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Optimising the implementation of evidence-based osteoarthritis guidelines in primary care: Development of a Knowledge Mobilisation Toolkit

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SUMMARY

Objective: Implementing clinical guidelines for osteoarthritis (OA) in primary care is complex. Whilst international guidelines detail *what* best practice for OA looks like, little is known about *how* this is best implemented. Limited resources are available to guideline developers, practitioners, researchers, or the public to facilitate implementation. Set in the context of a larger research project which sought to understand the factors that influence knowledge mobilisation (KM) in implementation for OA guidelines, this study reports the development of a toolkit to optimise KM for the implementation of evidence-based OA guidelines in primary care.

Design: Triangulation of three qualitative data sets was conducted, followed by a stakeholder consensus exercise. Public contributors were involved in dedicated meetings (n = 3) to inform the content, design, and KM plans for the toolkit.

Results: From data triangulation, 53 key findings were identified, which were refined into 30 draft recommendation statements, within six domains: approaches to KM; the knowledge mobiliser role; understanding context; implementation planning; the nature of the intervention; and appealing to a range of priorities. Stakeholder voting (n = 27) demonstrated consensus with the recommendations and informed the wording of the final toolkit.

Conclusions: Factors that optimise KM for OA guideline implementation in primary care were identified. Empirical data, practice-based evidence, implementation practice, and stakeholder (including patient and public) engagement have informed a toolkit comprising several overarching principles of KM, which are suitable for use in primary care. Consideration of equitable access when implementing evidence-based OA care among diverse populations is recommended when using the toolkit. Further research is needed to evaluate the toolkit's utility and transferability.

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Introduction

Despite evidence-based national and international guidelines providing consistent recommendations for the management of osteoarthritis (OA), implementation of best practice in primary care is complex[1] and variation in clinical practice for OA exists.[2] International models of OA care based on core non-surgical guideline recommendations,[3] aim to enhance quality and consistency of care and reduce the evidence to practice gap.[4] However, individual motivators and other factors affecting the uptake of best care (including

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a discordance between patient and practitioner views) have been identified.[5] Whilst models of OA care detail *what* evidence-based management looks like, little is known about *how* to implement these models of care consistently and which strategies optimise the process of implementing evidence-based guidelines.

The concept of moving knowledge into action can be confusing, with multiple terms and definitions reflecting the rapid evolution and advancement of thinking in the field. Knowledge mobilisation (KM), the term commonly used in healthcare research and practice in the UK, is defined as the proactive process of creating and sharing knowledge to catalyse change in policy and practice.[6,7] Despite terms being used interchangeably, KM differs from related concepts of knowledge transfer (the targeted distribution of knowledge to specific audiences[8]) and implementation (the process of embedding research evidence into everyday practice[9]) by focusing on the relational, collaborative and context driven process of creating, sharing and using knowledge at both systems and individual levels.[10] KM principles for optimising the integration of evidence into practice include: the use of KM theory to underpin research and implementation activities; dedicated resources to support change; public involvement; and sharing best implementation practice. For OA, focussed activity for implementation has been developed with the OA community in the Joint Effort Initiative (JEI) (endorsed by the Osteoarthritis Research Society International).[11,12]

While these broad principles are helpful, there are few dedicated resources and strategies to support healthcare professionals (HCPs), healthcare planners, guideline developers, researchers, and public and patients to optimise implementation of evidence-based guideline recommendations for OA and identify which strategies work best in which circumstances. Practical tools and robustly evaluated methods are required to improve the uptake of best evidence for OA internationally.[13] The aim of this study was to develop a toolkit to optimise KM for the implementation of evidence-based OA guidelines in primary care.

Methods

Overview of study context

This study was undertaken within a larger qualitative research project which sought to understand the factors that influence KM in implementation for OA in primary care.[14] Details of the three datasets drawn upon for this study are described briefly below and in Table I.

First, a systematic review of qualitative studies was conducted which synthesised evidence about factors which have influenced the implementation of evidence-based guidelines for OA in primary care.[5]

Dataset	Systematic review	Secondary analysis of focus group data	Interview study
Study aim	To synthesise qualitative evidence that investigates the factors influencing the implementation of evidence-based guidelines for OA in primary care	To understand and explain the KM process at the transition between completion of a research trial and 'real world' implementation in clinical practice	To understand the uptake of a clinical innovation for OA and explore the transition of knowledge from a clinical trial to implementation from a KM perspective
Patient and public involvement and engagement	Informed larger project study design, research questions	Informed larger project study design	Interview schedule Public facing documentation Make sense of data
Overview of sample	Four articles included with a total of 87 participants (patients n = 46, general practitioners n = 28, practice nurses n = 13) Three studies conducted in England within the context of an implementation trial, and one was conducted in the Netherlands	Three focus groups previously conducted with general practice staff in the control arm of the MOSAICS trial Participants n = 21 (5-8 per focus group) • General practitioner n = 13, • Practice nurse n = 6 • Healthcare support worker n = 1 • Trainee general practitioner n = 1	Semi-structured interviews conducted with individuals with experience of implementing the MOSAICS intervention (Osteoarthritis Management Programme) in at least three different practices Participants n = 13 • General practitioner n = 5 • Practice nurse n = 2 • Clinical academic physiotherapist n = 1 • Commissioner n = 1 • Managerial n = 2 • Lay contributor n = 2
Main findings	Best practice was not enough to achieve 'buy-in' to implementation but a range of tacit motivators to implementation were identified. Healthcare professionals used patient reasons to justify engaging or not engaging with implementation. Engaging with the whole practice was important in achieving implementation. A disconnect between research and 'real-world' primary care practice influenced long-term implementation.	In operationalising implementation of an innovation for osteoarthritis following a trial, the importance of a whole practice approach, including opportunity for reflection and planning were identified. The end of a clinical trial provided opportune timing for facilitating implementation planning.	Facilitation by an inter-disciplinary knowledge brokering service, nested within an academic institution, was instrumental in supporting ongoing implementation by providing facilitation, infrastructure, and resource to support the workload burden. 'Instinctive facilitation' may involve individuals who do not adopt formal brokering roles or fully recognise their role in mobilising knowledge for implementation. Public contributors and lay communities were not only recipients of healthcare innovations but also potential powerful facilitators of implementation.

Table I

Overview of datasets triangulated in this study.

Second, an in-depth, theoretically informed qualitative study was completed.[15] This study was nested within an implementation study; the Management of Osteoarthritis in Consultations (MOSAICS) study. MOSAICS was an investigation of the feasibility, acceptability and impact of implementing National Institute for Health and Care Excellence (NICE) OA Guidelines.[3] The aim of MOSAICS was to evaluate the clinical and cost effectiveness of a 'model OA consultation' - a complex intervention designed to increase adherence to the national guidelines for OA management in UK primary care. The intervention comprised:

1. An OA Guidebook written by patients and HCPs for patients to provide patient-centred and evidence-based information.
2. A model OA consultation for primary care to deliver NICE recommendations for people aged 45 years or older presenting to general practice with peripheral joint pain.
3. Training for general practitioners (GPs) and practice nurses to deliver the model consultation.
4. The development and capture of quality indicators of care (through an OA e-template and self-reported questionnaire).

The MOSAICS model consisted of three components: (i) an initial consultation with a GP, followed by (ii) up to four consultations with a practice nurse in an OA clinic, with (iii) the Keele OA Guidebook to support care. The evidence-based intervention was designed to provide relevant written information for patients, along with support in undertaking muscle strengthening exercises, increase physical activity and weight loss (where appropriate).

Two separate qualitative studies were conducted to explore the journey from the MOSAICS research study to implementation of the MOSAICS model in primary care practice. The two qualitative studies comprised: 1) secondary analysis of focus group data collected at the end of the MOSAICS trial with general practice staff, and 2) an interview study of key stakeholders involved in the implementation of the MOSAICS model following the MOSAICS study. The results of these qualitative studies are reported in one publication.[15]

Having completed this work, the next step was to draw upon the empirical findings of these three studies to develop practical recommendations for guideline implementation in the form of a toolkit (defined as a packaged grouping of multiple, evidence-based, KM strategies used to educate or facilitate behaviour change[16]) for key stakeholders including HCPs, healthcare planners, researchers, and patients and the public.

This paper describes the final stage of the research project and the steps taken to integrate and synthesise the research findings from the previous three data sets (systematic review, focus groups, interviews) to develop a pragmatic toolkit to optimise KM for the implementation of OA guidelines in primary care.

Design

Using data from the three data sets, a six-step triangulation exercise, including stakeholder consensus, was conducted to i) identify key findings from the three data sets, ii) develop draft recommendation statements for enhancing KM relating to OA in primary care, iii) seek opinions of potential end users of the toolkit on the content, and (iv) refine the content and design a toolkit. Ethical approval was obtained (Keele University ERP 2408 Oct 2018). Public contributor involvement was embedded throughout the research conducted as part of the larger project. For this study specifically, the aim of dedicated public contributor discussions (n = 3) was to inform the design, content, and KM plans for the toolkit and to support further funding applications to evaluate its use. The study is reported in accordance with the Guidance for Reporting Involvement of Patients and the Public (GRIPP2) checklist.[17]

Triangulation involves combining and synthesising data and to identify whether data agree (convergence), contradict (dissonance) or complement each other.[18] This study used methodological triangulation, including three data collection techniques (systematic review, focus groups, and interviews); data source triangulation (data collected at different time points); and partial investigator triangulation (analysis undertaken by LS and ZP collaboratively). Fig. 1 outlines the study methods.

Triangulation exercise - steps 1-4

A pragmatic triangulation protocol, based on the principles of Farmer et al[19] was conducted to integrate the data (after all data sets were individually analysed), identify key findings from the three datasets (systematic review, secondary analysis of focus group data, and qualitative interview study data), and develop draft recommendation statements for stakeholder review.

All the key findings from the three datasets were identified, with supporting quotes, by LS (Step 1). To make the list more manageable, duplicate findings were removed at this stage. To gain further understanding of the 'strength' of each key finding, convergence coding was undertaken by LS, ZP (Step 2). Convergence coding consisted of examining each dataset to determine whether each key finding was either detected in more than one dataset (agreement either completely or partially), if there were contradictory findings in other datasets (dissonances), or an absence of that key finding in other datasets (silences). A process of iterative checking (Step 3) then took place whereby instances of complete agreements (across all three datasets), contradictions and absences were examined further. The original datasets were then revisited, and further analysis completed to ensure a true representation of the data had been captured.

The study management group (SMG) (LS, ZP, AF, KD) met to discuss the relationship between findings and generate draft recommendations (Step 4). This was informed by the 'strength' of the findings in the convergence coding. Findings were grouped into a typology and, any statements with similar meaning were combined and refined. Following this, draft recommendation statements were developed, relating to one or more original key finding.

Triangulation exercise - stakeholder review – step 5

For stakeholder review, a consensus exercise was undertaken. A consensus conference approach[20] (using TurningPoint interactive polling software) at a national KM event (Birmingham UK, November 2018) was used to determine the level of stakeholder agreement on the draft recommendation statements via a majority vote, as advocated in European Alliance of Associations for Rheumatology (EULAR) guidelines for recommendation development.[21] All delegates, including public contributors, at the event were invited to participate, anonymously. Participants selected their level of agreement with the statements using a 7-point Likert scale. Written and verbal feedback from participants were also collated.

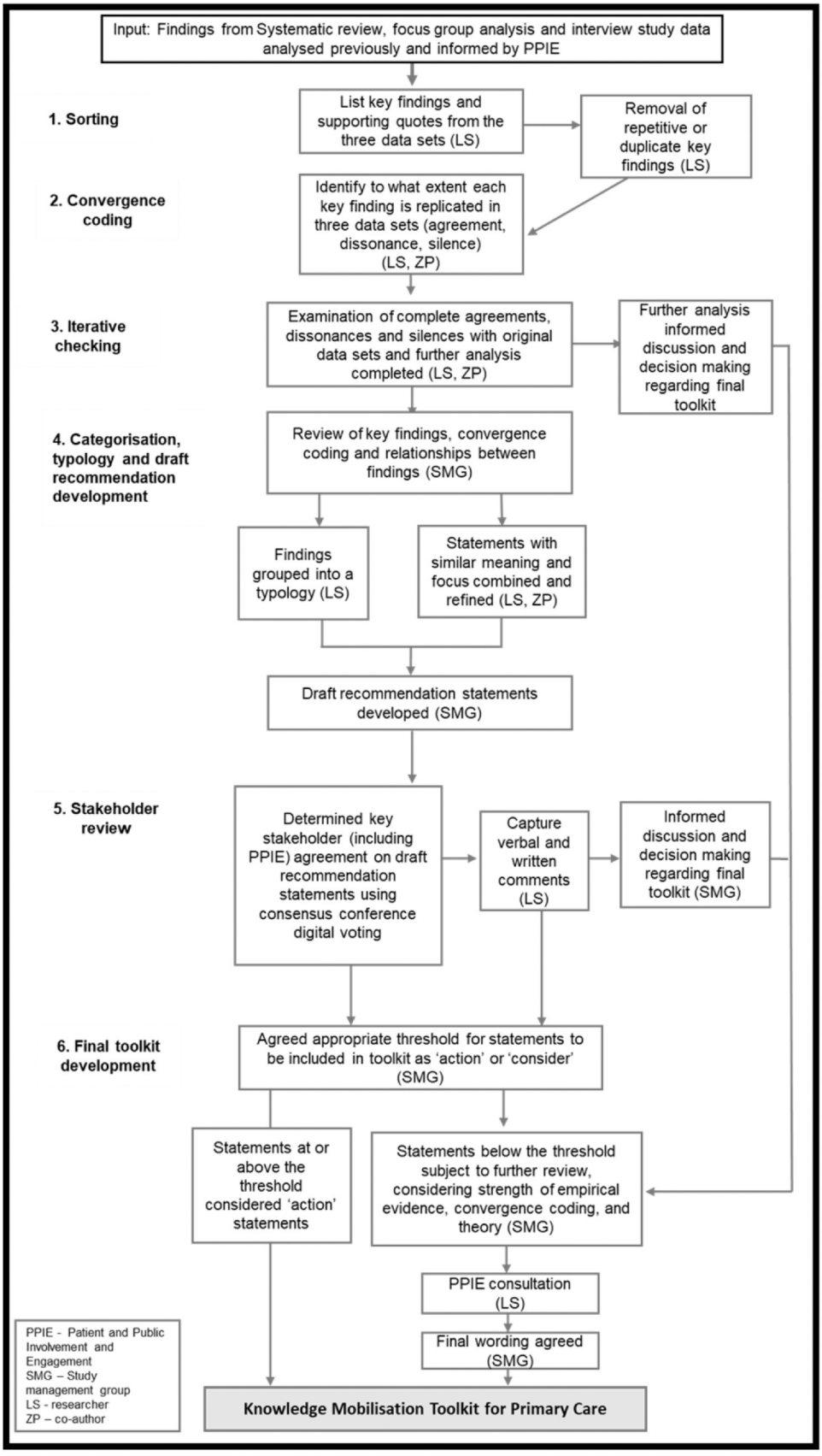

Fig. 1

Overview of study methods.

Final toolkit development – step 6

Through discussion with the SMG, it was decided that all recommendation statements would be included in the toolkit but presented with varying degrees of strength of recommendation as indicated by degree of stakeholder agreement. This was because all but one of the recommendation statements were data derived and hence had empirical evidence to support their utility. The choice of final wording was informed by NICE and EULAR recommendations.[21,22] The SMG agreed that 75% agreement or higher (defined a priori as combined responses for strongly agree, agree, or somewhat agree) was an appropriate threshold for inclusion in the toolkit as 'action' statements (e.g. offer, involve, identify). Those statements receiving less than 75% agreement were subject to further review as to the appropriateness of a 'consider' statement. This review included SMG and public contributor discussion in conjunction with any relevant written or verbal comments, results from the convergence coding (which indicated the 'strength' of the original key findings), and KM theory. Public contributor consultation took place before the final wording was agreed. Minor rewording of the draft recommendation statements was also considered if verbal or written feedback, or voting, suggested the wording was unclear or suboptimal. Public contributor views were sought on the toolkit in a later dedicated meeting.

Results

Triangulation exercise - steps 1-4

Ninety-five key findings were identified from the three datasets, 42 of which were removed through repetition or duplication, leaving 53 distinct key findings (Table II). Convergence coding identified five key findings were evident in all three data sets, and four were contradictory across datasets (Fig. 2), which were explored further in iterative analysis.[14]

Revisiting the original data analysis during iterative analysis (step 3) allowed for a detailed review and additional interpretation of the underlying dimensions of the three datasets. Examining the data and potential reasons why certain key findings were or were not identified across all datasets, led to the identification of important elements or core categories which informed the typology. For example, one of the key findings that was identified in each dataset (agreement) was how OA was deemed a 'low priority' by patients and HCPs and hence was less likely to be prioritised over conditions associated with financial reward or tariffs in general practice (e.g., diabetes, asthma etc). Other key findings identified in all datasets related to the range of motivations of HCPs for engaging with implementation of an intervention for OA (for example, reducing workload burden for GPs and providing additional management options in clinical consultations for practice nurses). Therefore, 'Appealing to a range of priorities' was identified as an important component of the typology.

In the SMG meeting to develop draft recommendations, the 53 findings informed development of 30 draft recommendations, which were organised in a typology comprising six domains: approaches to KM; the knowledge mobiliser role; understanding context; implementation planning; the nature of the intervention; and appealing to a range of priorities (Table II). A key element that was not identified in the analysis but was felt to be important from the literature, and therefore added, was the use of theory to inform KM strategies, resulting in 31 recommendations.

Triangulation exercise – stakeholder review – step 5

Twenty-seven of the 30 delegates participated in the stakeholder consensus exercise. Demographic details of participants were not collected, however, attendees included managers, clinicians, commissioners, charities, and patient and public contributors from a wide spread of UK regions.

Twenty-one statements out of 31 (68%) achieved agreement of 75% or more by respondents (Table III). Stakeholders agreed with all statements in the domains of implementation planning and understanding context. Ten statements (32%) received less than 75% agreement (range 45-74%).

Final toolkit development – step 6

Twenty-one recommendation statements were initially included in the toolkit as 'action' statements. The remaining ten recommendation statements were discussed by the SMG in conjunction with written or verbal comments, results of the convergence coding, strength of empirical evidence, and theory to determine reasons for including in the toolkit as 'action' or 'consider' statements. This was then reviewed in a dedicated public contributor consultation meeting. Areas of repetition across recommendations were considered to ensure they only featured once in the final toolkit. The decisions relating to the re-wording of recommendation statements are shown in Table IV.

Public contributors also commented on the content of recommendations in the final toolkit. This discussion contributed to the consideration and identification of a 'late breaking' key finding relating to the importance of having a dedicated knowledge brokering 'Impact Accelerator Unit' to support KM in primary care, particularly the importance of this in providing infrastructure for the public contributors themselves to have meaningful input into KM. This recommendation was also added to the toolkit.

Fig. 2 provides an overview of study results.

The Knowledge Mobilisation Toolkit for Primary Care is shown in Fig. 3. Public contributors commented on design and usability of the toolkit and gave suggestions for future use and research.

Discussion

This three-step multi-method study drew on empirical findings from three datasets to develop a toolkit to optimise KM for the implementation of evidence-based OA guidelines in primary care. Draft recommendation statements derived using a robust triangulation protocol and voted on in a conference consensus exercise, informed the wording of the toolkit. High levels of stakeholder agreement were obtained for 21 (of 31) recommendations, indicating face validity and acceptability. The resultant pragmatic toolkit, grounded in empirical data and informed by public contributors, addresses both the planning and the 'doing' of KM in primary care.

To our knowledge, this is the first study to generate KM recommendations for OA in primary care using consensus methods with commissioners, clinicians, researchers, and patients. The work

Typology category	Key findings which informed recommendation statement	Draft recommendation statement
Approaches to knowledge mobilisation		A. When implementing in primary care, offer knowledge mobilisation approaches that:
	1. A range of different types and formats of knowledge, including guidelines, experience, tacit knowledge, and case stories are given priority by stakeholders and influenced the adoption of the intervention 2. HCPs reported how support and training in consultation skills facilitated a change in their knowledge, confidence, and practice	i. Utilise a range of different types and formats of knowledge, (including guidelines, experience, tacit knowledge and case stories)
	3. Many participants preferred face to face mobilisation of knowledge, with concise messages/sell points	ii. Are face to face
	4. HCPs reported valuing the opportunities for feedback and reflection while receiving training. This facilitated behaviour change and the transition of knowledge to practice. 5. HCPs reported engagement with implementation because of positive experiences in delivering the intervention 6. The intervention changed clinicians' approaches from biomedical to a more holistic, self-management approach 7. Clinicians described a need for 'head space' to enable time to stop and think about the evidence base to ensure the best services are being provided	iii. Provide opportunities for reflection and feedback
	8. Participants reported how implementation was optimised if they received knowledge from a trusted, credible source (often from within their peer network)	iv. Are delivered by credible knowledge brokers
	9. HCPs valued protected, dedicated time for whole practice continuing professional development (CPD)/discussion because it provided time and headspace for implementation planning 10. HCPs valued protected, dedicated time for whole practice CPD/ discussion because the whole practice approach ensured that consistent messages were delivered by all staff. General practitioners (GPs) report that practice managers and administration staff have a role in implementation, however, these professional groups were not included in any study 11. HCPs valued protected, dedicated time for whole practice CPD/ discussion because it enabled local contextual factors to be considered	v. Involve the whole general practice organisation
The knowledge mobiliser role	12. The affiliation to multiple networks was reported to be beneficial in optimising implementation because it was seen to speed up implementation and overcome barriers. This also gave implementers confidence in implementation because the wider team added credibility to the venture	B. The ability of individuals to mobilise knowledge for successful implementation is enhanced if they are part of multiple networks
	13. HCPs reported valuing the support provided by the research team in guiding implementation (including technical issues with template/ installing, providing guidebooks, training) 14. The skill set of the knowledge mobiliser was essential to implementation 8. Participants reported how implementation was optimised if they received knowledge from a trusted, credible source (often from within their peer network)	C. A trusted, credible individual needs to be identified to lead implementation projects at each beacon site
	15. Implementation was seen as 'bottom-up' (in some practices) and driven by front line staff rather than being imposed by managers 16. Participants expressed uncertainty as to whose role it is to mobilise knowledge for implementation some participants viewed it as everybody's role, some viewed it as a senior person such as a manager. Individuals perceived to be key knowledge mobilisers did not recognise this role	D. Everybody has a role in driving knowledge mobilisation (for example clinicians, commissioners, patients, public)
	16. Participants expressed uncertainty as to whose role it is to mobilise knowledge for implementation some participants viewed it as everybody's role, some viewed it as a senior person such as a manager. Individuals perceived to be key knowledge mobilisers did not recognise this role 19. Participants reported the culture and leadership (including practice manager) within a general practice influences engagement with implementation. Power dynamics in practices influenced the uptake of implementation, with some examples where one individual could block or facilitate involvement	E. Knowledge mobilisation should be driven by key decision makers in an organisation (for example manager, or someone in a senior role)
	13. HCPs reported valuing the support provided by the research team in guiding implementation (including technical issues with template/ installing, providing guidebooks, training) 16. Participants expressed uncertainty as to whose role it is to mobilise knowledge for implementation some participants viewed it as everybody's role, some viewed it as a senior person such as a manager. Individuals perceived to be key knowledge mobilisers did not recognise this role 17. Participants reported the knowledge mobiliser to be an essential role in implementation in primary care	F. The role and responsibilities of dedicated knowledge mobilisers should be defined at the beginning of implementation
	16. Participants expressed uncertainty as to whose role it is to mobilise knowledge for implementation some participants viewed it as everybody's role, some viewed it as a senior person such as a manager. Individuals perceived to be key knowledge mobilisers did not recognise this role 18. Some participants reported a desire to make the knowledge mobiliser role formal for example with a specific job specification	G. The knowledge mobiliser role needs to be explicit (for example acknowledged in job specifications)

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Table II (*continued*)

Typology category	Key findings which informed recommendation statement	Draft recommendation statement
Understanding context		H. Those promoting implementation within a general practice organisation need an understanding of:
	19. Participants reported the culture and leadership (including practice manager) within a general practice influences engagement with implementation. Power dynamics in practices influenced the uptake of implementation, with some examples where one individual could block or facilitate involvement	i. Leadership and decision makers in the organisation
	20. The notion of change fatigue was perceived to influence implementation by disengaging HCPs who are working under immense pressure and do not feel able to implement new interventions 19. Participants reported the culture and leadership (including practice manager) within a general practice influences engagement with implementation. Power dynamics in practices influenced the uptake of implementation, with some examples where one individual could block or facilitate involvement	ii. Culture in the practice, including attitudes to change and change fatigue
	21. Implementation was suggested by participants to have the potential to disrupt equipoise/balance within a practice because doing more for one condition or group of patients was perceived to have the potential to detrimentally affect others 22. Characteristics and needs of a practice's local population influenced engagement with implementation, for example, physical mobility is an important factor in an ageing rural population	iii. The characteristics (and needs) of their patient population
	23. Participants reported how the staffing model and staff turnover of a general practice influenced HCPs attitudes/engagement towards implementation and the extent to which staff has a vested interest in practice performance influenced engagement 24. Participants reported huge variation in the role of the practice nurse in primary care due to the nature of GPs being run as small businesses. Practice nurses were reported to work with differing levels of autonomy and their engagement in implementation planning was variable. In some practices, practice nurses were central to driving forwards implementation (decision making) and in others not	iv. The characteristics and skill mix of the practice staff
	25. Practices tend to work in isolation - interviewees speculated that working more collaboratively in small networks would facilitate implementation 12. The affiliation to multiple networks was reported to be beneficial in optimising implementation because it was seen to speed up implementation and overcome barriers. This also gave implementers confidence in implementation because the wider team added credibility to the venture	v. The characteristics of the practice network (for example whether it works in isolation or in a network such as a locality group of practices)
Implementation planning	9. HCPs valued protected, dedicated time for whole practice CPD/discussion because it provided time and headspace for implementation planning 10. HCPs valued protected, dedicated time for whole practice CPD/discussion because the whole practice approach ensured that consistent messages were delivered by all staff. GPs report that practice managers and administration staff have a role in implementation, however, these professional groups were not included in any study 26. HCPs reported the inability to be proactive towards implementation due to immense pressure faced working in primary care meaning that there is not enough time to plan	I. Offer dedicated time for a whole practice approach to implementation planning including all stakeholders such as clinicians, practice managers, and administrative staff
	27. Evaluation needs to be tailored to key stakeholder drivers and priorities. Evaluation outcomes need to be planned at the start of the implementation journey and relevant to all stakeholders 28. Collection of relevant outcome and evaluation data is challenging because of National Health Service systems and hard to measure outcomes	J. Determine the approach to evaluation at the planning stage, including consideration of relevant outcome data that meets the needs of all stakeholders
	29. Evaluation identified how the support of the research team was essential in initiating and maintaining implementation and routinisation of the intervention. Some participants report how implementation ceased when the support of the research team was withdrawn 30. HCPs and researchers report consistency in mobilising knowledge to all staff within the general practice as a challenge. HCPs reported an ad-hoc/pick and mix style of implementation following individual reflection and evaluation	K. Determine the approach to sustainable implementation at the outset
	31. Patient involvement was reported to be essential in achieving successful implementation in one practice 42. Patient participation groups (PPGs) were perceived as powerful in driving change in primary care practices	L. Involve patients in implementation and evaluation planning

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Table II (*continued*)

Typology category	Key findings which informed recommendation statement	Draft recommendation statement
Nature of the intervention		M. Those who are driving and leading implementation need to be able to demonstrate to stakeholders that the intervention:
	32. Flexible interventions were seen to facilitate implementation, particularly who delivered the intervention, when, where and how	i. Offers flexibility in whom it is delivered by, where it is delivered and how
	33. Implementation was optimised if the intervention aligned with the patient and/or clinician preferences for self-management. The intervention was not seen to make sense to some GPs who perceived that they had a limited role in self-management.	ii. Offers flexibility in meeting a range of patient preferences e.g. to self-manage
	34. Practice nurses and HCPs valued the opportunity to expand their role to implement and deliver the intervention because it was seen to enhance their professional autonomy by enabling them to manage patients with joint pain without referring patients back to the GP 35. HCPs reported engagement with the implementation of an intervention that aligned with holistic care 36. The desire/drive towards quality improvement influenced engagement of HCPs with the implementation 37. GPs valued strategies and opportunities to legitimise patients concerns and give reassurance to patients regarding joint pain 33. Implementation was optimised if the intervention aligned with the patient and/or clinician preferences for self-management. The intervention was not seen to make sense to some GPs who perceived that they had a limited role in self-management.	iii. Aligns with clinician beliefs and values
	38. Alignment of interventions with policy and culture of the management of long-term conditions and multi-morbidity facilitated implementation because it was recognised as important and provided clinicians with transferrable skills 35. HCPs reported engagement with the implementation of an intervention that aligned with holistic care 39. Policy and the regulatory environment affected implementation both positively and negatively for example Quality Outcomes Framework (QOF) influenced practice staffs' views of what was a priority. The need to adhere with NICE guidance on its own was not a motivator, in the absence of other drivers e.g. Care Quality Commission (CQC) target or QOF, however, NICE guidelines could be turned to a motivator when coupled with CQC target	iv. Aligns with health policy
	40. Patient preferences influenced implementation 41. Clinicians perceived the societal views of OA to require a biomedical approach which was a barrier to implementation 42. PPGs were perceived as powerful in driving change in primary care practices 43. GPs reported assumptions about patient preferences, assuming that the intervention placed an extra treatment burden on patients	v. Aligns with patient expectations
	44. Implementation was perceived as not onerous as it required minimal system level change as it did not require extra clinics, structural change, or increased time of time of consultations 21. Implementation was suggested by participants to have the potential to disrupt equipoise/balance within a practice because doing more for one condition or group of patients was perceived to have the potential to detrimentally affect others	vi. Offers opportunities to enhance care without disrupting the 'equipoise' within a general practice organisation

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Table II (*continued*)

Typology category	Key findings which informed recommendation statement	Draft recommendation statement
Appealing to a range of priorities		N. Those promoting adoption of implementation within a general practice need to appeal to a range of different priorities including:
	45. Individual clinician's motivators influenced engagement with implementation, for example, CPD or personal appraisal 34. Practice nurses and HCPs valued the opportunity to expand their role to implement and deliver the intervention because it was seen to enhance their professional autonomy by enabling them to manage patients with joint pain without referring patients back to the GP 46. The reduction in workload for GPs was a motivating factor for implementation. HCPs did not want to implement an intervention that would increase their workload 47. Individual interest in quality improvement and the condition/disease was reported to be a motivating factor for engaging with implementation 48. HCPs reported engagement with implementation because the intervention was perceived to enhance consistency but also gave more treatment options and the content for explanations based on evidence 49. GPs and practice nurses differed in their desire to close off the consultation (vehicle to dispose of patients and shift responsibility) or to provide a foundation for future consultations. Implementation of the intervention facilitated both of these 36. The desire/drive towards quality improvement influenced engagement of HCPs with the implementation 50. Different stakeholders have different priorities, for example, commissioners give priority to cost saving, GPs reduce consultations/ quality improvement. Participants reported how the implementation of an intervention that provides no financial savings is seen as a low priority to GPs and commissioners. This can make implementation challenging	i. Individual clinician priorities including CPD, appraisal
	40. Patient preferences influenced implementation 41. Clinicians perceived the societal views of OA to require a biomedical approach which was a barrier to implementation 33. Implementation was optimised if the intervention aligned with the patient and/or clinician preferences for self-management. The intervention was not seen to make sense to some GPs who perceived that they had a limited role in self-management.	ii. Patient priorities
	51. You can improve patient care but not endlessly 52. Implementation of interventions for OA was often seen as a low priority 53. Implementation could only be considered if no additional resource was needed. Funding helped to facilitate implementation in some practices but was insufficient in helping others 39. Policy and the regulatory environment affected implementation both positively and negatively for example QOF influenced practice staffs' views of what was a priority. The need to adhere with NICE guidance on its own was not a motivator, in the absence of other drivers e.g. CQC target or QOF, however, NICE guidelines could be turned to a motivator when coupled with CQC target	iii. Practice priorities including targets
	53. Implementation could only be considered if no additional resource was needed. Funding helped to facilitate implementation in some practices but was insufficient in helping others 50. Different stakeholders have different priorities, for example, commissioners give priority to cost saving, GPs reduce consultations/ quality improvement. Participants reported how the implementation of an intervention that provides no financial savings is seen as a low priority to GPs and commissioners. This can make implementation challenging	iv. Commissioning priorities such as cost savings or reducing referrals

builds upon existing literature relating to implementation in primary care[1] by focussing on research evidence for OA. This is of importance for the OA community, given that other implementation toolkits (e.g. the Normalisation Process Theory toolkit http://www.normalizationprocess.org/npt-toolkit/) are not condition-specific.

Considering the literature identifying OA as a low priority to clinicians and patients,[23] and, that guidelines alone are insufficient in ensuring best practice,[5,24] a condition-focussed toolkit may be more relevant. Previous work has illustrated that conditions deemed 'low priority' by both patients and HCPs may require a more dedicated approach to facilitating implementation.[15] Whilst the toolkit was derived from evidence grounded in the context of OA, the recommendations were evaluated with a generic audience of stakeholders (including patients and the public) from a broad musculoskeletal background. Elements of the toolkit may be applicable across other musculoskeletal or pain conditions requiring a long-term self-management approach, including inflammatory arthritis.

Co-production and early engagement between implementation researchers and clinical stakeholders are suggested strategies for maximising potential for successful implementation.[5,25] The toolkit identifies the importance of early evaluation and sustainability planning to ensure that research and innovations are relevant to the local context, hence translatable into practice. Furthermore, the toolkit highlights specific primary care contextual factors that may influence KM. For example, ensuring research innovations and new models of care are flexible and fit within existing systems, policy,

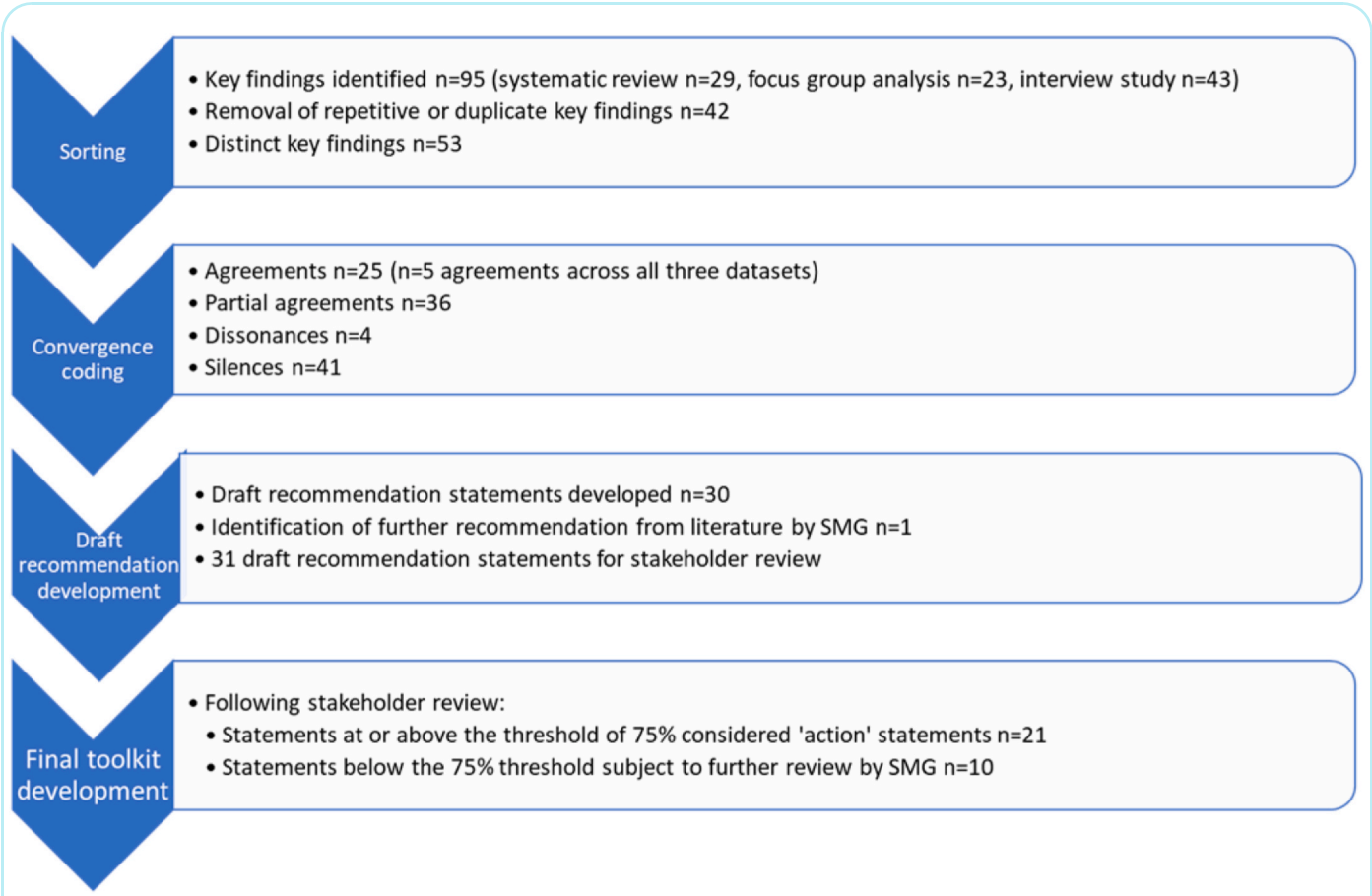

Fig. 2 Osteoarthritis and Cartilage

Study results.

and processes, and addressing professional and organisational drivers. The notion that implementation needs to maintain the balance or equipoise within a general practice is not referred to in implementation theories, models, or frameworks, but is supported by empirical evidence which illustrates how prioritising one condition over another in primary care can be problematic for implementation as typically, conditions for which care is incentivised take preference over other conditions.[26]

From a methodological perspective, we have presented a slightly briefer 'stream-lined' process to triangulation than described by Farmer et al.[19] First, rather than a six-step process, we used a five-step protocol which integrated the review of the convergence coding between researchers within steps 2-4 rather than as a distinct step. Second, we did not identify the frequency of key findings amongst each data set as 'complete agreements' were considered to provide sufficient evidence of data strength. Finally, rather than sorting data into similarly categorised segments or overarching themes, the decision was made in this study to sort individual key findings from each data set and not overarching themes, to mitigate the risk of losing the meaning and nuances of the rich data within each data set. This enabled a detailed examination of the data throughout the process whereby the contextualised nature of each individual finding was maintained, and close attention was paid to each key finding throughout the process so that subtleties were not lost in the early stages by the themes being too broad.

The triangulation protocol provided an important methodological bridge between the empirical data and the development of the toolkit. The method enhanced credibility, and trustworthiness of findings by amalgamating several perspectives to address the aims of the work and enabled detailed examination of the data to maintain the contextualised nature of each individual finding. The development of a typology to further extend and explain the findings provided additional interpretation of the underlying dimensions of the data analysis, to ensure congruence between the concepts and

Typology domain	Draft recommendation statement	% Agree[a]
Approaches to knowledge mobilisation	When implementing in primary care, offer knowledge mobilisation approaches that utilise a range of different types and formats of knowledge, (including guidelines, experience, tacit knowledge and case stories)	96
	When implementing in primary care, offer knowledge mobilisation approaches that provide opportunities for reflection and feedback	92
	When implementing in primary care, offer knowledge mobilisation approaches that are delivered by credible knowledge brokers	84
	When implementing in primary care, offer knowledge mobilisation approaches that are grounded in a theoretical approach	73.5
	When implementing in primary care, offer knowledge mobilisation approaches that are face to face	65
	When implementing in primary care, offer knowledge mobilisation approaches that involve the whole general practice	67
The knowledge mobiliser role	Involve individuals who are part of multiple networks as knowledge mobilisers	96
	Involve all key stakeholders in knowledge mobilisation (for example clinicians, commissioners, patients, public)	96
	Identify a trusted, credible individual to lead implementation at each beacon site	85
	Define the role and responsibilities of dedicated knowledge mobilisers at the beginning of implementation	78
	Knowledge mobilisation should be driven by key decision makers in an organisation (for example manager, or someone in a senior role)	45
	The knowledge mobiliser role needs to be explicit (for example acknowledged in job specifications)	74
Understanding context	Those promoting implementation within a general practice organisation need an understanding of culture in the practice, including attitudes to change and change fatigue	100
	Those promoting implementation within a general practice need an understanding of leadership and decision makers	96
	Those promoting implementation within a general practice organisation need an understanding of the characteristics and skill mix of the practice staff	96
	Those promoting implementation within a general practice organisation need an understanding of the characteristics of the practice network (for example whether it works in isolation or in a locality group of practices)	96
	Those promoting implementation within a general practice organisation need an understanding of the characteristics (and needs) of their patient population	92
Implementation planning	Determine the approach to evaluation, including consideration of relevant outcome data that meets the needs of all stakeholders, at the planning stage	96
	Involve patients in implementation and evaluation planning	92
	Offer dedicated time for a whole practice approach to implementation planning including all stakeholders such as clinicians, practice managers, and administrative staff	89
	Determine the approach to sustainable implementation at the outset	76
Nature of the intervention	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention offers flexibility in whom it is delivered by, where it is delivered and how	88
	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention offers flexibility in meeting a range of patient preferences e.g. to self-manage	81
	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention aligns with clinician beliefs and values	49
	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention aligns with health policy	69.5
	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention aligns with patient expectations	68
	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention offers opportunities to enhance care without disrupting the 'equipoise' within a practice	69
Appealing to a range of priorities	Those promoting adoption of implementation should appeal to patient priorities	100
	Those promoting adoption of implementation should appeal to commissioning priorities such as cost savings or reducing referrals	96
	Those promoting adoption of implementation should appeal to practice priorities including targets	88
	Those promoting adoption of implementation within a general practice need to appeal to a range of different priorities including individual clinician priorities including CPD, appraisal	72

CPD, continuing professional development.
[a] Statements with 75% or higher agreement, defined as combined responses for strongly agree, agree, or somewhat agree.

Table III

Osteoarthritis and Cartilage

Stakeholder voting on recommendation statements.

Typology domain	Draft recommendation statement and % agree	Rationale		Final recommendation statement
		Supporting evidence considered from convergence coding/iterative analysis and verbal/written comments	SMG and public contributor discussion and rationale	
Approaches to knowledge mobilisation	When implementing in primary care, offer knowledge mobilisation approaches that are grounded in a theoretical approach **(73.5%)**.	This was not explicitly identified in the data but was included in the stakeholder voting (see author discussion). Clinicians may not know how to use and apply theory in practice or where to start.	Theory is advocated amongst the literature, but the benefits may not be something that clinical staff are aware of. This was deemed important in enhancing KM.	Re-word to 'action' statement: *When implementing in primary care, offer knowledge mobilisation approaches that are grounded in theory*
Approaches to knowledge mobilisation	When implementing in primary care, offer knowledge mobilisation approaches that are face to face **(65%)**.	There was partial agreement for the key finding that relates to this recommendation between two datasets (interview and focus group). Some recommendation statements may be difficult to interpret if participants have not experienced the situation or circumstances. Statements may depend on context, for example, what the intervention is and where it is being implemented and the individuals or teams involved.	Although the benefits of face-to-face training was a strong finding in the empirical data, we recognise that this is likely to be context specific as the original study evaluated a face to face training package. The notion of 'face-to-face' presented in the consensus exercise may have been interpreted differently by participants and could allude to a range of approaches including skype or a 'round the table' discussion. A clearer definition of 'face-to-face' may have been useful for participants. In other implementation projects face to face may be viewed as expensive or impractical. Face-to-face approaches to KM may be challenging to scale up due to resource requirements and time pressures faced by healthcare staff. Other studies have reported successful KM without adopting face-to-face approaches. For example, in the field of education. Therefore, this finding is likely to be context specific. Furthermore, the landscape has changed during covid-19 which has impacted the conduct of and necessity for face-to-face meetings.	Re-word to 'consider' statement: *When implementing in primary care, consider optimal approaches to knowledge mobilisation (e.g. face to face)*
Approaches to knowledge mobilisation	When implementing in primary care, offer knowledge mobilisation approaches that involve the whole general practice **(67%)**.	The key findings relating to whole practice engagement were mainly identified in the focus group data. These are reflective of the time point for data collection whereby practices involved were at the transition between a research study and planning implementation to suit their local contextual circumstances. This may depend on context, for example, what the intervention is and where it is being implemented and the individuals or teams involved. For a patient safety intervention, changes in practice may need to be made quickly and whole practice engagement at the start of the process may not be possible.	In the context of this work (OA), engagement of whole practice staff was key to optimising implementation. However, this recommendation may not be possible or appropriate in different settings or with different implementation projects. We recognise that this may be context specific considering that a 'whole practice intervention' was adopted in the original study. It is also important that KM strategies are targeted at the stakeholders for whom they are relevant to. Engagement should not only be directed towards GPs with special interests but all staff and patients who may be involved/interested with the intervention.	Re-word to 'action' statement: *When implementing in primary care, offer knowledge mobilisation approaches that involve all relevant stakeholders. This includes patient groups (PPGs) and professional service staff within the general practice*

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Table IV (*continued*)

Typology domain	Draft recommendation statement and % agree	Rationale		Final recommendation statement
		Supporting evidence considered from convergence coding/iterative analysis and verbal/written comments	SMG and public contributor discussion and rationale	
The knowledge mobiliser role	Knowledge mobilisation should be driven by key decision makers in an organisation (for example manager, or someone in a senior role) **(45%)**.	The key finding that was relevant to this recommendation was only identified in the interview data, however, ambiguity was noted. There may be several layers of individuals driving implementation and mobilising knowledge. Certain individuals within an organisation may 'block' KM and this could be challenging to circumnavigate. Some recommendation statements may be difficult to interpret if participants have not experienced the situation or circumstances. KM is important in healthcare requiring collaboration from a range of stakeholders.	Findings illustrate the uncertainty associated with whether KM should be driven by key decision makers in an organisation. The draft statement implies sole responsibility, yet the voting indicated that participants largely agreed that KM was 'anybody's role'. For KM to be effective it is important to have everyone engaged - participants endorsed a collaborative approach involving all key stakeholders, including patients. It is however, important not to disempower key decision makers and to look at the broader KM process. The perceived value of 'ad-hoc' informal conversations with trusted colleagues facilitating KM was shown. This recommendation is likely to be context specific.	Re-word to 'consider' statement: *Consider the role that key decision makers within an organisation have as part of knowledge mobilisation (for example a manager or someone in a senior role)*
The knowledge mobiliser role	The knowledge mobiliser role needs to be explicit (for example acknowledged in job specifications) **(74%)**.	The key finding that was relevant to this recommendation was only identified in the interview data (by some participants), whereby ambiguity was noted. There may be several layers of individuals driving implementation and mobilising knowledge. Certain individuals within an organisation may 'block' KM and this could be challenging to circumnavigate. Some recommendation statements may be difficult to interpret if participants have not experienced the situation or circumstances	There may be significant challenges associated with formalising the role both at an individual and organisational level. A potential reason for the ambiguity is that 'knowledge mobiliser' is a relatively poorly understood and defined term. Furthermore, KM is largely tacit and comprises a multi-tude of skills that not everyone has. This recommendation is likely to be context specific.	Re-word to 'consider' statement: *Consider how KM is recognised and rewarded as a key function of implementation of best practice (for example to be part of organisational culture, recognised in performance reviews acknowledged in job specifications)*
Nature of the intervention	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention aligns with clinician beliefs and values **(49%)**.	There was complete agreement across all datasets for the key finding that most strongly related to this recommendation. However, this was due to the need for behaviour change for some clinicians. Statement may depend on context, for example, what the intervention is and where it is being implemented and the individuals or teams involved.	We consider this finding to be generalisable to other interventions because it concerns attitudes to OA rather than the intervention from the original study. Stakeholders may assume that adopting best practice recommendations is enough to facilitate implementation. However, the empirical data from this work illustrated clinicians' beliefs and values to be hugely important and had the potential to be either a driving force or barrier to implementation. It would, therefore, be prudent for this recommendation to counteract any assumptions that clinicians' beliefs and priorities are not important. This was a strong finding in the empirical data so, despite the low percentage agreement, the statement was reworded as an 'action' statement.	Re-word as action statement with additional context: *If an innovation requires clinician's behaviour change, knowledge mobilisers need to be able to demonstrate to stakeholders that the intervention aligns with clinicians' beliefs and values*

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Table IV (*continued*)

Typology domain	Draft recommendation statement and % agree	Rationale		Final recommendation statement
		Supporting evidence considered from convergence coding/iterative analysis and verbal/written comments	SMG and public contributor discussion and rationale	
Nature of the intervention	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention aligns with health policy **(69.5%)**.	Partial agreement across all datasets was noted for the key finding relating to this recommendation statement. In some instances, alignment with policy was a motivating factor for engagement with implementation but not in others.	This was a prominent theme in the empirical data but with mixed findings. This statement is likely to be context specific. A key factor relating to the nature of the intervention is the ability of the person(s) leading implementation to describe and explain the characteristics of the intervention in order to 'sell' the intervention to stakeholders. This should be included in the toolkit.	Re-word as 'consider' statement: *Knowledge mobilisers should consider demonstrating to stakeholders that the intervention aligns with health policy*
Nature of the intervention	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention aligns with patient expectations **(68%)**.	Complete agreement was seen for one key finding relating to this recommendation between two datasets (focus group and systematic review) and partial agreement between two datasets (focus group and interviews). When considering patient expectations for self-management and clinician perceptions of these, findings were mixed. In the findings from the systematic review, implementation was optimised if the intervention aligned with the patient and/or clinician preferences for self-management. The data illustrated tensions, reported by GPs, in implementing an innovation that conflicted with patient expectations or failed to align to what they described as 'patient agendas'. Patients may feel overlooked. In some instances, e.g. a safety intervention, changes in practice may be necessary quickly	Some clinicians perceived that some patients may not want a self-management approach. This may be related to the clinician's preferences for the management of OA. There are a range of preferences regarding self-management which impact KM and implementation efforts. The research findings led to important recommendations for the stakeholder engagement exercise regarding demonstrating the benefits of an innovation to patients and ensuring the inclusion of patient and public involvement to understand and manage patient expectations.	Re-word as 'consider' statement: *Knowledge mobilisers should consider demonstrating to stakeholders that the intervention aligns with patient expectations*
Nature of the intervention	Those who are driving, and leading implementation need to be able to demonstrate to stakeholders that the intervention offers opportunities to enhance care without disrupting the 'equipoise' within a practice **(69%)**.	There was complete agreement across all datasets for the key finding that most strongly related to this recommendation. Implementation requires consideration about how to change practice for the better whilst maintaining parity and fairness to other services. Knowledge mobilisers may wish to show how new ways of working can offer similar services for other conditions.	It was not clear from the data whether *any* new model of care or intervention has the potential to upset practice equipoise, or if there is something specific about interventions for OA, the perceptions of the disease, and how it presents that affects this. This recommendation may not be possible or appropriate in different settings or with different implementation projects. However, in the context of this work (OA), recognising other pressures and priorities faced with the practice was key to optimising implementation	Re-word as 'consider' statement specifically for general practice: *Knowledge mobilisers should consider demonstrating to stakeholders that the intervention offers the opportunity to enhance care without disrupting the 'equipoise' or parity of other services offered within the practice*

(*continued on next page*)

Table IV (*continued*)

Typology domain	Draft recommendation statement and % agree	Rationale		Final recommendation statement
		Supporting evidence considered from convergence coding/iterative analysis and verbal/written comments	SMG and public contributor discussion and rationale	
Appealing to a range of priorities	Those promoting adoption of implementation within a general practice need to appeal to a range of different priorities including individual clinician priorities including CPD, appraisal **(72%)**.	There was partial agreement across all datasets for the key finding relating to this recommendation.	In the empirical data this was important when clinician behaviour change was required. There was strength in the empirical data relating to the importance of clinician motivators, but this may be context specific as literature suggests that OA is often deemed as a low priority.	Re-word as 'consider' statement: *If an innovation requires clinician's behaviour change, then knowledge mobilisers should consider appealing to clinician priorities such as CPD or appraisal*

CPD, continuing professional development.

Table IV

Osteoarthritis and Cartilage

Recommendation statements obtaining less than 75% agreement and rationale for wording in final toolkit.

the data. The stakeholder engagement consensus exercise provided a further opportunity to obtain external validation and feedback regarding the recommendation statements. Further strengths to the work include results which are underpinned by three datasets, and the approach to developing recommendations was based on principles of the methodology advocated by EULAR.[21] One of the unique features of this work, included in the toolkit, is the importance of involving patients and the public in KM. Public contributor involvement and engagement was embedded within the research which generated the three datasets used in this study. Public contributor discussions identified a key element of the toolkit regarding the importance of dedicated knowledge brokering resource and infrastructure to support KM.

This work is subject to limitations. It is worthy of note that two of the three datasets informing the recommendation relate to the experience of implementing one research innovation.[14] Issues of transferability were carefully considered in author discussions when deriving and refining the recommendation statements. The consensus exercise included 27 participants and did not generate in-depth feedback. Whilst a more qualitative consensus method (e.g. Nominal Group Technique) may have been helpful in refining the statements for the toolkit, conference consensus exercise was a pragmatic, timely, and economical way of achieving consensus. The participants in the original studies and the stakeholder consensus were from high-income countries. Furthermore, we did not collect data on protected characteristics in either the underpinning qualitative research or in the consensus exercise and therefore we cannot comment on the diversity of the participants. It is possible that findings may have differed with greater representation from more diverse and underserved populations. The toolkit may have included specific mention of the need to attend to equitable access and provision among diverse populations when implementing evidence-based OA care, recognising that evidence-based interventions often have limited uptake and sustainability when implemented in underserved populations.[27] We recommend that researchers using the toolkit keep this at the forefront of their mind. In addition, the total number of public contributors at the voting event are unknown and we are unable to identify if the views of patients and the public differ to the views of HCPs. We introduced one element to the toolkit that did not derive from the empirical data – the use of KM theory. However, relatively high stakeholder agreement (73.5%) reinforced that this was considered important. We also introduced one element after the stakeholder voting relating to the importance of underpinning infrastructure to support KM and patient and public involvement and engagement – as this element was considered important by public contributors the study team felt it important to include and unfortunately it was not possible to seek further voting on this. Finally, the study was grounded in UK Primary Care and so consideration and exploration of contextual relevance in other settings is required.

It is important to acknowledge the change in the healthcare landscape imposed by covid-19 since this work was conducted. This has been reflected in Table IV and when considering the final recommendations with public contributors. One of the key contextual changes is the way in which HCPs, patients and the public engage in online, digital materials. Further research is needed to better understand the role and impact of digital technology for supporting KM strategies.

In summary, we have developed the first KM toolkit for OA in primary care which can facilitate the mobilisation of evidence-based knowledge to our OA community. To date, the toolkit has informed a national publication for the Chartered Society of Physiotherapy Council for Allied Health Professional Research; 'Implementation for Impact'[28] and is being used in research, clinical practice and the JEI implementation working group strategy, thus evidencing the need for practical KM resources in this area. We recommend that researchers using the toolkit consider the need to attend to equitable access and provision among diverse populations when implementing evidence-based OA care. Next steps include evaluating the use of the toolkit in the scale and spread of evidence-based guidelines, investigating the utility, and exploring transferability of the toolkit to different cultural contexts and conditions.

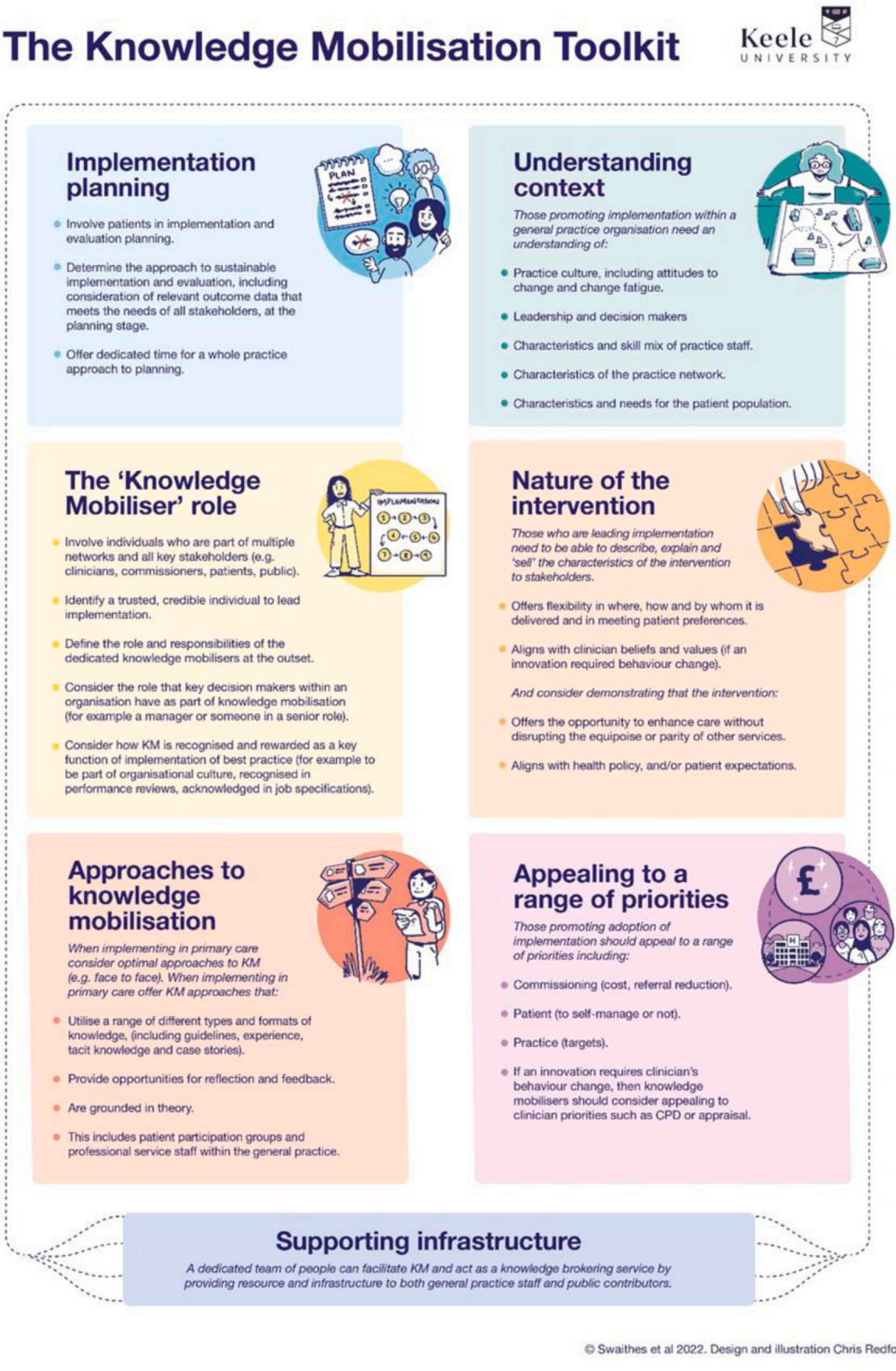

Fig. 3

Osteoarthritis and Cartilage

The Knowledge Mobilisation Toolkit for Primary Care. CPD, continuing professional development.

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Author contributions

LS, AF, KD and ZP contributed to the conception and design of the article. NW contributed to the conception and set up of the stakeholder consensus exercise. LS and ZP contributed to the data analysis and all authors discussed interpretation. All authors contributed to the drafting and final approval of this article.

Conflict of interest

KD was appointed a National Institute for Health and Care Excellence Fellow during the programme period (2013-16), received an NHS England Regional Innovation Fund award to implement aspects of the programme, was an invited speaker by the British Health Professionals in Rheumatology, OARSI, EULAR, G-IN to present MOSAICS results; and is a member of the EULAR Task Force developing implementation considerations for EULAR guidelines.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.joca.2024.01.003.

References

1. Lau R, Stevenson F, Ong BN, Dziedzic K, Treweek S, Eldridge S, *et al*. Achieving change in primary care—causes of the evidence to practice gap: systematic reviews of reviews. Implement Sci 2016;11(1):1.
2. Porcheret M, Jordan K, Croft P. Treatment of knee pain in older adults in primary care: development of an evidence-based model of care. Rheumatology 2007;46(4):638–48.
3. Dziedzic KS, Healey EL, Porcheret M, Ong BN, Main CJ, Jordan KP, *et al*. Implementing the NICE osteoarthritis guidelines: a mixed methods study and cluster randomised trial of a model osteoarthritis consultation in primary care-the Management of OsteoArthritis In Consultations (MOSAICS) study protocol. Implement Sci 2014;9(1):1.
4. Allen KD, Choong PF, Davis AM, Dowsey MM, Dziedzic KS, Emery C, *et al*. Osteoarthritis: models for appropriate care across the disease continuum. Best Pract Res Clin Rheumatol 2016;30(3):503–35.
5. Swaithes L, Paskins Z, Dziedzic K, Finney A. Factors influencing the implementation of evidence-based guidelines for osteoarthritis in primary care: A systematic review and thematic synthesis. Musculoskelet Care 2020;18(2):101–10.
6. Powell A, Davies H, Nutley S. Missing in action? The role of the knowledge mobilisation literature in developing knowledge mobilisation practices. Evid Policy: J Res Debate Pract 2017;13(2):201–23.
7. NIHR. Plan Knowledge Mobilisation 2023. Accessed: November 21, 2023. Available from: https://www.nihr.ac.uk/researchers/i-need-help-designing-my-research/plan-knowledge-mobilisation.htm.
8. Lavis JN, Robertson D, Woodside JM, McLeod CB, Abelson J. How can research organizations more effectively transfer research knowledge to decision makers? Milbank Q 2003;81:221–48.
9. Proctor EK, Powell BJ, McMillen JC. Implementation strategies: recommendations for specifying and reporting. Implement Sci 2013;8(1):1.
10. Rycroft-Malone J. From knowing to doing—from the academy to practice Comment on "The many meanings of evidence: implications for the translational science agenda in healthcare. Int J Health Policy Manag 2014;2(1):45.
11. Swaithes L, Dziedzic K, Cottrell E, Quicke J. Response to: Losina E. Why past research successes do not translate to clinical reality: gaps in evidence on exercise program efficiency. Osteoarthr Cartil 2019;27:1–2. Osteoarthritis and cartilage. 2019;27(7):e7-e8.
12. Bowden JL, Hunter DJ, Mills K, Allen K, Bennell K, Briggs AM, *et al*. The OARSI joint effort initiative: priorities for osteoarthritis management program implementation and research 2024–2028. Osteoarthr Cartil Open 2023;5(4), 100408.
13. Eyles JP, Hunter DJ, Bennell KL, Dziedzic KS, Hinman RS, van der Esch M, *et al*. Priorities for the effective implementation of osteoarthritis management programs: an OARSI international consensus exercise. Osteoarthr Cartil 2019;27(9):1270–9.
14. Swaithes L. From Research to Primary Care: A Knowledge Mobilisation Study in Osteoarthritis (Keele Library theses). Keele University; 2020.
15. Swaithes L, Dziedzic K, Finney A, Cottrell E, Jinks C, Mallen C, *et al*. Understanding the uptake of a clinical innovation for osteoarthritis in primary care: a qualitative study of knowledge

mobilisation using the i-PARIHS framework. Implement Sci 2020;15(1):1–19.
16. Yamada J, Shorkey A, Barwick M, Widger K, Stevens BJ. The effectiveness of toolkits as knowledge translation strategies for integrating evidence into clinical care: a systematic review. BMJ Open 2015;5(4), e006808.
17. Staniszewska S, Brett J, Simera I, Seers K, Mockford C, Goodlad S, *et al.* GRIPP2 reporting checklists: tools to improve reporting of patient and public involvement in research. Res Involv Engag 2017;3(1), 13.
18. Meijer PC, Verloop N, Beijaard D. Multi-method triangulation in a qualitative study on teachers' practical knowledge: An attempt to increase internal validity. Qual Quantity 2002;36(2):145–67.
19. Farmer T, Robinson K, Elliott SJ, Eyles J. Developing and implementing a triangulation protocol for qualitative health research. Qual Health Res 2006;16(3):377–94.
20. Nielsen AP, Hansen J, Skorupinski B, Ingensiep HW, Baranzke H, Lassen J, et al. Consensus Conference Manual. LEI, onderdeel Wageningen UR, The Hague; 2006.
21. van der Heijde D, Aletaha D, Carmona L, Edwards CJ, Kvien TK, Kouloumas M, *et al.* 2014 Update of the EULAR standardised operating procedures for EULAR-endorsed recommendations. Ann Rheum Dis 2015;74(1):8–13.
22. NICE. Developing NICE guidelines: the manual. In: Excellence NIfHaC. London: NICE; 2014.
23. Egerton T, Diamond LE, Buchbinder R, Bennell KL, Slade SC. A systematic review and evidence synthesis of qualitative studies to identify primary care clinicians' barriers and enablers to the management of osteoarthritis. Osteoarthr Cartil 2017;25(5):625–38.
24. Gabbay J, le May A. Mindlines: making sense of evidence in practice. Br J Gen Pract 2016;66(649):402–3.
25. Greenhalgh T, Jackson C, Shaw S, Janamian T. Achieving research impact through co-creation in community-based health services: literature review and case study. Milbank Q 2016;94(2):392–429.
26. Armstrong N, Herbert G, Brewster L. Contextual barriers to implementation in primary care: an ethnographic study of a programme to improve chronic kidney disease care. Fam Pract 2016;33(4):426–31.
27. Gustafson P, Abdul Aziz Y, Lambert M, Bartholomew K, Rankin N, Fusheini A, *et al.* A scoping review of equity-focused implementation theories, models and frameworks in healthcare and their application in addressing ethnicity-related health inequities. Implement Sci 2023;18(1), 51.
28. Swaithes L, Campbell L, Fowler-Davis S, Dziedzic K. Implementation for Impact. 2019. https://cahpr.csp.org.uk/system/files/documents/2019-09/16_implementation_for_Impact_0.pdf .