The following content was supplied by the authors as supporting material and has not been copy-edited or verified by JBJS.

Appendix 1. Searched international orthopaedic associations and repositories

Continent	<u>Association</u>	<u>URL</u>
	Argentina Association of Orthopedics and Traumatology (AAOT)	http://www.aaot.org.ar/
	Argentinian Association for the Study of the Hip and Knee (ACARO)	http://www.acaro.org.ar/
South America	Brazilian Society of Knee Surgery (SBCJ)	http://www.sbcj.org.br
	Brazilian Society of Orthopaedics and Traumatology (SBOT)	http://www.portalsbot.org.br/
	Latin American Society of Arthroscopy, Knee and Sports (SLARD)	http://www.slard.org
	Latin American Society of Orthopaedics and Traumatology (SLAOT)	http://www.slaot.org
	AAHKS - American Association of Hip and Knee Surgeons	http://www.aahks.org/
	AAOS - American Academy of Orthopaedic Surgeons	http://www.aaos.org/
	AOASSN - American Orthopaedic Association	https://www.aoassn.org
	Canadian Orthopaedic Association (COA)	http://www.coa-aco.org
North America	Italia-America-Arthroplasty	http://ISK-Institute.com
	Mexican College of Orthopaedics and Traumatology (CMO)	http://www.smo.edu.mx/
	Mexican Federation of Orthopaedic and Traumatology Colleges	http://www.femecot.com/
	(FEMECOT)	
	The Knee Society	http://kneesociety.org
	ESSKA - European Society for Sports Traumatology, Knee Surgery and	https://www.esska.org/
	Arthroscopy	
	Belgian Knee Society (BKS)	https://www.bvot.be/bks
Europe	Belgian Society of Orthopaedics and Traumatology (Belgische Vereniging	http://www.bvot.be
Larope	Voor Orthopedie et Traumatologie) (BVOT)	
	British Association for Surgery of the Knee (BASK)	http://www.baskonline.com/
	British Orthopaedic Association (BOA)	http://www.boa.ac.uk/
	Danish Orthopaedic Society	https://www.ortopaedi.dk/

	European Federation of National Associations of Orthopaedics and Traumatology (EFORT)	http://www.efort.org
	French Society of Orthopaedic Surgery and Traumatology (SOFCOT)	http://www.sofcot-congres.fr/fr/
German Society for Orthopaedics and Orthopaedic Surgery (DGOOC) ht		http://www.dgooc.de
	German-Austrian-Swiss Society for Orthopaedic and Traumatologic Sports Medicine (GOTS)	http://www.gots.org
	Hellenic Association of Orthopaedic Surgery and Traumatology (HAOST/EEXOT)	http://www.eexot.gr
	Italian Society of Knee Surgery, Arthroscopy, Sport, Cartilage and Orthopaedic Technologies (SIGASCOT)	http://www.sigascot.com
	Italian Society of Orthopaedics and Traumatology (SIOT)	http://www.siot.it
	Netherlands Orthopaedic Society (Dutch)	https://www.orthopeden.org/
	NOF - Nordic Orthopaedic Federation	http://www.norf.org/
	Norwegian Orthopaedic Society	https://legeforeningen.no/
	Royal Belgian Society of Orthopaedic Surgery and Traumatology (SORBCOT)	http://www.sorbcot.be
	Spanish Society of Orthopaedic Surgery and Traumatology (SECOT)	http://www.secot.es
	Spanish Society of the Knee (SEROD)	https://www.serod.org
	Swedish Orthopaedic Society	http://www.ortopedi.se
	Swiss Orthopaedic and Traumatology Society	http://www.swissorthopaedics.ch
	Egyptian Orthopaedic Association (EOA)	http://www.eoa.org.eg
Africa	South African Knee Society (SAKS)	http://www.saknee.co.za/
	South African Orthopaedic Association (SAOA)	http://www.saoa.org.za
	AKS - Australian Knee society	https://www.kneesociety.org.au/
	AOA - Australian Orthopaedic Association	http://aoa.org.au
Asia	APAS - Asia Pacific Arthroplasty Society	http://apasonline.org/
Asia	Arthroplasty Society in Asia (ASIA)	http://www.arthroplastyonline.asia
	Asia Pacific Knee Society (APKS)	http://www.apoaonline.com/knee-section.php
	Asian Pacific Orthopaedic Association (APOA)	https://www.apoaonline.com/

	Asia-Pacific Knee, Arthroscopy and Sports Medicine Society (APKASS)	http://www.apkass.org
	Chinese Association of Orthopaedic Surgeons (CAOS)	http://www.caos-china.org
	Chinese Orthopaedic Association (COA)	http://www.coachina.org
	Indian Orthopaedic Association (IOA)	http://www.ioaindia.org
	Indian Society of Hip and Knee Surgeons (ISHKS)	http://www.ishks.com
	Japanese Orthopaedic Association (JOA)	http://www.joa.or.jp
	Japanese Orthopaedic Society of Knee, Arthroscopy and Sports Medicine (JOSKAS)	http://www.joskas.jp/
	Korean Knee Society	http://www.koreaknee.or.kr
	Korean Orthopaedic Association	http://eng.koa.or.kr/
	New Zealand Knee and Sports Surgery Society (NZKSSS)	https://nzoa.org.nz/events/nz-knee-sports-surgery-society
	New Zealand Orthopaedic Association (NZOA)	http://www.nzoa.org.nz
	Pan Arab Orthopaedic Association (PAOA)	http://www.panarabortho.org
	Saudi Orthopaedic Association (SOA)	http://soa.org.sa/
	Singapore Orthopaedic Association (SOA)	http://www.soa.org.sg
Russia	Association of Orthopaedists and Traumatologists of the Russian Federation	http://www.rniito.org/
	ISAKOS - International society of arthroscopy, knee surgery and orthopaedic	https://www.isakos.com/
International	sports medicine	
	International Society of Orthopedic Surgery and Traumatology	http://www.sicot.org/
	Ottawa Inventory	https://decisionaid.ohri.ca
Repositories	NICE Decision Aids	https://www.nice.org.uk
repositories	Cochrane Musculoskeletal group	https://musculoskeletal.cochrane.org/decision-aids
	Laval University	http://www.decisionbox.ulaval.ca

Appendix 2. Criteria for IPDASi & PEMAT assessment

	<u>IPDASi</u>				
	Original	Adapted (if relevant)			
QUALIFYI	NG				
0 = No; 1 =	Yes				
Q1	The patient decision aid describes the health condition or problem	Most will talk about OA			
	(treatment, procedure, or investigation) for which the index decision is required	Our focus is knee arthroplasty/replacement			
Q2	The patient decision aid explicitly states the decision that needs to be considered (index decision)	-			
Q3	The patient decision aid describes the options available for the index decision	Generically should discuss lifestyle changes, medication and surgery.			
		Must talk about surgery (inclusion criteria from screen).			
		If the aid is attempting to focus on surgery (e.g. "is knee replacement right for you?"), it must explicitly state that the aid is only for those who have			
		failed conservative treatment.			
Q4	The patient decision aid describes the positive features (benefits or advantages) of each option.	If the aid fails Q3, they should not be penalised again.			
Q5	The patient decision aid describes the negative features (harms, side effects, or disadvantages) of each option.	If the aid fails Q3, they should <u>not</u> be penalised again.			
Q6	The patient decision aid describes what it is like to experience the consequences of the options (e.g., physical, psychological, social).	Each option should allude to at least one type of each consequence (i.e. physical, psychological and social) for each option.			
CERTIFICA					
1 = Strongly disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree					
C1	The patient decision aid shows the negative and positive features of	This is discussing how/format the material is presented, not if the content			
	options with equal detail (e.g., using similar fonts, sequence,	is lacking.			
	presentation of statistical information).				

The patient decision aid (or associated documentation) provides	-
citations to the evidence selected.	
The patient decision aid (or associated documentation) provides a	2 if the DA has a space where a production date could be filled in.
production or publication date.	
The patient decision aid (or associated documentation) provides	2 if the DA has a space where a "next update" date could be filled in.
information about the update policy.	
"The patient decision aid provides information about the levels of	-
uncertainty around event or outcome probabilities (e.g., by giving a	
The patient decision aid (or associated documentation) provides	Look for logos if not explicitly stated
information about the funding source used for development.	
•	
disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree	
The patient decision aid describes the natural course of the health	For "progress if no action taken": If the DA states that they are looking at
condition or problem, if no action is taken (when appropriate).	a population with moderate-severe arthritis and functional limitations
	affecting activities of daily life, then agree.
The patient decision aid makes it possible to compare the positive and	-
negative features of the available options.	
The patient decision aid provides information about outcome	Penalise further for options missed as at Q3.
probabilities associated with the options (i.e., the likely consequences	
of decisions).	
The patient decision aid specifies the defined group (reference class)	-
of patients for whom the outcome probabilities apply.	
The patient decision aid specifies the event rates for the outcome	<u>Penalise further</u> for options missed as at Q3.
probabilities.	
The patient decision aid allows the user to compare outcome	Penalise further for options missed as at Q3.
probabilities across options using the same time period (when	
feasible).	
	citations to the evidence selected. The patient decision aid (or associated documentation) provides a production or publication date. The patient decision aid (or associated documentation) provides information about the update policy. "The patient decision aid provides information about the levels of uncertainty around event or outcome probabilities (e.g., by giving a range or by using phases such as "our best estimate is '')" The patient decision aid (or associated documentation) provides information about the funding source used for development. disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree The patient decision aid describes the natural course of the health condition or problem, if no action is taken (when appropriate). The patient decision aid makes it possible to compare the positive and negative features of the available options. The patient decision aid provides information about outcome probabilities associated with the options (i.e., the likely consequences of decisions). The patient decision aid specifies the defined group (reference class) of patients for whom the outcome probabilities apply. The patient decision aid specifies the event rates for the outcome probabilities. The patient decision aid allows the user to compare outcome probabilities across options using the same time period (when

Qu7	The patient decision aid allows the user to compare outcome probabilities across options using the same denominator (when feasible).	Penalise further for options missed as at Q3.
Qu8	The patient decision aid provides more than 1 way of viewing the probabilities (e.g., words, numbers, and diagrams).	-
Qu9	The patient decision aid asks patients to think about which positive and negative features of the options matter most to them (implicitly or explicitly).	-
Qu10	The patient decision aid provides a step-by-step way to make a decision.	Must explicitly step out the process or give an overall guide/lay out a series of questions that implicitly lead to decision-making
Qu11	The patient decision aid includes tools like worksheets or lists of questions to use when discussing options with a practitioner.	Should be embedded in DA for completed agreement (i.e. 4) If the DA explicitly references a resource/links to another tool, then agree (i.e. 3)
Qu12	The development process included a needs assessment with clients or patients.	-
Qu13	The development process included a needs assessment with health professionals.	-
Qu14	The development process included review by clients/patients not involved in producing the decision support intervention.	-
Qu15	The development process included review by professionals not involved in producing the decision support intervention.	-
Qu16	The patient decision aid was field tested with patients who were facing the decision.	-
Qu17	The patient decision aid was field tested with practitioners who counsel patients who face the decision.	-
Qu18	The patient decision aid (or associated documentation) describes how research evidence was selected or synthesized.	-
Qu19	The patient decision aid (or associated documentation) describes the quality of the research evidence used.	-

Qu20	The patient decision aid includes authors'/ developers' credentials or	Should explicitly state authors and their degrees/position
	qualifications.	If an organisation, should state their address (affiliations preferred)
Qu21	The patient decision aid (or associated documentation) reports	-
	readability levels (using 1 or more of the available scales).	
Qu22	There is evidence that the patient decision aid improves the match	-
	between the preferences of the informed patient and the option that is	
	chosen.	
Qu23	There is evidence that the patient decision aid helps patients improve	-
	their knowledge about options' features.	
	PEMAT-P.	$\overline{/\mathrm{AV}}$
	Original	Adapted (if relevant)
UNDERST	TANDABILITY	
Content		
1	The material makes its purpose completely evident.	-
2	The material does not include information or content that distracts	-
	from its purpose.	
Word Cho	ice and Style	
3	The material uses common, everyday language.	-
4	Medical terms are used only to familiarize audience with the terms.	-
	When used, medical terms are defined.	
5	The material uses the active voice.	-
Use of Nu	mbers	
6	Numbers appearing in the material are clear and easy to understand.	Any number or probability that is presented.
7	The material does not expect the user to perform calculations.	-
Organisatio	on	
8	The material breaks or "chunks" information into short sections.	-
9	The material's sections have informative headers.	-
10	The material presents information in a logical sequence.	As per guide, information builds in a sequence (not necessarily
		chronological)

11	The material provides a summary.	-
Layout and	Design	
12	The material uses visual cues (e.g., arrows, boxes, bullets, bold,	-
	larger font, highlighting) to draw attention to key points.	
Use of Visu	ual Aids	
15	The material uses visual aids whenever they could make content	As per guide, must have a meaningful effect on understanding the content.
	more easily understood (e.g., illustration of healthy portion size).	Generic photos = disagreement
16	The material's visual aids reinforce rather than distract from the	If $15 = N/A$ or disagree, this must be N/A
	content.	
17	The material's visual aids have clear titles or captions.	If $15 = N/A$ or disagree, this must be N/A
18	The material uses illustrations and photographs that are clear and	If $15 = N/A$ or disagree, this must be N/A
	uncluttered.	
19	The material uses simple tables with short and clear row and column	-
	headings.	
ACTIONA		
20	The material clearly identifies at least one action the user can take.	-
21	The material addresses the user directly when describing actions.	-
22	The material breaks down any action into manageable, explicit steps.	As per guide, must step it out (not enough to generically point patients towards treatments). E.g. 1 Lose weight; 2 Take medication; "N" Go
		for surgery
23	The material provides a tangible tool (e.g., menu planners, checklists)	-
	whenever it could help the user take action.	
24	The material provides simple instructions or examples of how to	-
	perform calculations.	
25	The material explains how to use the charts, graphs, tables, or	-
	diagrams to take actions.	
26	The material uses visual aids whenever they could make it easier to	-
	act on the instructions.	

Appendix 3. Hypothetical cases for decision aids requiring specific patient input

	Low Risk	Medium Risk	<u>High Risk</u>
Demographic	 Middle-aged (52yo) Female BMI 26.7 (overweight; 162cm; 70kg) 	 Middle-aged (52yo) Female BMI 29.7 (borderline obese; 162cm; 78kg) 	- Elderly (66yo) - Female - BMI 34.3 (obese; 162cm; 90kg)
General Health	 No co-morbidities/previous surgeries Otherwise fair health but has had symptoms for >2 years (long standing symptoms) No emotional issues ("all fine"/"not an issue") 	 No co-morbidities/previous surgeries Otherwise fair health but has had symptoms for >2 years (long standing symptoms) Some emotional issues ("some of the time"; medium energy, feeling down) 	 No co-morbidities/previous surgeries Otherwise fair health but has had symptoms for >2 years (long standing symptoms) Emotional issues ("often"; low energy, feeling down)
Knee Symptoms	 Can walk approximately 2km before being limited by pain, >2 flights of stairs can sometimes be an issue Sporadically experiences pain when doing ADLs ("some pain", VAS/NPRS = 4/10) No night pain or at rest Stiffness increasing with some feeling of joint rubbing with movement. Limb alignment is normal Full range of motion (extension/flexion) Feels no instability when doing ADLs (no functional instability) Mechanical symptoms present (e.g. locking or popping) 	 Can walk approximately 1km before being limited by pain, 1 flight of stairs can sometimes be an issue Occasionally experiences pain, increasingly interfering with ADLs ("occasional pain", VAS/NPRS = 6/10) No night pain or at rest Stiffness increasing with some feeling of joint rubbing with movement. Limb alignment is normal Lack of full extension (6 degree flexion contracture) and flexion (105 degrees) Feels no instability when doing ADLs (no functional instability) No mechanical symptoms present (e.g. no locking or popping) 	 Severely limited walking ability (~100m), stairs are an issue Pain at rest and night ("regular pain", VAS/NPRS = 8/10) Joint stiffness with crackling and rubbing within the joint Limb alignment is abnormal (varus) Lack of full extension (12 degree flexion contracture) and flexion (85 degrees) Feels instability when doing ADLs (functional instability) No mechanical symptoms present (e.g. no locking or popping)

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Imaging	 Arthritis predominantly in one compartment Some joint space involvement (Ahlback I - <3mm of joint space narrowing; Kellgren & Lawrence III – 	-	Arthritis predominantly in two compartments Some joint space involvement (Ahlback I - <3mm of joint space narrowing; Kellgren & Lawrence III –	-	Arthritis predominantly in three compartments Severe joint space involvement (Ahlback IV – moderate bone attrition (5-10mm); Kellgren & Lawrence IV – joint space
	moderate joint space narrowing)		moderate joint space narrowing)		great impaired with sclerosis of subchondral bone
Current Treatments	 Is on over the counter pain killers (e.g. aspirin, ibuprofen, etc.) (symptoms as above) No gait aids 	-	Is on over the counter pain killers (e.g. aspirin, ibuprofen, etc.) and does physiotherapy (symptoms as above) No gait aids	-	Has used many non-operative treatments including over the counter pain killers, corticosteroids, ointments, physical therapy and gait aids (uses a cane for all mobility) (symptoms as above)

When decision aid question not covered in hypothetical case, the response of "I don't know" or the most neutral/middle-ground statement was selected.

Appendix 4. Sources of included decision aids

<u>ID</u>	Author / Institution (Year)	<u>Title</u>	<u>Country of</u> <u>Origin</u>	<u>Format</u>	<u>URL</u>
KA041	Tufts Medical Center (NR)	Knee arthritis treatment decision tool: Helping you decide on knee surgery	USA	Webpage	http://medicalequipoise.com/
KA049	Owensboro Health (NR)	Knee-replacement decision aid	USA	Webpage	http://owensborohealthse3.adam.com/content.aspx?productId=68&pid=68&gid=000045
KA140	NHS (2017)	NHS: Deciding what to do about osteoarthritis of the knee	UK	Handout	http://www.northdurhamccg.nhs.uk/wp-content/uploads/2013/07/Osteoarthritis-of-the-Knee-updated-february-2017.pdf
KA145	American Academy of Orthopaedic Surgeons (2016)	Appropriate use criteria: Osteoarthritis of the knee, surgical management	USA	Webpage	http://www.orthoguidelines.org/go/auc/default.cfm?auc_i d=224986&actionxm=Terms
KA146	UW Medicine: Orthopaedics and Sports Medicine (NR)	Total Knee replacement: A patient's guide	USA	Webpage	http://www.orthop.washington.edu/patient- care/articles/knee/total-knee-replacement-patients- guide.html
KA153	NHS (NR)	Total knee replacement referral support facility	UK	Video	http://www.puddletownsurgery.co.uk/info.aspx?p=8

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KA155	NHS (NR)	Should I have a knee replacement?	UK	Handout	http://www.royalberkshire.nhs.uk/Downloads/GPs/GP%2 0protocols%20and%20guidelines/Should%20I%20have% 20a%20TKA%2017.10.12doc
KA296	UConn Musculoskeletal Institute (NR)	Total knee replacement	USA	Webpage	https://health.uconn.edu/msi/clinical-services/orthopaedic-surgery/center-for-joint-USApreservation-and-replUKacement/total-knee-replaceUKment/
KA381	OrthoInfo (2015)	Total knee replacement	USA	Webpage	https://orUSAthoinfo.aaos.org/en/treatment/totaUSAl-knee-replacement/
KA382	Newcastle MAGIC Team (2015)	Osteoarthritis of the knee management options	UK	Handout	https://medical.azureedge.net/decision-aid/knee- osteoarthritis.pdf
KA398	NHS (2008)	Total knee replacement: A Guide for Patients	UK	Handout	https://services.nhslothian.scot/orthopaedics/KneeConditions/TotalKneeReplacementPatientsGuide.pdf
KA419	Advocate Health Care (2016)	Deciding about surgery: Knee OA	USA	Handout	https://www.advocatehealth.com/assets/documents/subsit es/cmc/neurovascular/knee-osteo.pdf
KA427	Arthritis Health (2018)	Undergoing total knee replacement for knee arthritis	USA	Webpage	https://www.arthritis-health.com/surgery/knee-surgery/undergoing-total-knee-replacement-knee-arthritis

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KA472	Teunis, T., Ring, D., Koeing, K., Bozic, K., & Andrawis, J. (NR)	PATIENT+ decision aid: Knee osteoarthritis	The Netherlands	Webpage	https://www.decisionaid.info/
KA496	Ministry of Health, NZ (NR)	Is a knee replacement right for you?	New Zealand	Handout	https://www.health.govt.nz/system/files/documents/pages/is-knee-replacement-right-for-you.pdf
KA498	Queensland Government, Australia (2011)	Consent information: Total knee arthroplasty (knee replacement)	Australia	Handout	https://www.health.qld.gov.au/data/assets/pdf_file/0025/143980/ortho_43.pdf
KA576	NHS (2016)	Overview knee replacement	UK	Webpage	https://www.nhs.uk/conditions/knee-replacement/
KA630	Australian Commission on Safety and Quality in Health Care (2018)	OA of the knee: A decision support tool for patients	Australia	Handout	https://www.safetyandquality.gov.au/wp-content/uploads/2018/05/Designed-draft-DST-for-OAK-for-consultation-April-2018.pdf
KAR1	Healthwise (2018)	Arthritis: Should I have knee replacement surgery?	USA	Webpage	https://decisionaid.ohri.ca/AZsumm.php?ID=1191

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KAR2	McGowan, J., Toupin- April, K., Hawker, G., Rader, T., & Tugwell, P. (2011)	What are my options for managing hip or knee osteoarthritis?	Canada	Handout	https://musculoskeletal.cochrane.org/sites/musculoskeleta l.cochrane.org/files/public/uploads/What%20are%20my% 20options%20for%20managing%20hip%20or%20knee% 20osteoarthritis%20%20June%2015.pdf
KAR3	Universite Laval (2012)	Options for managing hip or knee osteoarthritis	Canada	Handout	http://www.decisionbox.ulaval.ca/fileadmin/documents/decisionbox/document/dbox.hip_knee_osteoarthritis.pdf
KAR5	OptionGrid / Dynamed (2017)	Knee osteoarthritis treatment - Option Grid	USA	Webpage & Handout	http://www.dynamed.com/topics/dmp~AN~T920479/Kne e-osteoarthritis-treatment-Option-Grid
KAA7	AAHKS (2017)	Do I need a joint replacement?	USA	Webpage	https://hipknee.aahks.org/do-i-need-a-joint-replacement/
KAA12	Mexican College of Orthopaedics and Traumatology (NR)	Total knee replacement	Mexico	Handout	http://www.smo.edu.mx/consulta/descargas/tratamiento.p
KAA19	British Orthopaedic Association (2016)	Total knee replacement: A guide for patients	UK	Handout	https://www.boa.ac.uk/patient-information/tkr-patient-advice/

KAA41	Orthoanswer (2012)	Orthoanswer: Knee replacement	Australia	Webpage	http://www.orthoanswer.org/knee-leg/knee-replacement/index.html
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KA – Online aid; KAR – Repository aid; KAA – International Orthopaedic Association aid; NR – Not reported, NHS – National Health Service (United Kingdom); UW – University of Wisconsin; UConn – University of Connecticut; AAHKS – American Association of Hip and Knee Surgeons; NZ – New Zealand; USA – United States of America; UK – United Kingdom; OA - Osteoarthritis