792	10.1097/CORR.0000000000000601	not all predictors available in LROI
Jain	2019	THA, TKA, and posterior lumbar fusions	90 day complications, 90 day readmission, and 1 year revision surgery	pre-operative opioid use	14,734 + 32,667 + 10,681	10.2106/JBJS.18.00502	Outcome + predictors not available in LROI
Klausing	2019	TKA	postoperative medical complications	Charlson Comorbidity Index, Index of Coexistent Disease, age, hemoglobin, hematocrit, creatinine, leukocytes, c-reactive protein, international normalized ratio, partial thromboplastin time.	649	doi: 10.1016/j.arth.2018.12.034	Outcome + predictors not available in LROI
Verbeek	2019	TKA	5 year functional outcome	Age, gender, functional KSS, reason for revision, type of bone defect	295	10.1007/s00167-019-05365-x	Outcome + predictors not available in LROI

Harris	2018	TKA and THA in veterans	30 day mortality	Age, CVA, PTCA, dyspnea-minimal exertion, dyspnea rest, albumin, thromboplastin time, wound infection, dementia, ulcers, malignancy, hemiplegia, angina, PVD, ASA	70,569	10.1016/j.arth.2017.12.003	not all predictors available in LROI
Starr	2018	TKA	revision TKA	Chronic opioid use, age, gender, BMI, diabetes, chronic kidney disease, nonchronic opioid use	32,297	10.1097/AJP.0000000000000544	not all predictors available in LROI
Tan	2018	THA and TKA	Periprosthetic joint infection	BMI, gender, government insurance, THA/TKA/revision, prior procedures, comorbidities, smoking, drug abuse	27,717	10.2106/JBJS.16.01435	not all predictors available in LROI
Everhart	2016	TKA, revision TKA, THA, revision THA	30 day infection, 1 year infection	Procedure, COPD, Diabetes mellitus, rheumatoid arthritis, smoking, osteomyelitis, fracture, morbid obesity, bone cancer, reaction to implant, staphylococcal septicemia,	6,789	10.2106/JBJS.15.00988	not all predictors available in LROI
Hussey	2016	Metal-on-metal THA	Revision risk	Harris hip score, blood metal ion levels	1,709	10.2106/JBJS.15.00685	not all predictors available in LROI
Inacio	2015	THA and TKA	Revision surgery	Age, gender, diagnosis (ICD-10), Charlson, ATC code comorbidities, Elixhauser	11,848 + 18,972	10.1016/j.arth.2015.06.009	not all predictors available in LROI
Paxton	2015	THA and TKA	Revision risk	TKA: Age, sex, BMI, Diabetes mellitus, osteoarthritis, post traumatic artritis, osteonecrose THA: sex, age, BMI, osteoarthritis	22,721 + 41,750	10.1007/s11999-015-4506-4	included
Sabry	2014	TKA	infection after two-stage revision	BMI, time from index surgery, duration of symptoms, number of previous surgeries, hemoglobin, soft tissue coverage required, previous infection same joint, previous two-stage revision, type of organism, diabetes, immunocompromised, heart disease	314	10.1016/j.arth.2013.04.016	not all predictors available in LROI

Wuerz	2014	THA and TKA	major postoperative complications	Lowest heart rate, extimated bloos loss, blood urea nitrogen, type of arthroplasty (primary/partial/revision), ethnicity, ASA, comorbidities, fracture	3511	10.1016/j. arth.2013. 09.007	outcome not available in LROI
Bozic	2013	THA	2 year PJI and 90 day mortality	PJI: Gender, age, alcohol abuse, depression, electrolyte disorder, peptic ulcer disease, urinary tract infection, rheumatologic disease, preoperative anemia, cardiopulmonary (cardiac arrhythmia, congestive heart failure, ischemic heart disease, chronic pulmonary disease) comorbidities, and peripheral vascular disease. Mortality: gender, age, electrolyte disorder, hemiplegia/paraplegia, hypertension, hypothyroidism, metastatic tumor, preoperative anemia, coagulopathy, cardiopulmonary (congestive heart failure, chronic pulmonary disease) and psychiatric (psychoses, depression) comorbidities, malignancies, and peripheral vascular disease	53,252	10.1007/s 11999- 012-2605- z	not all predictors available in LROI