

ID	UNCERTAINTY (summary followed by original submissions)	Source of uncertainty (Codes for respondents: H = health professional, P = patient, C = carer, F = friend, O = other)
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IN SCOPE Round 1

Care & Support

Qn No.	Original question	Respondent
C1: What social care do people need after revision knee surgery?		
9.3	What are the best pathways for those without social or family to go home to	PC
53.3	I am 80 years of age and after the operation my only available carer is only able to help full time for one week. Is this enough ?	PC
59.2	What physical and social support is needed and for how long after knee surgery to get the best outcome.	PC
C2: What is the psychological impact of a problem knee replacement and what psychological support do people need before, during and after revision knee surgery?		
59.3	What psychological support is needed and for how long after knee surgery to get the best outcome.	PC
7.3	How can the patient be managed psychologically and emotionally after a problematic knee replacement so that it aids the medics in treating the replacement?	P
24.2	What are the psychosocial support needs of patients undergoing revision TKR	PC
26.2	What is the psychological burden from revision knee surgery and problematic knee replacement? How do psychological factors influence treatment sought, undertaken, outcome, satisfaction?	H
113.3	How do psychological factors (depression/anxiety) affect the outcomes of revision knee surgery?	H
129.3	What psychosocial support do people need after revision surgery?	O
148.3	Examine the life style of the patient to see if the motivations there to follow exercise and other rehabilitation programmes.	PF
C3: What are the best ways to manage patient expectations of their initial knee replacements and revision surgery?		
56.2	Does effective pre-operative education, with learning goals met, give better patient satisfaction?	H
16.3	Do patients expectations of their surgery match the outcome, following a knee replacement.	H
25.2	would optimising and recording patient expectations before revising replacement help with outcomes after treatment	PC
42.1	factors for predicting dissatisfaction following knee replacement. identifying patients who have a higher risk of being unhappy.	H
42.2	natural history of the dissatisfied patient following TKR	H
47.1	To see if thorough non conflicting/ consisting information pre op helps with post op expectations/level of satisfaction post revision.	H
47.2	To see if pre op factors of why someone having a Revision predict satisfactory outcomes post op. Is Revising for instability, rather than pain/ poor range of movement/ general dissatisfaction of unexplained pain more linked to happier outcomes/ better levels of satisfaction.	H
56.1	Do patients with poor outcomes have unrealistic expectations?	H
56.2	Does effective pre-operative education, with learning goals met, give better patient satisfaction?	H
59.1	My surgeon said expectations are important. Is there a way of managing or scoring our expectations before redo knee replacements	PC
74.2	What factors increase the risk of patients not being satisfied with their total knee replacements and how can we identify them?	H
83.3	Are surgeons setting unrealistic expectations after knee surgery?	H
85.4	and how do we manage patient expectation?	H
136.3	How much education is given to the patient pre or post op?	H
137.1	Do expectations formed prior to being seen by a surgeon affect the outcome e.g., if a patient has been told by their GP that they will require further surgery but then they don't end up having it	H
148.2	What were the patient's expectations of the original knee surgery ? What are their expectations now there is a need for a revision ? Does the patient have any insight into why the revision is needed ?	PF
158.1	For the patient with a painful TKR, what pre-operative assessment and analysis of the results about patient expectation for the initial operation was undertaken? If any	H
177.3	what should patients expect from their surgery?	P
182.1	what expectations should patients have before knee replacement?	H
182.2	do expectations affect outcome?	H

Prehab/rehab		
H1: Is there a way to manage a problem knee replacement to avoid surgery (through physiotherapy, lifestyle change and/or self-management)?		
2.3	Do non operative interventions help the pain or instability problems so that the patient can avoid revision surgery?	H
12.1	Can physiotherapy interventions prevent the need for revision surgery to performed	H
49.2	If a patient has an unstable knee replacement, what is the best course of action in resolving this ? ie revision/other methods	H
54.3	What are the best physiotherapy treatments e.g. education, exercise, pain management tools etc. for patients with a problematic knee replacement?	H
89.3	Management - What is the success rate of physiotherapy alone in helping manage problematic knee replacements?	H
99.3	Would intensive non-surgical treatment - physiotherapy/pre-habilitation delay my need for surgery?	H
158.3	What amount of rehab do patients really do when trying to manage the painful non-infected knee and could a minimum requirement affect the need for revision?	H
130.1	What is the best way to manage pain/problems after TKR to prevent the need for revision surgery?	HO
7.1	What is the most effective types of physiotherapy in managing problematic knee replacement?	P
8.2	Does early intensive rehabilitation reduce the need for revision surgery?	P
72.2	Are there alternatives to undertaking more surgery or replacing the implants?	P
H2: What physical therapy can be done before revision knee surgery (including physiotherapy and exercise) to maximise the chances of success?		
18.3	Does a formal exercise programme (pre-habilitation) improve outcomes for revision knee surgery? Are any specific programmes better than others - cardiovascular, quads strengthening, etc?	H
54.1	Does rehabilitation before revision surgery improve outcomes after revision surgery?	H
162.3	How can patients best train themselves to prepare physically for knee or revision knee surgery	H
99.2	What are the predictors of a poor-outcome? What can I do about it (to reduce my chance of a bad outcome) before my operation?	H
107.2	'Prehabilitation'. Many patients receive education pre-op. Would a physio assessment of the whole lower limb (particularly) hip strength, with provision of home exercise programme, walkignaid, insole etc, reduce length of stay, improve outcome and satisfaction and reduce stiffness and pain?	H
99.4	Would intensive non-surgical treatment - physiotherapy/pre-habilitation benefit my post-operative outcome?	H
166.2	what can i do to improve the chance of revision surgery being successful.	P
90.1	For knee replacement which loosen what is the best way to prepare in terms of exercises, to optimise revision surgery	PC
105.2	Before the operation you should be seen by a physio and shown the exercesed to do to prepare you better for your op.	PF
H3: What physical therapy can be done after revision knee surgery to (including physiotherapy and exercise) to maximise the chances of success?		
6.2	What are the most effective rehabilitation techniques to return patients to normal life quicker?	C
41.3	What is the role of physiotherapy and prescribed exercise in positive outcomes for problematic knee surgery?	C
100.3	Would a fitness training programme improve my outcome in addition to standard physiotherapy?	C
4.2	How can the function after revision knee surgery be improved?	H
22.3	Do revision knee surgery patients who attend post operative physiotherapy have a better outcome than patients who don't?	H
32.3	Is the use of a CPM (continuous passive movement) machine necessary after an MUA [manipulation under anaesthetic] or arthrolysis? If so, what is the ideal prescribed regime?	H
49.1	What specific physio and rehabilitation is recommended following a revision knee ?	H
82.3	Does manipulation under anaesthetic achieve improved range of motion and patient reported outcome compared to physiotherapy/CPM in the treatment of the stiff TKR within 12 weeks of surgery?	H
87.2	Rehabilitation For patients undergoing a revision knee replacement, which rehabilitation regime is associated with he best patient reported outcomes one year after surgery?	H
149.2	What do we know about the factors that predict recovery in those who do require revision - thus more or less intensive rehabilitation, cryotherapy etc.	H
151.3	What is the optimum post-operative rehabilitation, education and follow up regime?	H
12.3	What is the cheapest and most effective post-surgical management to reduce pain, and improve function and QOL	H
129.1	What is the best rehabilitation for people after revision surgery?	O
131.2	Is there a need to tailor in-patient rehabilitation for patient who have undergone a knee revision or should they receive the same rehabilitation programme as patient who underwent a primary knee replacement? Should clinician be provided with official guidelines?	O
5.1	What is the best way to rehab following second knee replacement on the same side	P
8.3	Dose an intensive face to face rehabilitation programme after revision surgery improve outcomes.	P
23.3	How long is physiotherapy needed after the second operation	P
127.2	Should the patient commit to exercise and how far should he/she push themselves?	P
166.3	does physiotherapy help?	P
122.3	Could a lubricant be added to make it easier to move your knee after a knee replacement, especially to help in the first few days when the knee is stiff?	P
171.2	i didn't get proper physio after my operation and i didn't know what to do - what should i have done	P
34.2	What should I be doing early post operatively to ensure decreased risk of pain long term	P
70.2	What is the best way of working out the optimal amount of physio after surgery?	P
24.1	What is the best way to provide rehabilitation for patients after revision TKR?	PC
139.2	Does effective pain management using pain clinic expertise following knee replacement revision facilitate more effective physiotherapy/outcome?	PC
33.3	what else can be done to ensure maximum results after surgery	PF
39.3	How does muscle weakness affect TKR mechanics and can optimising muscle function improve pain and function?	PF
150.3	What physiotherapy should I do to aid my rehabilitation and what help should I expect from my physiotherapist to help me?	PF
168.2	Should I have moved my knee more after the operation. It is stiff and painful.	PF
37.3	Is there a way in which we can standardise post op physiotherapy to give a marker of functional progress?	PF
104.1	What exercise should I do after my operation? Will this improve my outcome?	PF

105.3	proper rehabilitation guided by physio to ensure that you get maximum benefit from the operation	PF
H4: What can be done before and/or after a knee is replaced for the first time (including physiotherapy and making lifestyle changes) to reduce the risk of problems?		
164.2	what rehabilitation is best after knee replacement?	PC
13.3	does prehabilitation for primary knee replacement reduce the likelihood of joint failure?	H
95.1	Evidence that physiotherapy prior to knee replacement improves outcomes	H
95.3	With the rising BMI of patients what programme can they be given pre op to help with weight management and exercise to improve outcome. Evidence shows that the patients that have operations to help pain so they can exercise and lose weight fail to do this and often return for second joint heavier than first. how do we manage this expanding literally population	H
97.3	does obesity affect the replaced joint, and should there be more support for individuals to reduce weight and therefor load on the joint to improve outcomes	H
109.3	How can the condition of the knee be improved before surgery? Weight loss?	P
23.1	How can you improve or optimise stability of the knee after it is replaced	P
44.2	Does the patients adherence to post-operative rehabilitation have an effect on the likelihood of developing a problematic knee replacement?	H
71.2	What is the optimum rehabilitation protocol to drive best outcomes following primary TKR, to reduce the incidence of pain, stiffness and dissatisfaction? I believe this is yet to be fully determined.	H
84.1	Is there a relationship between adherence to rehabilitation protocols following primary TKR and subsequent development of stiffness and pain	H
94.2	How important is to be active (comply with the exercises given) after a knee replacement and how important is this in a successful outcome?	H
101.1	What rehabilitation routine gives best improvement in function after knee replacement?	F
106.3	What are the best types of exercises to do once I have have knee replacement to get my knee in good shape?	PF
107.1	Different methods and models of rehabilitation including prehabilitation? A lot of rehab is down to the patient completing a home exercise program. Is this the best model? Would proviiding routine rehab be of benefit by preventing problems that may require further expensive intervention including surgery?	H
H5: What causes knee stiffness following knee replacement? How can it be avoided and how it is best treated?		
123.1	How to best treat persistent stiffness following knee arthroplasty.	H
32.2	Do you think aggressive physiotherapy during the acute rehabilitation phase contributes negatively to long term soft tissue scarring and increases the risk of subsequent knee stiffness?	H
138.2	following MUA for post op pain and stiffness at what point do we advise no further surgery will help ?	H
77.3	Stiff Painful TKR ? Causes and how to prevent it in a primary TKR.	H
32.1	What is the ideal time window for a 'stiff' knee to undergo an MUA? Manipulation under anesthesia	H
137.2	Is there a correlation between BMI and stiffness post op total knee replacement	H
57.2	What is the best treatment plan for managing a painful stiff knee replacement ?	HC
173.1	I have stiffness and am having an MUA for stiffness - will this work? Will it come back after?	P
173.2	Why do knees get stiff after tka	P
104.4	Why do some patients have pain or stiffness?	PF
Infection		
I1: What causes infection in knee replacements and how can this be avoided?		
74.1	What factors allow us to predict the risk of infection within knee replacements?	H
77.1	Does leaking wound lead to deep infection ? If so should be have water tight closures of the wound ?	H
94.1	Why do some patients develop knee infections?	H
113.1	What measures can be undertaken to prevent/reduce the risk perioperative comorbidity?	H
43.3	Should every infected revision procedure include the use of honey, vinegar and silver coated implants?	H
57.1	Are there coatings or local treatments that can reduce recurrence of infections with revision knee surgery?	HC
123.2	How best to manage recurrent prosthetic joint infections, following gold standard first line 2 stage revision.	H
64.1	Why do infections, recurring and/or chronic infections occur and what more can be done to reduce this?	P
72.3	How can infection risk be minimised?	P
79.1	Antibiotics and how infection starts	P
122.1	Could antibiotics be infused or added within the knee at time of a knee replacement to prevent infection?	P
167.1	Why did I get an infection in my knee replacement, could I have avoided it	P
180.1	infection. how can this be prevented?	P
102.1	What is the best way to prevent or reduce the risk of infection?	PC
108.2	Are there common factors in patients who get infections that can be worked around / avoided?	PC
37.1	Are there any factors that could predict infection in patients	PF
40.1	Why does infection occur?	PF
I2: What is the best way to treat infection of a knee replacement?		
1.2	How do we treat the bone following removal of implants in infected knee replacement	H
4.3	What is the best way to treat infection of the knee replacement?	H
10.2	When treating suspected infected knee arthroplasty what treatment strategies or protocols (surgical or non-surgical) work best at eradicating infection?	H
11.2	Is it possible to eradicate biofilm from an infected knee prosthesis without removing the implant?	H
20.1	management of Infection	H
49.4	What are the best tests to treat infected knees, and do we always have to remove the knee?	H
60.3	Is there a way to remove infected material from infected knee replacments without reremoving the whole implant. Can we sterilise these implants in situ?	H

85.1	What is the optimal method of treatment of infection?	H
95.2	When patients presents with an infection post operation - who should manage it GP or operating consultant for best outcome for patient	H
131.1	What is the best surgical management for infected knee replacement?	O
127.3	Infection in joint - are anti-biotics the only viable answer?	P
128.1	What are best treatment to treat infection.	P
152.1	During my initial consultation my question would be what are the options open to me. (I guess the surgeon will only truly know after he has opened up the knee). Could an infection be treated by non surgical methods. i.e. anti-biotics, Hyperbaric Treatment etc.	P
152.3	In the case of a second revision. Will you be using the same antibiotic as used for the first revision? The indication being that the initial choice was not successful.	P
25.1	Best treatment for knee replacement infections	PC
102.2	What is the best treatment for infection?	PC
153.1	In the case of infection, which antibiotic are most successful in treating particular strains of infection? Are there more than one which would / could treat the infection?	PF
I3: If necessary following infection in a knee replacement, should revision surgery be done in one or two stages?		
3.3	One stage or 2 stage for infections?	H
11.1	In the context of infection, is there a difference in outcome between single and two stage revision surgery?	H
17.2	What is the consensus on one stage vs two stage revision.	H
46.2	One stage or two stage for infection?	H
55.2	One stage vs two stage revisions in infected TKA.	H
82.1	Which technique should be preferred in terms of patient reported outcome for revision for prosthetic joint infection, single or two stage revision?	H
88.2	What should be the determining factors in deciding whether to perform a 1 or 2 stage revision for infection? The organism? Patient co-morbidities? Presence of sinuses?	H
91.1	We need a reliable test/tests to rule out infection to reduce the need for 2 stage revision	H
110.3	When to do a 1 stage and when a 2 stage for infection	H
159.2	Why do not all surgeons do 1 stage revision for infection?	PC
I4: What is the best way to diagnose infection in a knee replacement?		
10.4	When treating suspected infected knee arthroplasty what diagnostic strategies work best at eradicating infection?	H
20.4	Diagnosis of Infection	H
31.3	If negative aspirated but clinically feel infected....is there any other test to help decide infection or not	H
45.3	Is there a specific intra-operative test for infection and	H
49.3	What are the best tests to diagnose infected knees?	H
73.2	Do the current investigations for infection really reassure when normal that there is no infection eg normal Inflammatory markers.	H
76.1	What are the best tests for diagnosing infection after total knee replacement.	H
85.4	What is the optimal method of diagnosis of infection?	H
117.2	What are the best tests to diagnose infection in problematic knee replacements	H
183.1	in terms of diagnosing infection are techniques like PCR going to become more useful than standard culture of tissue and fluid samples?	H
109.1	What blood tests diagnose infection?	P
128.3	What are best tests for infection.	P
167.3	It took a long time to diagnose my infection. Why?	P
180.2	how should infection be tested for	P
I5: What are the long-term consequences of infection in a knee replacement?		
26.1	What are the consequences of infection to a primary knee replacement (relative outcome, additional morbidity)? Do these vary by type of primary knee replacement (e.g. partial vs total)? Do these vary by the type of treatment undertaken for the infection?	H
92.2	How does having an infection in the knee to be replaced affect the knee? Does this affect the outcome of surgery?	PF
Surgery		
S1: What are the best forms of surgery to use for revision knee surgery (including choice of implant and technique)?		
6.1	What are the best methods for selecting the correct knee replacement size to avoid problems with incorrect knee replacement interventions later on in patient pathways?	C
15.3	Metaphyseal loading tibial devise can decrease aseptic loosening?	H
26.4	At the time of revision knee surgery, does the primary procedure (e.g. implant design) impact upon the outcome or complication rate associated with the revision procedure?	H
28.3	The role of trabecular metal	H
35.3	Should we be using different design strategies in TKRs that might make kinematic alignment easier for surgeons to do	H
58.3	Which design of knee replacement is the best for all age groups?	H
122.2	Is there benefit from knee replacements made specifically for you from a scan of your knee?	P
175.1	are all replacement types the same? should i have had a different knee replacement type?	P
86.3	Condylar or hinge prosthesis? Outcomes	H
110.2	When to use a hinge in revision knee surgery	H
118.3	Do rotating hinges or PS/CCK implants provide better outcome or improvement in patient outcome?	H
S2: What are the most effective forms of pain relief during and immediately after revision knee surgery?		
18.2	How do we manage post-op pain for patients requiring revision surgery?	H
19.1	What is the success rate of local infiltration in providing post operative analgesia compared to traditional regional blocks ?	H
19.2	Does obviating spinal opiate actually reduce the incidence of PONV /urinary retention /pruritis in patients ? In my view as it keeps patients adequately pain free to engage in physiotherapy post operatively , hence my question what is the incidence of PONV/pruritis /retention in patients where spinal opiate has been used ?	H

36.1	What operative factors would lead to a reduction in pain in the immediate post op time?	P
139.1	What is the most effective pain management strategy following knee replacement revision?	PC
S3: Is the success of revision knee surgery influenced by the surgical procedures used during the initial knee replacement?		
26.3	At the time of revision knee surgery, does the primary procedure (e.g. prior procedures) impact upon the outcome or complication rate associated with the revision procedure?	H
22.2	Do patients who are revised from a unicompartmental knee have a better outcome than those revised from a total knee replacement?	H
S1: What are the best forms of surgery to use for revision knee surgery (including choice of implant and technique)?		
77.2	Cementing the tibia ? Is there a UK wide consensus on how to cement tibia . Everybody has a theory and opinion but which is the right way ?	H
35.2	What is the optimal target alignment (overall HKA, femoral and tibial varus/ valgus and femoral and tibial rotation) of TKAs that will give the best results. Is it the same for all patients and if not how closely should we be following patients pre-disease anatomy	H
45.1	What is acceptable with regard to fixed bearing component positioning?	H
45.4	should all revisions be one stage anyway?	H
48.1	How important is Deviation from Normal Knee alignment -	H
48.2	How important is restoration of extensor lever arm -surface of patella to mid femoral rotation axis -	H
48.3	How important is restoration of posterior condylar offset in problematic knee	H
55.1	What is the cut-off point for rotational malalignment following TKA? https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4513597/ Based on the current systematic review and correlation analysis, we can make some recommendations for further research. First, there is no reliable protocol to assess the rotational alignment of the tibial tray; the optimal intraoperative anatomical landmarks, as well as the optimal postoperative radiological reference points, are yet to be determined. Furthermore, large prospective cohort studies are needed to allow subgroup analysis in which the effect of separate parameters can be examined while other parameters remain within acceptable limits. These cohort studies should incorporate both functional and subjective outcome measures. After such studies, conclusions can be drawn regarding the identification of optimal rotations for both components. Finally, studies reporting on revision for malalignment should report both preoperative and postoperative rotational alignment measured with CT scan.	H
78.1	I find that the most trouble with 'unsuccessful' TKR's related to severe anterior knee pain which I put down to advanced retro-patellar OA. I can't remember the last time I saw a patient where the patella was resurfaced as well. Why this so rarely performed when severe anterior knee pain is so common?	H
84.2	The factors predisposing to the development of patella baja. Arthroscopic arthrolysis can help in my hands if the problem is stiffness without infection or patella baja, we need evidence to back this approach up	H
178.3	should i aspirate all patients with problems after knee replacement?	H
S5: What is the best way to restore lost bone during revision knee surgery?		
31.2	What is the best method of filling bone defects	H
28.2	How best to restore bone stock	H
76.2	What role should cones or sleeves play in managing bone loss in revision total knee replacement.	H
118.2	What are the best strategies to manage bone loss and fixation in poor quality bone?	H
Prognosis		
R1: How long does a revision knee replacement last and what can be done to extend its life?		
4.1	What is the best way to make revision knee replacements last a long time?	H
111.2	How long will a revision knee replacement last?	H
64.2	Understanding best practice and developing patient education to maximise longevity of joint replacement to reduce/delay need for further replacement in later life.	P
172.1	my replacement is 'loose' and needs redoing. could this have been prevented?	P
70.3	What is the best material to use for a revision to last as long as possible? I have had 8 knee replacement operations since 2000 and it's getting a bit ridiculous!	P
169.1	My knee had to be replaced because it wore out. How can we stop this? Why did it wear out?	P
172.2	Can we find implants that last longer?	P
38.1	What factors in detail could have prevented aseptic loosening of my implant?	PC
53.2	What is the optimum length time I can expect to have a good knee after a revision i.e. after fully recovering from the procedure to when the prosthetic starts to show signs of wear ?	PC
103.1	How can the lifespan of a knee replacement be extended?	PCH
66.1	How long will the new revision replacement last.	PF
R2: What factors predict whether revision surgery is likely to be a success?		
2.2	How do we know whether revision knee surgery will help the pain problem?	H
3.1	How can we pick the winners	H
3.2	What are the outcomes of revision for different indications?	H
11.3	Can we predict which patients do well following aseptic revision surgery?	H
12.2	Which clinical assessments or tests are the most effective at predicting the need for revision surgery	H
14.1	What tests are best in determining what to do with problem knees	H
14.2	How do we know which patients will benefit from more surgery and who will get no benefit	H
20.3	prediction and selection algorithms for revision TKR	H
21.1	What outcome measures are used to decide if someone has a manipulation under anaesthetic of a problematic knee or revision knee surgery?	H
46.1	How do we predict who will do badly from tkr	H
50.1	What is the best method to identify patients who may benefit from secondary patella resurfacing	H
52.1	Can we use/develop a tool to select patients better who will get a good result from a TKR and those who will not?	H
52.3	Can we develop a tool and surgical principles that will aid selection and best results for patients with painful non infected TKRs re revision?	H
54.2	What are the predictors of revision surgery improving patient outcomes?	H

60.1	How should we best investigate TKR instability, to allow prognostic information to guide treatment, ideally giving prognostic information on who should be revised for symptoms of instability	H
75.3	What are the predictive factors to success	H
83.1	What is the best indicator for knee replacement?	H
85.5	What are the best investigations for the painful TKR without obvious cause what are the indications for surgical intervention?	H
86.2	Clear understanding of the risk/benefit ratio for a revision. Is it worth having it done	H
87.1	Assessment Which 'trigger' for revision knee replacement is associated with the best patient reported outcomes at one year after surgery? e.g. pain, changes on x-ray, other	H
89.1	Assessment - How often it is the accuracy in the alignment of the knee that leads to problematic knee replacements?	H
89.2	Assessment - What criteria would be the best markers for indicating a revision of the knee replacement	H
91.2	What is the correlation between 3d misalignment and symptoms? Specifically can we say what symptoms patient might experience depending on what the misalignment is	H
93.3	How can we counsel the patient pre op with accurate data of who has problems and what might be done to avoid them,	H
99.1	What is the optimum time to have a TKR for best results? How long should I wait?	H
111.1	If my knee replacement is painful but the x-ray looks good is there any benefit from revision surgery?	H
111.3	Can you predict the outcome of my revision surgery?	H
123.3	At what point during treatment of recurrent PJI should alternatives to re-revision be considered? As in, is there a long term benefit/ is there evidence to support more than three revisions of one joint? Do these often very expensive operations provide any quality of life, what is the success rate, and should we be offering alternatives such as amputation earlier? As orthopaedic surgeons are we performing these operations 'because we can' rather than because there is an evidence base to support their use?	H
133.1	Is there a link between knee deformity pre-op and problematic knee replacements?	H
133.2	Are there prediction assessment tools we can use to identify patients who are more likely to have complications post operatively?	H
143.1	Why some surgeons recommend kneeling after a knee replacement and others don't ?	H
151.2	What are the pre-operative predictors for a good outcome revision TKR?	H
162.1	Which subgroup of patients are unlikely to benefit from total knee arthroplasty in terms of overall quality of life. (taking into account such factors as general health deterioration, decline in cognitive ability after major surgery, loss of independence etc.	H
162.2	Who should have an amputation rather than a revision knee replacement?	H
182.3	could problems be avoided by selecting patients more carefully?	H
183.3	should i not undertake surgery on patients with a high BMI? At what level? 30? 35?	H
5.2	how can we predict which knee replacements will get better with redo surgery, or get better with other non surgery treatments	P
128.2	What factors allows for success for revision etc.	P
134.2	What factors predict a successful outcome for re-do surgery	P
152.2	If I elect to have surgery. what are the chances of success. The question here is what do I (as the patient) consider success. In my case I am looking for the eradication of infection and a greater degree of painless flexibility.	P
166.1	when is the best time to have my revision operation?	P
108.3	Is there a better outcome for knee replacements if the operation is done sooner or does the timing of the surgery not matter / not affect the outcome?	PC
112.3	Is there age limits for revision surgery i.e. total knee replacement to full knee replacement?	PC
164.1	who will do well after knee replacement. who will not do well? Can surgery be avoided in some people that will do badly?	PC
164.3	when should I have surgery - does delay affect outcome?	PC
39.1	Are there increased risks in those with neurodisability with a TKR?	PF
150.1	How likely is it that my operation will be a success?	PF
157.3	How effective is revision surgery	PF
168.3	Will my revision surgery improve my knee function?	PF
170.2	my knee replacement is fine but my friend's is not but she doesn't know why it doesn't move properly and can't bend	PF
170.3	why is mine ok but my friends not ok?	PF
R3: How can the benefits of revision knee surgery be measured in a way that is meaningful to patients?		
85.3	What are the best outcome measures	H
117.1	What are the best long term outcome measures for patients who have undergone surgery or non-surgical treatment?	H
136.1	What tests/outcome measures are in place to determine a successful knee replacement?	H
151.1	What is the best way to measure patient outcome in revision TKR?	H
158.2	What is a patients measure of success after revision TKR by comparison to a surgeons? i.e. is there an expectation mismatch/reality failure	H
163.1	what functional level of activity determines a successful outcome	H
130.3	What outcomes are important to patients who are experiencing pain or problems after knee replacement surgery	HO
129.2	What outcomes are important to people after revision surgery?	O
8.1	Can patient interviews / other tools focusing on quality of life aims add value to identifying the best treatment options for patients?	P
90.2	How can you measure the things that are most important to patients after revision surgery in terms of assessing the outcome of surgery	PC
165.3	how should outcome be measured?	PC
170.1	the joint registry form is confusing. what measurements from patients should be recorded to examine outcome?	PF
R4: What are the long-term consequences of revision knee surgery?		
92.1	What is the long term prognosis for patients who have undergone 'redo' knee surgery?	PF
112.2	How do knee replacements affect other medical problems?	PC
119.2	long term impact on health	PF
125.2	Long term Impact on Health	PF
157.4	and long term outcome.	PF

165.2	what is the long term outcome for knee replacement	PC
R5: Is it possible to predict which people with knee replacements will require revision surgery?		
13.1	what effect does BMI have on outcomes following knee replacement?	H
18.1	What patient factors increase the risk of a problematic knee replacement in the first place? Co-morbidities - if so, which ones? Psychological and physical issues relating to knee pain - ie chronic pain, pain catastrophisers?	H
43.1	What are the most predictable pre op factors which predict a poor outcome?	H
44.1	Are there factors pre or immediately post 1st Arthroplasty that help us predict the likelihood of the patient having a problematic knee replacement? These factors could include placement of prosthesis, physiotherapy intervention, pain management, pre-surgery activity levels, attitudes to surgery etc.	H
44.3	What role can swelling and lymphoedema management have of the likelihood of developing a problematic knee replacement?	H
58.1	How to predict negative outcomes during preoperative assessment?	H
58.2	How does high BMI affect the short term and long term outcomes following total knee replacement?	H
62.1	What is the most effective screening to identify high risk patients who may have a poor outcome after surgery?	H
71.3	Can we predict who is at risk of a poor outcome from primary replacement surgery accurately enough to modify our clinical practice and drive up outcomes (without denying surgery to patients that could benefit).	H
73.1	Are there pre operative factors that can help predict patients who have poorer outcomes and higher levels of dissatisfaction post operatively ? (for example mild to moderate OA , younger patients, presence of yellow flags pre op)	H
97.2	can the likelihood of requiring revision surgery be predicted at the time of the primary replacement?	H
149.1	Which patient group are at greatest risk of having to undergo revision surgery, can we refine prediction tools to identify these patients?	H
39.2	How can we predict those with UKR that will likely need conversion to TKR within 5 years?	PF
119.1	likelihood of knee failure	PF
125.1	Likelihood of knee failure	PF
174.3	i have diabetes does that make me more likely to have a bad knee replacement	PF
R6: What is the expected improvement in quality of life following revision knee surgery?		
16.1	What is the expected quality of life improvement following surgery.	H
16.2	What is the expected improvement in functional walking distance.	H
17.1	What are the expectations in functional ability, range of movement and strength when a TKR is revised.	H
36.2	What proportion of patients would be able to carry out activities post op like riding a bicycle?	P
36.3	How does a total knee replacement affect walking biomechanics?	P
69.3	Can knee replacement ever result in pain free- that is patient forgets an artificial knee is present	PF
175.3	how successful is redo surgery?	P
Diagnosis		
D1: What is the best way to diagnose and assess pain caused by a knee replacement?		
1.1	How can we diagnose patients with unexplained pain	H
2.1	How do we know the patients pain is caused by the problem with the knee replacement?	H
15.2	What is the best tool to measure the pain in total knee patient?	H
51.2	Should biopsy be standard practice? [IN INVESTIGATING PAINFUL KNEE]	H
51.3	What is the optimum screening tool/outcome measure for detecting pain and function?	H
73.4	Should we continue to follow up every painful knee even in the absence of clinic findings ?	H
85.2	What are the best investigations for the painful TKR without obvious cause what are the indications for surgical intervention?	H
93.1	What is the protocol to manage the painful knee replacement? ie blood tests, ct scan and biopsy	H
5.3	What is the best group of tests to fully assess a knee replacement which is causing symptoms again	P
37.2	When patient feels pain in TKR, how can we streamline an algorithm to decide standardised management	PF
D2: What are the best ways to diagnose structural failure in a knee replacement (e.g. loosening or poor position)?		
29.1	Should we still be using bone scans to assess for loosening. Is pet ct better. Are there other imaging modalities that are better?	H
31.1	What is the best imaging modality to assess if a knee implant is loose.	H
34.1	What are the mechanics of a problematic total knee that associates it with decreased mobility?	P
43.2	How accurate are we at diagnosing rotational malalignment, and when does it matter?	H
45.2	Can we quantify imbalance/patholaxity better?	H
50.2	Is metal subtraction MRI beneficial in the failed TKR	H
81.1	Role of CT to assess component positioning/ Role of SPECT-CT to localise pain generator	H
86.1	The role of Nuclear Bone scans in the diagnosis of loosening	H
88.1	What is the optimum way to follow up knee arthroplasties, so as to best use resources, whilst detecting failing knees when revision surgery is likely to be simpler.	H
98.1	How do we objectively define/diagnose pathological knee instability following TKR?	H
132.1	How accurate is X-ray in determining Lysis/ loosening of the prosthesis?	H
132.2	How do you assess on X-ray whether the implant size is correct?	H
135.2	What X-ray views are needed to rule out problems with the implant?	H
178.2	are new imaging techniques e.g. MRI/ ultrasound useful for investigating problems with knee replacement?	H
D3: Can the identification of problem knee replacements be made quicker?		
41.2	What assessment route would speed up the diagnosis and treatment of post operative knee replacement problems?	C

107.3	Is a pathway needed for patients with a failing knee replacement to ensure problems are picked up and investigated as soon as possible?	H
130.2	How can we better identify patients who are having problems after knee replacement between the 6 week and one year follow-up?	HO
180.3	should there be a pathway for patients with problems to identify problems soon?	P
114.3	How can you improve the follow up for operations that go wrong instead of being told there is nothing wrong fro months?	P
Pain		
P1: What are the best treatments for pain in replacement knees, particularly if revision knee surgery is not recommended?		
100.1	How can my pain be more effectively managed following knee replacement?	C
10.1	What are the best strategies available for managing / treating chronic painful knee arthroplasties where there appears to be no clear cut indication of bone / implant failure and therefore no reliable surgical treatment option?	H
14.3	What pain management strategies work best in problem knees	H
29.3	Where no mechanical cause for unhappy knee patients is identified what are the best treatments to help wih ongoing pain	H
60.4	Can we alter this pain with surgical/non surgical strategies without revising the knee?	H
82.2	Are geniculate nerve blocks or radio frequency ablation effective in the treatment of the painful TKR?	H
93.2	What is the best way to manage a patient who has a TKR and no mechanical cause is identified for the pain.	H
144.1	What is the best management of a person with a painful knee replacement, that is not infected or loose, after an appropriate period of rehabilitation or conservative care (ie revision or other treatments)	H
144.2	Is physiotherapy beneficial for people with a painful knee replacement?	H
144.3	Is genicular nerve blockade/ablation beneficial for people with painful total knee replacement?	H
181.1	Do nerve blocks help people with pain after knee replacement or revision?	H
181.2	what pain medications are most effective in patients with problems after knee surgery	H
181.3	should we inject knee replacements with steroid to reduce pain after knee replacement?	H
7.2	What is the best treatment for patients who have damaged painful nerves after a knee replacement?	P
72.1	How can pain from problematic knee replacements be best managed?	P
115.1	To walk without pain	P
134.1	More research into the management of pain caused by badly done original knee replacements	P
171.3	how can i reduce my pain in my knee replacement?	P
177.1	how can pain be treated after knee replacement?	P
103.2	What improvements in pain management after knee replacement and success rate can be made to make patient's lives better?	PCH
P2: What are the causes of pain following a knee replacement and how can these be avoided?		
101.2	Why does my friend's knee replacement still hurt/cause pain?	F
35.1	What is the cause of pain in knee replacements after infection, extrinsic causes (eg hip OA) and loosening have been excluded	H
46.3	What are the causes of non-specific pain after tkr?	H
50.3	How much is stress shielding responsible for persistent pain after TKR	H
52.2	Are we able to identify surgical factors that may be relevant to painful TKRs?	H
60.2	Where does pain originate in TKRs? Is it from bone or soft tissues?	H
71.1	What is the cause(s) of pain in the ~10-20% of primary knee replacement patients that are not satisfied following surgery? Currently the majority of these patients have no cause identified and therefore no treatment is available.	H
91.3	How can we prevent neuropathic pain?	H
110.1	How to avoid anterior knee chronic neuropathic pain from injury to branches of the saphenous nerve	H
116.1	Why am I in constant pain in both knee replacements after 14 years and 3 years	P
171.1	i can't walk properly and my knee hurts after my operation, should this have been predicted before having it done?	P
179.2	could i have prevented this problem pain and limited movement with more therpay before or after the operation	P
108.1	Is there a common factor/factors in what causes pain and failure in knee replacement?	PC
165.1	why do some people have pain after replacement?	PC
104.2	What prevents pain after knee replacement? Why do some patients have pain or stiffness? Why do some knee replacements not work?	PF
106.2	Why does my knee replacement that was supposed to last for 20 years, done in 2013, cause me pain?	PF
HEALTH SERVICES		
E1: What are the most effective ways to organise health care to improve the outcomes of revision knee surgery?		
15.1	Is two revision suergeons opinion before revision suergy can improve the postoperative outcome?	H
28.1	Should revision knee surgery be undertaken only in a regional centre	H
30.2	Does diagnostic accuracy increase if the 'problematic knee' is assessed by specialists (as oppose to surgeons with a 'special' interest)?	H
57.3	Should revision knee replacements only be done by expert surgeons and if so how do we identify who these are?	HC
98.2	Where should revision TKR be performed, by whom and in what volume? What is the minimum number of infected revisions that should be performed?	H
113.2	Where and by whom is revision knee surgery best performed?	H
88.4	Does networking + MDT's improve care?	H
118.1	Is it more cost effective for revision TKA to be done in specialist centres?	H
SINGLE QUESTIONS		
13.2	what provisions in discharge planning after primary knee replacement reduce the incidence of problems?	H
23.2	What is the best surgery to perform if you break your leg around the knee replacement	P

76.3	Do negative pressure dressings reduce early wound complications following revision total knee replacement.	H
98.3	Can we definitively exclude allergy as a mode of failure of TKR?	H
149.3	Should ERAS (ENHANCED RECOVERY AFTER SURGERY) be tested in these patients (& indeed all TKR patients)	H
163.2	Does allergy have a role in painful joint replacements and if so how can we best screen/ test patients for it	H
18.4	Does effective perioperative analgesia improve long-term outcome measures after revision surgery?	H
113.1	What measures can be undertaken to prevent/reduce the risk perioperative comorbidity?	H
70.1	What happens to knee joint and how much damage can be done whilst waiting for a date for surgery, especially when waiting list is long?	P

IN SCOPE ROUND 2

Care & Support

Qn No.	Original question	Respondent
C1: What social care and support do people need after revision knee surgery?		
238.4	what are the social effects of a problematic knee replacement	H
C2: What is the psychological impact of a problem knee replacement and what psychological support do people need before, during and after revision knee surgery?		
238.2	what are the psychological effects of a problematic knee replacement	H
C3: What are the best ways to manage patients' unmet expectations and dissatisfaction with problem knee replacements and/or revision surgery?		
195.3	Patients may feel that they have been led to feel too optimistic about recovery period- some feel it was two years before they felt they had truly recovered. Should there be a change to the conversation about this possibility?	P
220.3	How can we improve information about the long-term recovery prospects? For example, when swelling should be expected to abate?	P
221.1	How well and holistically the patient was assessed before surgery i.e. Comorbidities, long term analgesia, <u>expectations from surgery</u> , socio-psychological factors affecting pain, trial of injection before surgery, assessment of back and hip joint	H
221.2	Has the surgeon patient relationship developed good enough to go for a major surgery ? For how long the surgeon has met the patient to understand the needs and expectations and developed mutual confidence in the outcome. (are we treatinx Xrays or Patient's)	H
225.3	Why isn't the patient told the pros and cons in full having further knee revisions? What is the success rate for the more you have? I'm quite scared about possibility of have a fifth knee replacement	PF
235.2	How can we make patients realize that the outcome of rehabilitation depends on them as well?	H
238.3	How do we manage patient expectations about their problematic knee replacement or revision surgery?	H

Prehab/rehab

H1: Is there a way to manage some types of problem knee replacement to avoid surgery (through physiotherapy, lifestyle change and/or self-management)?		
252.2	how can we prevent need for revision surgery	P
H2: What can be done <u>before</u> revision knee surgery (including physiotherapy, lifestyle change and exercise) to optimise the result?		
208.2	Before my intervention I underwent 6 weeks of physio which, I was told by the surgeon, was pointless because of the state of my knee was in. I submit that the time and money spent on pre-op exercise should only be given to those who would benefit.	PF
213.3	Are we still supposed to be requesting patients to lose weight pre-referral?	H
222.1	Does pre-operative education and rehab significantly improve short and long term outcomes post TKR surgery	H
234.3	How can we best prehabilitate patients prior to revision knee surgery	HC
246.2	What can patients do in term of preparing for surgery? (ie: the physio rehab in revision surgery took its toll on upper body, could we have done more in the way of preparing?)	PF
H3: What can be done <u>after</u> revision knee surgery to (including physiotherapy and exercise) to optimise the result?		
190.2	What is the best rehabilitation to enable speedy recovery	P
191.2	What is the most effective post operative treatment? Why is this not given?	PF
197.2	Follow-up physiotherapy very difficult.	P
200.2	My replacement is a success! I have always been involved in sport so had idea what to do but surprised offered no physio at all after operation.	P
204.2	Best long time results are patient orientated exercises - generally keeping legs moving+ keeping a watch (if possible) outpatients.	PC
219.2	More physio sessions face to face would definitely help with rehab .to ensure exercises were correctly carried out.	PF
220.2	Is the current regime of physiotherapy always necessary for usually active, younger patients? Or does it simply cause swelling and slow down ROM?	P
221.3	Is the p/o rehab and follow up appropriate to the patient's needs . Dies the follow up happens with the surgeon him/herself or in the community?	H
225.1	Why aren't patients physio emphasised in great detail? The first knee replacement I had was from day one to do so many exercises every hour on the hour. My second and third and fourth one said to do them 2 or 3 times a day. I found in knee group at the physio dept that people were way behind my progress and I found myself telling them to do more. If I hadn't been told the first time around my progress would have been so slow and probably making my knee too stiff to move, delaying progress.	PF
225.2	Why isn't hydro an option for knee replacement post operative treatment? That helped me a lot of the first time around.	PF
228.1	How come not all patients are offered hydro therapy after a new replacement, I know I for one did benefit on the occasions it was offered.	P
230.1	Advice for lifestyle adjustments to prevent further revisions	P
231.3	How many physiotherapy session would give me the best recovery	P
243.3	Difficult to know how much to do for rehab exercise, if knee aches do you exercise?	P
249.3	Physio in local area always offered to get best outcome.	P
256.3	would more physiotherapy help after replacement?	P
260.1	In terms of rehab are there any physiotherapy programmes specific to patients with problem knee replacements. If not should there be?	HP
260.2	Is any one type of physio more effective e.g. hydrotherapy as opposed to more conventional exercises on land.	HP

260.3	How do different [PHYSIO] treatments compare in terms of recovery time/ reduction of pain	HP
261.2	sometimes pain and stiffness can be difficult to differentiate therefore when carrying out physiotherapy it can be hard to know how far to push the joint.	H
261.3	would any other treatments be worth exploring e.g. massage, more intensive heat or cold therapies, even 'alternative' therapies such as acupuncture	H
262.2	Movement is very important - should the physiotherapy in the community be going on for some time longer?	PF
H4: What causes knee stiffness following knee replacement? How can it be avoided and how is it best treated?		
185.1	What are the best interventions to relieve stiffness after knee replacement?	O
223.1	If after a knee replacement you cannot bend the knee, can the ligaments be stretched or a piece added to help with flexibility.	P
224.1	Why does the knee not fully bend after surgery?	PF
252.1	what causes pain/stiffness after knee replacement	P
253.2	what caused my stiff knee after knee replacement?	PF
255.2	Why can I move my knee a limited amount after replacement?	P
257.1	my knee is stiff and has limited movement - why? could this have been avoided?	P
257.2	should I have surgery on my stiff knee (replacement)	P
257.3	would different physio prevent stiffness?	P
258.2	Severe stiffness and a feeling that my knee was going to give way - how to manage this?	P
261.1	How could postoperative stiffness be managed more effectively	H
Infection		
I1: What factors increase the risks of infection in knee replacements and how can these risks be reduced?		
235.3	It is better to reconsider for knee replacement patients with higher risk of infection ?	H
240.1	why is there so much infection in joint replacements	PC
242.2	Research into how to prevent germs entering the knee.	P
243.2	Are there preventive procedures for the patient pre-surgery to prevent infection, i.e. washing with?	P
247.1	What is the correlation between pre-op intra-articular steroid injection and joint infection? As a GP I was given a steroid injection into my knee then had open surgery 8 weeks later. I am repeatedly told "there is no evidence"....	HP
256.1	What caused the infection in my knee replacement?	P
I2: What is the best way to treat infection of a knee replacement?		
185.3	How can outcomes be improved after surgical treatment for periprosthetic knee infection?	O
197.3	Length of time for antibiotics needed and reviewed regularly.	P
203.1	How can we stop infection returning?	P
215.2	What do you do when microbiology suggests a culture negative infection	H
238.1	What is the best way to manage a patient who attends primary care with a possibly infected knee replacement	H
256.2	how should infection be treated after replacement?	P
259.1	What are the most effective treatment regimes for infection in knee replacements?	H
259.2	How does IV Antibiotic therapy alone compare with use of both IV antibiotics and antiinfective impregnated beads in combination. Similarly how effective is the use of long term oral antibiotics in combination with short term IV antibiotic therapy.	H
259.3	following infection should there be a more structured protocol for post op infection monitoring e.g. regular bloods, periodic aspirate, more regular outpatient	H
265.1	what antibiotics should be used to treat infections?	HC
I3: If necessary following infection in a knee replacement, should revision surgery be done in one or two stages?		
212.3	What is role of single stage revision for infection	H
214.2	When do to second stage revision for PJI?	H
I4: What is the best way to diagnose infection in a knee replacement?		
197.1	Quicker diagnosis of infection problem.	P
227.1	How to reliably exclude infection	H
242.1	Best tests to diagnose infection.	P
246.1	Are there pathways developed to help GP's (in the way of tests/knowledge) with early identification of knee infections post surgery?	PF
247.2	how often is missed joint infection in the CRP below 40? (the orthopaedic cut off). For 17 months my infection was missed as my CRP never exceeded 18. I felt I wasn't listened to and my physical symptoms were overlooked. Are physical symptoms considered? -fatigue, apathy, depression?	HP
I5: What are the long-term consequences of infection in a knee replacement?		
26.1	What are the consequences of infection to a primary knee replacement (relative outcome, additional morbidity)? Do these vary by the type of treatment undertaken for the infection?	H
92.2	How does having an infection in the knee to be replaced affect the knee? Does this affect the outcome of surgery?	PF
Surgery		
S1: What are the best forms of surgery to use for revision knee surgery (including choice of implant and technique)?		
126.3	Has cemented fixation remained the gold standard for REV TKR survivorship	H
184.2	When should unilateral knee replacement be used?	C
184.3	is there a role for robotic-assisted surgery?	C
190.1	What is the best test to have to make sure the revision is the best outcome by way of type of repair i.e full knee v's half knee	P

194.2	Will the use of patient specific instruments for all patients improve outcomes	HC
208.1	Also I undersant that "tailor made" joints are available (if costly!) but would also save future problems (they are available for animals!!!)	PF
212.1	Hinge vs CCK outcomes in revision tkr	H
215.1	What are the limits of acceptable malrotwtion of the femoral and tibial components	H
215.3	What are the indications for metaphyseal fixation (cones/sleeves)	H
220.1	What is the best replacement for a younger, active patient with early-onset osteoarthritis?	P
224.3	Is there any other material that could be used to improve outcomes?	PF
229.1	How can revision surgery be improved in order to extend the long term success?	P
229.2	How can revision surgery can be improved by making it less invasive?	P
232.2	When changing from partial to total knee replacement does timing matter?	PF
232.3	Why are there different types of knee replacement and when is best to use each one.	PF
233.2	Which are the best implants for surgeons to use in revision knee surgery and	H
237.3	Which are the safest knee replacement implants for a patient to have to prevent problems	P
244.3	To alleviate if possible scar tissue build up which reduces movement.	PF
249.1	Assessment; it should be mandatory for surgeons to see a full leg x-ray (not just of the knee) to see the individuals anatomy and do the knee replacement accordingly.	P
254.3	are some knee replacements better than others?	P
S2: What are the most effective forms of pain relief during and immediately after revision knee surgery?		
18.2	How do we manage post-op pain for patients requiring revision surgery?	H
19.1	What is the success rate of local infiltration in providing post operative analgesia compared to traditional regional blocks ?	H
19.2	Does obviating spinal opiate actually reduce the incidence of PONV /urinary retention /pruritis in patients ? In my view as it keeps patients adequately pain free to engage in physiotherapy post operatively , hence my question what is the incidence of PONV/pruritis /retention in patients where spinal opiate has been used ?	H
36.1	What operative factors would lead to a reduction in pain in the immediate post op time?	P
139.1	What is the most effective pain management strategy following knee replacement revision?	PC
S4: What is the best way to treat a break or fracture around a knee replacement?		
23.2	What is the best surgery to perform if you break your leg around the knee replacement	P
209.1	How should fracture around a knee replacement be treated?	H
231.2	What is the best operation to do when you fall and break your leg around your knee replacement?	P
S6: Is knee revision surgery cost-effective?		
29.2	How much does a revision really cost and who funds it?	H
209.3	Is revision surgery cost-effective?	H
210.2	Is salvage revision surgery cost-effective?	H
Prognosis		
R1: How long does a revision knee replacement last and what can be done to extend its life?		
198.1	How long should a knee replacement last.	P
199.1	How long will the replacement last.	PC
200.1	What measures can I take to prolong life of knee replacement	P
228.2	How long is a knee replacement supposed to last on a younger patient.	P
230.2	Prognostic features for long term survival of implants	P
251.1	Improved materials for longer knee life.	P
R2: What factors predict whether revision knee surgery is likely to work?		
221.5	How well and holistically the patient was assessed before surgery i.e. <u>Comorbidities, long term analgesia, expectations from surgery, socio-psychologucal factors affecting pain, trial of injection before surgery, assessment of back and hip joint.</u>	H
186.2	How do outcomes of revision TKR depend on the indication. I suspect that a revision for frank loosening is more likely to be successful than for dubious diagnoses such as 'mid flexion instability'.	H
194.1	What patient related factors affect outcomes following total knee replacement	HC
211.1	How can we predict outcome following revision knee surgery?	H
213.2	What pre-existing medical conditions are the most likely to be associated with a poor outcome post operatively?	H
216.1	what should the indications be for revising non-infected, non-loose implants.	O
222.2	Which pre-operative factors correlate most closely with problematic knees post op.	H
250.3	How best to predict outcomes following total replacement.	PF
253.1	How successful is revision knee surgery?	PF
254.1	when should revision knee surgery be performed? to improve what problems after first replacement?	P
264.2	can mode of failure predict the likelihood of success of revision TKA?	H
265.2	should I have a revision? (what will outcomes be?)	HC
265.3	does weight matter - i.e. does MY weight matter? is this why the knee replacement failed?	HC
250.1	How best to predict the impact with on replacement surgery in patients with joint hypermobility .Spectrum disorder.	PF
126.2	What are the causes of poor outcome following REV TKR and how can they be addressed.	H
R3: How can the results of revision knee surgery be measured in a way that is meaningful to patients?		
126.1	Best measures of outcome following REV TKR	H

191.3	How is success of the operation measured - In straight does not necessarily indicate success.	PF
234.2	How best to measure and monitor outcomes following revision surgery	HC
R4: What are the long-term consequences of revision knee surgery?		
193.3	What is the long term outcome for patients with problematic knee replacement?	H
244.1	Long term outcome if possible to ascertain.	PF
R5: What is the expected improvement in quality of life following revision knee surgery?		
198.3	With the way my leg is now what are my chances of walking unaided?	P
209.2	What are the outcomes of re-revision and re-re-revision?	H
214.1	What are the outcomes of re-revision TKRs?	H
Diagnosis		
D1: What is the best way to investigate the causes of pain following a knee replacement?		
195.2	Patients who remain in pain longterm are often told their xrays look 'fine'. Does this indicate that the Xray is not the optimum test for such patients?	P
204.1	When a patient complains of constant pain in a knee & surrounding leg. Please see patient in hospital to check causes . Then follow-up regularly to establish causes.	PC
210.1	Can thresholds, based on patient factors and level of pain be created for proceeding with revision surgery in patient with persistent pain?	H
D2: What are the best ways to investigate implant-related failure in a knee replacement?		
192.3	Why are x-rays used as a decision maker for possible surgery when sometimes they do not show exactly what is wrong?	PF
194.3	Why is there a discrepancy between radiological findings and symptoms	HC
211.2	How best to confirm loosening	H
D3: Can the assessment of problem knee replacements happen sooner?		
236.1	Should patients be seen directly by the operating surgeon sooner rather than repeated primary care when having problems at 2 years	H
237.1	Is there a pathway that should be started when patients are still having problems at 1 year following knee replacement	P
241.1	When a knee problem arises, treatment earlier might help with the recovery quicker, or avoid further surgery.	PF
243.1	Why did it take so long to (at a different hispital) diagnose the infection type and delay between diagnosing and redo surgery.	P
262.3	a quicker review time would be an advantage if there were ongoing problems.	PF
D4: Does allergy cause knee replacement failure? If yes, how is this best investigated?		
211.3	Is metal allergy really a clinical cause of knee pain following arthroplasty?	H
98.3	Can we definitively exclude allergy as a mode of failure of TKR?	H
163.2	Does allergy have a role in painful joint replacements and if so how can we best screen/ test patients for it	H
227.3	what, if any, is the role of allergy/hypersensitivity reactions?	H
Pain		
P1: What are the best treatments for pain in replacement knees, particularly if revision knee surgery is not recommended?		
212.2	What is best treatment strategy for painful tkr without obvious cause	H
227.2	what to do with the non-infected, technically sound but painful TKR?	H
252.3	what can be done for pain after knee replacement	P
P2: What are the causes of persistent pain following a knee replacement? How can the pain be prevented or minimised?		
195.1	Within the actual operation – which aspect of the operation was most likely to result in longterm pain- specifically: i) The process of gaining access to the joint ii) the process of replacing the knee joint with the prosthetic – iii) the method of closing the wound?	P
196.1	Might patients' not undertaking the exercises they were asked to perform postop be a factor in longterm pain?	P
196.2	Might the type of prosthetic used have a bearing on the chance of a patient experiencing pain longterm?	P
207.1	I have had problems since the original replacement. I am still in unspeakable pain after 6 weeks> Is this what I can expect ? What factors are causing this unbearable pain?	PF
232.1	How can we best solve pain that doesnt improve following a knee replacement	PF
236.2	What community pain relief works best	H
250.2	How to improve inability to kneel on operated knee following TKR due to pain from tissues.	PF
255.1	Why does my knee replacement hurt while my friend's doesn't?	P
HEALTH SERVICES		
E1: What are the most effective ways to organise health care to improve the outcomes of revision knee surgery?		
185.2	How can GPs improve how they respond to pain and stiffness after knee replacement?	O
190.3	What follow up process is best after revision - repair of the knee	P
204.3	Redo surgery involves careful op, constant care while hospitalized for wound ,healing- this can make a big difference to how quickly the patient gets well and mobilised. A good surgeon who knows about infections, etc	PC
210.3	Does a MDT approach to treating revision knee patients improve the outcome for patients?	H
221.4	What is the access to surgeon by patient who has some ongoing issues in early post op period?	H
226.2	Are periprosthetic infections best treated by revision surgeons who work with a specialist bone infection unit?	H
226.3	How many revision knee operations should a revision knee surgeon perform per year?	H
233.1	Is having a familiar theatre team better when doing revision surgery should the operating team be trained as a team rather than individually	H
236.3	For re-revision patient what is the most appropriate follow up intervals	H
226.1	Are periprosthetic fractures best managed as part as a trauma service or as part of an urgent elective service?	H
E2: If revision knee surgery is delayed, does this cause additional damage or harm?		

205.6	As soon as the decision to redo the knee is made it is desirable to have the replacement as soon as possible as the increase in pain week on week was quite dramatic.	P
247.3	Does the time between stage 1 and stage 2 affect outcome? Prolonged waiting reduces mobility, affects mental well-being and the post-operative recovery after stage 2. Chronic pain for 10 months whilst waiting for stage 2 had a very detrimental effect all round.	HP

OUT OF SCOPE Round 1

Audit		
Qn No.	Original question	Respondent
30.1	What is the TRUE rate of infection in UK TKR?	H
30.3	Are outcome measures worse for non-specialist surgeons performing revision TKR	H
69.2	Is the failure rate improving	PF
135.3	What is the conversion rate from primary to revision?	H
136.2	What are the differences in post op physiotherapy treatment across the country? Could this be standardized?	H
Broad / off-topic		
9.1	What helps create the best long term results for those who have surgery	PC
79.2	Exercise regimes	P
33.1	How do you ensure that other aspects of the disease process will not impede recovery	PF
61.1	Rehabilitation	P
61.2	Xrays	P
65.1	I am a 90 year old retired Grenadeer Guardsman - I would like medical professionals to take the lead and make appropriate informed decisions -	P
65.2	I do not feel qualified to give informed feedback other than to say I am pretty pleased with the treatment and provision of my replacement knee.	P
68.1	What's wrong	P
68.2	Can anything be done	P
75.1	How can we minimize the need for revision	H
81.3	Implant/ Fixation method	H
109.2	How do we get the best outcome with no pain and good movement? I had a stiff and painful knee	P
97.1	what can be done to improve the outcome of primary knee replacements to avoid revision surgery.	H
22.1	Which is the best outcome score to use to identify patients with problematic knee replacements?	H
69.1	Why do so many knee replacements require revision	PF
Information & Advice		
21.2	On average what knee flexion range of movement is realistic to achieve in the 2-5 days post revision surgery.	H
27.1	How long does a replacement. Knee last	PC
27.2	Does a damage knee waiting for surgery affect the hip	PC
33.2	Is tendon issues always a factor in poor outcomes	PF
38.2	Why is it that my knee can "give way" months following a total knee replacement?	PC
40.2	If when a patient has been discharged what do you look out for when you suspect an infection?	PF
40.3	How long do you wait before seeking professional advice if you think there is an infection	PF
63.1	When will I need more surgery	PC
63.2	Will it work as a proper knee	PC
63.3	How long will it last	PC
66.2	How long before I will be up and moving.	PF
66.3	If any infection enters the new joint, what happens.	PF
67.2	Already had physio, painkillers for years...what else is there other than surgery?	PC
67.3	Is it different to what I've already been through?	PC
78.2	Is it correct that only 1 sensory nerve innervates the retro-patellar cartilage and that this nerve can be denervated during TKR surgery to address the problem I mentioned in question 1.	H
80.1	What does the surgeons expect range of movement wise	H
90.3	How long do you need to wait when having pain after a knee replacement before you should see someone for further assessment or management	PC
92.3	Is there any way of being able to be told prior to the operation what preparations should be made at home for when recovering from surgery?	PF
94.3	Why kneeling after a TKR is advised by some surgeons and not by others? Is kneeling ok?	H
96.1	How can I be sure my surgeon doing my knee replacement is an expert, to try and prevent a re-do being necessary?	PC
106.1	Why did my knee go black after the operation and have to be replaced five times?	PF
114.1	Why do we need further surgery could patients be told this information?	P
119.3	length of time replacement knee will last with normal living activity	PF
120.2	The knee replacement clicks and feels loose . Is it cause lack of muscle strength/bulk to hold it together.	PF
120.3	How successful is revision surgery.	PF
125.3	Length of time replacement knee will last with normal living activity	PF
21.3	How long after primary knee surgery can a knee be deemed as problematic and needing revision surgery?	H

112.1	Given a time limit on how long before revision of joints?	PC
126.3	How successful is Revision knee surgery?	PF
127.1	If repetitive revisions are necessary, when will amputation become a realistic proposition?	P
132.3	What are the success rates of revision knees within 5 years of the original?	H
138.1	at what point post-operatively can we advise a patient "this is as good as it gets" ?	H
138.2	following MUA for post op pain and stiffness at what point do we advise no further surgery will help ?	H
138.3	are there support groups/info we can signpost patients with "failed knee replacements" ?	H
53.1	Are there any further restrictions e.g. no jogging, after a revision than there were after a TKR?	PC
27.3	How long should the pain last after all the rehabilitation has been completed	PC

Policy & Practice

9.2	Should group physio meaning the patient would see the physio. Longer in end group than if there were individual Sessions betree than individual sessions	PC
10.3	At what point in a complex struggle to salvage a person's knee joint should one consider amputation, and do formal strategies or workflows exist to help the surgeon and the patient to determine this?	H
17.3	Should the revisions be recorded as a separate procedure on the joint register to accurately represent the figures for each trust. At present the trusts that provide a revision service have longer length of stay then those that do not.	H
20.2	management of painful or dissatisfied patients with TKR	H
29.2	How much does a revision really cost and who funds it? Are hospitals being reimbursed fairly?	H
41.1	For problematic knee replacements, would a fast track route to consultant clinic, by-passing the GP, be cost effective, and improve the overall patient experience?	C
51.1	Should there be a gold standard algorithm that all centres follow when investigating a painful knee?	H
62.2	Should you not refer all high risk patients to an anaesthetist and geriatrician prior to surgery?	H
67.1	Twelve plus months first saw physio who immediately said replacement needed replacing and also other knee needed replacing....so why does it take so long?	PC
70.1	What happens to knee joint and how much damage can be done whilst waiting for a date for surgery, especially when waiting list is long?	P
75.2	Can it be simplified t ok be performed in any hospital	H
81.2	Concrete criteria for revision	H
83.2	Why do some patients get total and others partial knee replacement as some surgeons do not offer patina knee surgery?	H
96.2	If I have a problem with my knee replacement, what ensures that I am seeing the right person do investigate or do the re-do?	PC
96.3	My GP said "knees can't be redone" - how do we make sure GP's are better informed and refer to an expert?	PC
105.1	Joint registry booklet was confusing and misleading as it asks about your health in the last 4 weeks. It should just be about your knee replacement and not your overall health	PF
114.2	Lots of Physiotherapy after surgery	P
114.3	How can you improve the follow up for operations that go wrong instead of being told there is nothing wrong fro months?	P
120.1	I felt the physio I received was inadequate and after care non existent .Would I have benefited with a closer follow-up and better physio.	PF
121.1	improved after care	PF
124.1	Improved aftercare (physio)	PF
15.1	Is two revision suergeons opinion before revision suergy can improve the postoperative outcome?	H
42.3	clean guidance on managing these patients - assessment, tests and management	H
135.1	What are the baseline investigations that are required in patient's with problematic knee replacements?	H
140.1	How soon after primary knee replacement should/ could it be deemed a failure or in need of revision?	PF
140.2	What functionality, or lack of, would indicate that a revision should be considered?	PF
73.3	Do virtual ESP led follow up clinics provide an effective way of identifying and managing patients in comparison to traditional consultant led clinics?	H
47.3	Trying to establish most evidence based tests to try and ensure any infection is not source of ongoing pain. Consistent approach to all ensure tests / interventions used are based on best evidence.	H

OUT OF SCOPE ROUND 2

Audit

Qn No.	Original question	Respondent
254.2	how common are problems after knee replacement surgery?	P

Broad / off-topic

186.1	Was the primary knee replacement really indicated or was the OA not so severe so could the pt have had more conservative treatment such as a UKR	H
187.1	Not being followed up swiftly after initial referral	PF
187.2	When first being got out of bed, reassurance would have been helpful re: infection during this period of time	PF
188.1	Length of time for treatment	P
188.2	More rehabilitation after op	P
189.1	How easy is it to get a second opinion	P
193.1	What is the most effective approach to managing patients with problematic knee replacement?	H
193.2	When can patients who are likely to develop problematic knee replacement be identified?	H
201.1	To make sure a first knee replacement is in the correct position and the surgeon .	PC
213.1	What are the main preventable reasons that knee replacements fail in the community?	H

216.2	What pre-operative factors (before primary) increase risk of poor outcome in the first place.	O
218.1	A document to be read well before the assessment date. It should set out the sort of questions that are likely to be asked so that one can reflect and notice before the consultation.. i.e.: help prepare for the questions	PF
219.1	As far as infection goes, absolute cleanliness of the hospital, wards, operation theatre and instruments are paramount.	PF
222.3	Which outcome measures most accurately predict a problematic knee post operatively	H
234.1	What is the best way to classify problematic knee replacements?	HC
239.1	Lack of rehabilitation. No physio	P
239.2	Support when infection reoccurs.	P
242.3	Research into arising defects of delicate skin i.e. blisters , stitches slow healing	P
244.2	To be able to gain improved movement and gradual improvement over time.	PF
248.3	What can you do to reduce the chance of having problems after a knee replacement?	P
249.2	Follow-up x-ray to establish that leg is straight.	P
253.3	how can problems after knee surgery be prevented/reduced/treated?	PF
258.1	I was on a study which due to the person taking it was never completed. I had very positive feelings when I was operated on. However returning back to hospital I was always told I had good bend in the knee to begin with	P
262.1	I had biopsies to detect the infection. the results were quick and I was given the surgery needed.	PF
264.3	do patients truly understand the risk of revision surgery when giving 'informed consent' - would they have still had the primary TKA?	H
184.1	Is there a place for osteochondral allografts in place of, or to postpone, first knee replacement? That could allow preservation of menisci and range of movement.	C
Information & Advice		
192.1	Why have antibiotics been given before an infection has been diagnosed?	PF
199.2	What options are there if the implant does not work.	PC
200.3	What are next options after two replacements of same knee.	P
202.1	The spacer moved after being discharged from hospital after 1st stage revision . Is this something that happens frequently?	P
203.2	Why after 3 months after knee revision am I still in a great deal of pain?	P
203.3	Why does the antibiotics cause such bad side affects?	P
207.2	I am still very unstable. The knee gives way and cracks a lot. Is this normal?	PF
207.3	What can I expect re: the infection? I have been on the antibiotics since January 2018 and had 2 procedures to clean out the bacteria. What Can I honestly expect?	PF
208.3	An information pamphlet on what to expect. Look out for following surgery would be helpful for both patients and carers, especially colour/condition of wound.	PF
217.1	Why was the infected joint not replaced straight away?	P
230.3	"ad flags" for problems after revision knee replacement	P
231.1	Where is the best place to be seen after the first operation when having problems	P
237.2	Where is the best centre to have partial knee replacement converted to full knee replacement	P
248.1	How long should you have pain after a knee replacement?	P
248.2	How do you know if the pain in your knee is normal ?	P
255.3	Should I have further knee replacement (revision) surgery?	P
Policy & Practice		
186.3	Can GP's/ commissioners be informed of the revision rates of the local surgeons performing knee arthroplasty so that patients can be directed to the most appropriate specialists	H
191.1	Why is there very little physiotherapy or none given after the operation? (Had to keep requesting this and the little bit given was ineffective)	PF
201.2	Physio to continue on discharge from hospital-not three months.	PC
205.1	Physiotherapy- over the years there is less physio offered after surgery. As I have had los of surgery to my knees, it may be that people think that I know what to do regarding exercise combined with rest	P
228.3	When I so much pain are we made to wait years for a replacement.	P
245.1	Quicker surgical revision (mine was 11 months).	PF
245.2	Better physio afterwards.	PF
258.3	Physiotherapist was too long in being offered	P
263.1	a year after surgery the consultation was with a nurse who could not answer my questions. I had to return a few weeks later to see a surgeon. the surgeon explained what they thought the problem was. there was then no further follow up made I had to take the initiative.	P
263.2	I would like the NHS to keep control until all problems have been sorted.	P

PSP unique identifier (to be allocated by JLA team on receipt of final priorities from PSP)	Record ID (the unique identifier of the uncertainty. To be allocated by JLA team on receipt of final priorities from PSP)	PSP Name	Total number of verified uncertainties identified by the PSP	Uncertainty	Ranking at final workshop	Explanatory note	Date of the priority setting workshop	Evidence (reference, and weblink where available, to the most recent relevant systematic review identified by the PSP, plus a maximum of 2 other systematic reviews, including protocols for future systematic reviews, that the PSP considers relevant.)	Health Research Classification System (high level HRCS code to be allocated by the JLA team unless the PSP prefers to complete this)	Contributing data from 'all questions'
		Revision Knee Replacement PSP	32	What are the causes of persistent pain following a knee replacement? How can the pain be prevented or minimised?	1	Pain, which persists after the initial recovery period following knee replacements, remains one of the main of the biggest concern for patients and professionals alike. This topic ranked top in both groups through out the process. In particular, participants want to better understand what can cause it and what can be done to prevent or minimise such pain.	21.5.19			P2
		Revision Knee Replacement PSP	32	What is the best way to diagnose and treat infection of a knee replacement?	2	Infection is a devastating complication following knee replacement which is related to significant morbidity and mortality. Patients are affected in their quality of life, and this issue creates a significant health economic burden. Thus the timely, accurate detection of infection, as well as optimising treatment modalities remains a key goal for arthroplasty surgeons.	21.5.19			I2, I4
		Revision Knee Replacement PSP	32	What are the most effective ways to organise health care and avoid delay to improve the results and patients' experience of revision knee surgery?	3	Studies in various fields have suggested that surgical volume may be related to patient outcomes, and following the success of centralisation of services within major trauma/vascular surgery, health professionals were keen to explore the best models for infrastructure. Patient were also keen on organisation of services as it has a direct consequence on their experience and quality of life when dealing with a problematic knee replacement.	21.5.19			D3,E1
		Revision Knee Replacement PSP	32	What factors determine (predict) whether revision knee surgery is likely to work?	4	Given increasing numbers of knee replacements and rising life expectancy, there is likely to be an increased burden for revision surgery in the future. However, patient selection is paramount, and both patients and healthcare professionals are eager explore ways to best predict which patients will indeed benefit from revision surgery, to help weigh up with the potential risks of surgery.	21.5.19			R2, R5, R6,
		Revision Knee Replacement PSP	32	What can be done after and/or before revision knee surgery (including physiotherapy and exercise) to optimise the result?	5	Following any surgery a key component of the preparation and recovery phases relate to rehabilitation and prehabilitation which patients undergo under the expertise and supervision of physiotherapy departments across the country. It is important to assess how these can best be conducted and indeed if there are other adjuncts which are non-physiotherapy based that can make a difference to the outcome of surgery.	21.5.19			H2, H3, H4
		Revision Knee Replacement PSP	32	What is the psychological impact of a problematic knee replacement and what support do people need before, during and after revision knee surgery?	6	Musculoskeletal problems have emotional and mental as well as physical consequences. Participants were keen for research exploring what psychological impact problematic knee replacements might have, as well as needs for psychological and social support around the time of revision surgery.	21.5.19			C1, C2
		Revision Knee Replacement PSP	32	How should we measure the outcomes following revision knee surgery in a way that is meaningful to patients, and is surgery cost effective?	7	The assessment of efficacy of treatments is heavily reliant on the quality and appropriateness of how we measure outcomes. In addition it is very important in the current health economic climate, to understand the balance between cost and benefit of surgical procedures, to guide allocation of resources.	21.5.19			R3,S6
		Revision Knee Replacement PSP	32	Is there a way to manage some types of problematic knee replacement to avoid revision knee surgery (through physiotherapy, lifestyle change and / or self-management)?	8	Some patients are not fit for revision surgery, or surgery is not appropriate given the underlying cause of their problems following knee replacement. It is important to better understand non-surgical treatment for these groups.	21.5.19			H1,
		Revision Knee Replacement PSP	32	What causes knee stiffness following knee replacement? How can it be avoided and how is it best treated?	9	Stiffness can cause significant distress and difficulty for patients following knee replacement, so we need to better understand the causes and what can be done to avoid this issue. In those in whom it is not avoidable, how can we best deal with the problem.	21.5.19			H5
		Revision Knee Replacement PSP	32	What are the best forms of surgery to use for revision knee surgery (including choice of implant and technique)?	10	There are multiple variations in technique, implant and / or instrumentation that can be used in revision knee surgery. We need better evidence to guide surgeons which allow the best outcomes, and in which patient groups.	21.5.19			S1, S5
		Revision Knee Replacement PSP	32	What are the best ways to investigate the causes of pain following a knee replacement?	11	This is related to the top ranking priority, but submissions were focussed specifically on best modalities for investigation and diagnosis of persistent pain.	21.5.19			D1
		Revision Knee Replacement PSP	32	What are the best treatments for pain in replacement knees, particularly if revision knee surgery is not recommended?	12	For those in whom persistent pain following knee replacement manifests, what treatments are best. This uncertainty also included submissions where context of interest was pain relief when surgery has not been deemed appropriate.	21.5.19			P1
		Revision Knee Replacement PSP	32	What is the best way to treat a break or fracture around a knee replacement?	13	What are the best ways to treat patients who sustain a broken bone around a knee replacement - including surgical and non-surgical options.	21.5.19			S3
		Revision Knee Replacement PSP	32	How long does a revision knee replacement last and what can be done to extend its life?	14	Patients and professionals are keen to know how long a revision knee replacement should last and what might be done to maximise the time it functions well, without symptoms before requiring further attention.	21.5.19			R1
		Revision Knee Replacement PSP	32	What are the best ways to manage patients' unmet expectations and dissatisfaction with problem knee replacements and/or revision surgery?	15	Some patients feel their expectations are not met following knee replacement due to ongoing / further problems. How can this be addressed? This might include interventions before or after surgery to set realistic expectations and educate patients and professionals.	21.5.19			C3
		Revision Knee Replacement PSP	32	What factors increase the risks of infection and how can these risks be reduced?	16	What increases the chance of picking up and infection in the replaced knee, and what can patients and professionals do to minimise the probability?	21.5.19			I1
		Revision Knee Replacement PSP	32	What are the long-term outcomes when a knee replacement has been infected?	17	For those whose knee replacement becomes infected - what level of function and symptoms might be expected in the short, medium and long term?	21.5.19			I5
		Revision Knee Replacement PSP	32	What are the best non-surgical treatments around the time of revision knee surgery to improve outcomes (e.g. reducing bleeding, improving wound care)?	18	What else can be done in addition to the revision knee operation itself, to ensure the best possible outcome for patients? This might include strategies including but not limited to pharmacological interventions or dressing options, to optimise all elements related to recovery following knee surgery?	21.5.19	1. Newman, J.M., et al., Use of Closed Incisional Negative Pressure Wound Therapy After Revision Total Hip and Knee Arthroplasty in Patients at High Risk for Infection: A Prospective, Randomized Clinical Trial. The Journal of arthroplasty, 2019. 34(3): p. 554-559. e1. 2. Romano, C.L., et al., Does a thrombin-based topical haemostatic agent reduce blood loss and transfusion requirements after total knee revision surgery? A randomized, controlled trial. Knee Surgery, Sports Traumatology, Arthroscopy, 2015. 23(11): p. 3337-3342. 3. Yuan, X., et al., Synergistic effects of intravenous and intra articular tranexamic acid on reducing hemoglobin loss in revision total knee arthroplasty: a prospective, randomized, controlled study. Transfusion, 2018. 58(4): p. 982-988.		76.3, 149.3, 113.1, 18.4
		Revision Knee Replacement PSP	32	What are the most effective forms of pain relief during revision knee surgery and in the recovery period?	19	What are the most effective forms of pain relief during and immediately after revision knee surgery?	21.5.19			S2
		Revision Knee Replacement PSP	32	What are the long-term outcomes of revision knee surgery?	20	What are the positive or negative consequences of revision knee surgery on patients? This includes effects on the patients symptoms, function, quality of life, general health or how their medical problems might be affected.	21.5.19			R4
		Revision Knee Replacement PSP	32	What are the best ways to investigate implant-related failure in a knee replacement?	21	What are best way to assess problematic knee replacements where there is a problem with the implant? This includes issues with loosening or when the implant positioning could be improved and may include research exploring imaging modalities in this context.	21.5.19	Sheng, P., et al., Patient outcome following revision total knee arthroplasty: a meta-analysis. Int		D2
		Revision Knee Replacement PSP	32	If necessary following infection in a knee replacement, should revision surgery be done in one or two operations?	22	There are different approaches that can be used when knee replacement surgery is revised due to infection. In what situations is it appropriate to perform such revision in one operation, and when should two operations be considered? What are the outcomes associated with these options?	21.5.19			I3
		Revision Knee Replacement PSP	32	What is the best way to restore lost bone during revision knee surgery?	23	For those who lose bone around the implants, what are the best options to restore the defects to optimise outcome during revision surgery?	21.5.19			S5

There were 25 questions discussed at the final workshop. 'What is the best way to diagnose infection in a knee replacement?' and 'What is the best way to treat infection of a knee replacement?' were merged to make question 2. 'How can the results of revision knee surgery be measured in a way that is meaningful to patients?' and 'What is the expected improvement in quality of life following revision knee surgery, and is it cost effective?' were merged to make question 7.