



## Article

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# The value of allied health professional research engagement on healthcare performance: a systematic review

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## Research Article

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# Abstract

## Background

Existing evidence suggests that clinician and organisation engagement in research can improve healthcare performance. However, current evidence has considered the relationship across all healthcare professions collectively. With the increase in allied health professional (AHP) clinical academic and research activity, it is imperative for healthcare organisations, leaders and managers to understand research engagement within these specific clinical fields. This systematic review aims to examine the value of research engagement by allied health professionals and organisations on healthcare performance.

## Methods

This systematic review had a two-stage search strategy. Firstly, the papers from a previous systematic review examining the effect of research engagement in healthcare were screened to identify relevant papers published pre-2012. Secondly, a multi-database search was used to update the previous review but with a specific focus on allied health to identify publications from 2012 to date. Studies which explored the value of allied health research engagement on healthcare performance were included. All stages of the review were conducted by two reviewers independently, plus documented discussions with the wider research team when discrepancies occurred. Each study was assessed using the appropriate critical appraisal tool developed by the Joanna Briggs Institute.

## Results

Twenty-two studies were included, of which six were ranked as high importance. This sample comprised mixed research designs. Overall, the findings indicated positive improvements in processes of care. The review also identified the most common mechanisms which may link research engagement with improvements to processes of care.

## Conclusion

This landmark review is the first benchmark of evidence that explicitly shows improved processes of care and outcomes from AHP research engagement. The lack of transparent reporting of AHP research engagement highlights the need for clear recommendations in the design of future prospective studies. These proposals specifically include greater transparency in relation to AHP involvement, mechanisms and types of research engagement. The inclusion of these aspects as an integral component of future intervention study designs may contribute essential evidence of the value and impact of AHP research engagement.

**Trial registration:** This systematic review protocol was registered with the international prospective register of systematic reviews, PROSPERO (registration number CRD42021253461).

## Background

Clinicians and healthcare organisations who engage in research have been associated with improved healthcare performance; specifically, processes of care (1, 2). In the United Kingdom, acknowledgement of this potential impact underpins various key policy documents. For example, the National Health Service (NHS) Long Term Plan (3) specifically identifies that research and innovation is fundamental to driving future health improvement and the Department of Health and Social Care firmly state that a ‘sustainable and supported (health) research workforce’ is fundamental to achieving such impact (4).

A review in 2015 (1, 2) investigated the question of whether the engagement of clinicians and organisations in research improves healthcare performance<sup>1</sup>. In conjunction the authors explored the possible mechanisms at play; defined as the levers that instigate a relationship between research engagement activities and improved health care, for example improvements in infrastructure, staff training, linkage and exchange between organisations, research networks (1). Within their analysis, the researchers took ‘engagement in research’ to mean a “deliberate set of intellectual and practical activities undertaken by healthcare staff and organisations...”(p.2). This contrasted with a broader definition of research engagement to include ‘engagement with research’, meaning “less substantial involvement at individual and team level related more to receiving and transmitting the findings of research”(p.3). The review concluded that when clinicians and organisations engage *in* research, it is likely that healthcare performance improves. It is worth noting that the papers (identified from the 2012 search strategy) were predominately set within the context of medicine, surgery, nursing or pharmacotherapies, with only one paper specifically referencing the involvement of Allied Health Professionals (AHPs, physical therapists) (5).

Allied Health Professionals are the third largest workforce in health and care in the United Kingdom and it has been acknowledged that this group, along with nurses and midwives, could become central to innovative patient care as clinical academics in the years ahead (6). Over the past decade, research engagement among AHPs has gained momentum with an increase in access to dedicated pathways to support clinical research careers across the NHS and higher education institutions, such as the creation of the National Institute of Health Research Integrated Clinical Academic pathway (6). The increase in AHP research engagement is also recognised through the developing literature in allied health research engagement strategies, activity, funding, capacity and evaluation. The agenda to accelerate the growth of AHP research has been published in the Health Education England (HEE) AHP Research and Innovation Strategy for England 2022 (7), which identifies that “securing and sustaining excellence in research and innovation for the Allied Health workforce is (now) a global priority agenda” (p.5). Furthermore, the AHPs Strategy for England: AHPs Deliver (8) defines ‘research, evaluation and innovation’ as one of its four enhanced foundations and states the “expectation is that AHPs commit to research, innovation and evaluation (and)...implementation initiatives across these significant agendas will support enhanced

engagement and impact” (7). Given this ambition it is imperative for healthcare organisations, leaders and managers to understand research engagement within these specific AHP disciplines.

In 2019, a qualitative systematic review exploring a broad range of impacts of clinical academic activity by healthcare professionals outside of medicine included two studies exclusively involving AHPs (9). The paper identified impacts which mapped to seven themes. For example, impacts for patients demonstrated the beneficial changes to service provision that arose from clinical academic activity and improved access to evidence-based healthcare. Impacts on service provision highlighted that clinical academic activity was regarded as beneficial because it resulted in enhanced care delivery and pathways. Other themes included impact to the clinical academic, research profile, and culture and capacity. Despite some of these themes broadly aligning to the processes of care and health outcomes previously identified (1) the methodology used and the small number of studies focusing on AHPs mean the question remains as to the value of research engagement specifically by AHPs on healthcare performance.

This systematic review provides a timely update to the previous broader review (2), drawing on its methodology but providing a narrower focus on research engagement by the named AHP disciplines<sup>2</sup>. This paper therefore intends to accelerate our understanding of the value of research engagement by AHPs on healthcare performance.

## Objectives

1. To describe the value of research engagement by AHP clinicians and organisations on healthcare performance.
2. To identify mechanisms that instigate a relationship between research engagement activities and improved healthcare performance.

[1] The specific nature of ‘health care performance’ as Hanney et al. (2013) explains can include a wide range of measures including “measures of clinical process, health outcomes, access, efficiency, productivity and employee variables” (p3). To focus the review and to reflect the methods conducted by Hanney et al. (2013), health care performance here specifically denotes improvement in clinical ‘processes of care’ and ‘health outcomes’.

[2] The Allied Health Professions (AHP) in England include all of the following named disciplines: Art Therapists, Drama Therapists, Music Therapists, Dietitians, Occupational Therapists, Operating Department Practitioners, Orthoptists, Osteopaths, Paramedics, Physiotherapists, Podiatrists, Prosthetists and Orthotists, Diagnostic and Therapeutic Radiographers, and Speech and Language Therapists (NHS England, 2022)

## Methods

### Search strategy

Firstly, full paper screening was undertaken by two reviewers of all included studies from the previous systematic review (1, 2) to identify any relevant studies published pre-2012. Secondly, a multi-database search was carried out on Medline, Embase, HMIC, PsychINFO, CINAHL, and OpenGrey from 2012 – June 2021. The same search strategy which was used in the previous review (1, 2) was utilised with additional terms for AHPs (see Additional file 1 for the full search strategy). Additionally, all included studies' citation lists were screened for eligible studies.

#### Inclusion and exclusion criteria

The study protocol (10) was adopted from a previous study (1) conducted by Boaz et al. but with a specific focus on AHPs, as opposed to all healthcare professionals. However, following preliminary searches of the literature, it was recognised that this approach would not allow us to meet our original objective in the protocol which focused on effectiveness because of the paucity of research specifically focused on AHPs fitting this strict criteria. Amendments were therefore made to broaden the inclusion criteria and take a more pragmatic approach with a focus on value. See Table 1 for the broadened study inclusion criteria compared to the protocol.

Table 1  
Broadened inclusion criteria in comparison to the protocol

Variable	Protocol inclusion criteria	Broadened inclusion criteria
<b>Population</b>	Studies solely including allied health professionals	Studies including a mixed population of healthcare professionals; encompassing a partial sample of AHPs, stated explicitly or implied by the clinical context. Any of the registered AHPs were included (including their teams and organisations) which work within health, social and/or educational settings, as specified in the AHP Research and Innovation Strategy for England 2022 (7)
<b>Intervention</b>	Studies making explicit reference to engagement in research. This incorporated papers focusing on: (a) agenda setting, (b) conducting research, (c) action research, or (d) research networks where the engagement in research is noted.	Studies addressing engagement both 'in' and 'with' research. This included evidence-based clinical professional develop, evidence-based practice, implementation efforts, critical appraisal, research utilisation, and adoption of research in policy making or clinical guidelines.
<b>Comparison</b>	Studies with or without a comparator	No amendment
<b>Outcomes</b>	The primary outcome of this review was healthcare performance (processes of care or health outcomes) assessed pre- and post-research engagement. The secondary outcomes were the mechanisms at play.	No amendment
<b>Study type</b>	Effectiveness studies: randomised control trials, repeated measured or quasi-experimental studies. Mixed method studies were considered where an effectiveness component was included in the study and this directly related to the outcome of healthcare performance.	Any primary research study type with reference to research engagement.

### Research Engagement Terminology

Terminology to describe research engagement is problematic (11) and include phrases such as 'engagement in research' and 'engagement with research'. These are often used interchangeably despite efforts made by Hanney et al. to distinctly define these (2). The broadened inclusion criteria uses the term 'research engagement' as an umbrella term referring to the inclusion of both engagement *in* and *with* research.

# Indirectness Classification

Due to the amendments made, it was important to demonstrate the applicability of included studies to the protocol inclusion criteria through a classification of indirectness (12). All included studies were classified using a 1-to-10-point Likert scale (Table 2) with a score of 10 meaning that it would fully meet the inclusion criteria in the protocol for that particular variable. The values between the 10-point scale were determined through discussion and based upon the principles in Table 2.

**Table 2:** 10-point Likert scale to judge the relevancy of each study to the inclusion criteria set out in the protocol

Rating Scale	Population	Intervention	Study design
10 ↑ ↓ 1	Only includes AHP	Explicitly describes <i>engagement in research</i>	Randomised control trial or repeated measures
	Partial population of AHPs	Engagement in and with research	Mixed methods
	No indication of including AHP	<i>Engagement with research</i>	Qualitative studies

## Selection process

Duplication removal was undertaken using both EndNote and Rayyan (13). References were uploaded and managed on the Rayyan web database to facilitate the screening process. An initial screening of abstracts and titles was undertaken on 10 papers independently by all reviewers to ensure consistency of screening. All titles and abstracts were reviewed by two independent assessors (SC and SA, LC, AK or HR). Full papers were screened independently by two reviewers (SC, JH). For both title, abstract and full paper screening disagreements were resolved by discussion; if consensus was not achieved arbitration was carried out by a third reviewer. All reasons for selection or rejection of full papers were recorded.

## Data collection

Two reviewers independently completed data extraction on a pre-piloted data extraction form (SC, JH, SA, LC, AK, HR). The data extraction table was stored as an Excel spreadsheet. Disagreements and inconsistencies were resolved by discussion and where consensus could not be achieved arbitration was carried out by the research team.

All included studies were analysed using the theoretically driven matrix developed (2) by Hanney et al. to characterise the dimensions in which research engagement might have led to healthcare performance outcomes. The matrix was developed through an iterative process which evaluated existing reviews and theories (2). The matrix enabled extraction of salient information across the following dimensions:



degree of intentionality, level of study engagement, impact, findings and outcomes (see Table 3 for the full description of each dimension). The importance of each paper to the review was assessed and completed by two independent reviewers (SC, JH, SA, LC, AK, HR). The quality assessment and study type were the most important aspects to judge importance, followed by the indirectness of population and intervention in relation to the inclusion criteria.

Additional data items that were sought recorded: paper title, authors, year, country, allied health profession, organisation, clinical setting, study design, research question, nature of research engagement activity (intervention), methods, outcome measures and quality assessment.

Table 3  
Data analysis dimensions identified in the theoretically driven matrix (1, 2)

Data item	Category	Key	Full definition
<b>Level of study engagement</b>	Organisational level	O	Level of engagement discussed either at organisational or clinician level
	Clinician level	C	
<b>Impact</b>	Specific	S	“Refers to those who had engaged in research being more willing and/or able to provide evidence-based care that was related to the specific findings of the research in which they were engaged.”
	Broad	B	“Refers to those who had engaged in research being more willing and/or able to provide evidence-based care that was based on relevant research conducted anywhere and, and that was not related to the specific findings of the research in which they were engaged.”
<b>Findings</b>	Positive	+	Where the findings of the paper were positive or negative in relation to the review objective i.e. positive if they showed research engagement did improve healthcare performance, and negative if not. Within each group some were also classified as mixed.
	Negative	-	
	Mixed	M	
	Mixed-positive	M+	
	Mixed-negative	M-	
<b>Improvement identified</b>	Processes of care	P	The nature of the healthcare performance improvement identified in the paper
	Health outcomes	HO	
<b>Importance</b>	High	1	Integrated assessment based on firstly the quality assessment and study type, and secondly the relevancy of population and intervention to the review question
	Low	2	

## Quality Assessment

Quality appraisal was carried out by two independent reviewers with arbitration by a third reviewer (SC, JH, SA, LC, AK, HR). The diversity of methods used in the papers meant that one quality appraisal tool could not be applied universally. The research team selected the most appropriate Joanna Briggs Institute critical appraisal tool (14) based on the design of each included study.

## Synthesis methods

Heterogeneity among the included papers prevented meta-analysis. There was no minimum number of studies required for the synthesis, and exclusion was not made following the quality assessment due to the overall paucity of research in this area. A narrative synthesis was completed to analyse the similarities and differences between and within the different study types which reported positive findings, compare the level of relevance to the population and intervention in relation to the inclusion criteria, and the overall level of importance. Studies' findings were clustered around common study design and importance where appropriate.

## Subgroup analysis

Each paper included within this review was additionally examined for any factors that the study authors proposed as potential components of the improvement in healthcare performance. Hanney et al. developed a taxonomy of the various mechanisms and sub-mechanisms through which outcomes may be superior in research-active settings (2). The 12 mechanisms identified and described in the previous review were used in a pre-defined coding framework (Additional file 2). The mechanisms were described regarding the most common to least common. Due to the majority number of studies which reported positive findings and the wide variation in the indirectness classification, it was judged that vote counting of positive studies for each mechanism would not be appropriate.

# Results

## Study selection

After duplicate removal 1,209 citations were identified from the search strategy. An additional 28 papers were identified through citation screening and 33 papers were included from the previous review (1). Subsequently 1,270 citations were identified for screening. After title and abstract screening 85 papers were sought for retrieval full paper screening. There was 98.24% agreement between the first and second reviewers ( $k = 0.67$ ). Two papers were unable to be retrieved, and 61 papers were excluded of which 32 papers had an incorrect intervention and 29 papers did not include AHP. This resulted in 22 studies being eligible to be included in this review (See Fig. 1 for PRISMA Flow Diagram (15)).

## Study characteristics

Studies were conducted in seven different countries: five in Canada, five in Australia, four in the United States of America, four in the United Kingdom, two in Germany, one in Spain, and one in Ireland. These studies took place from 1999 to 2021. The studies were conducted in a wide range of clinical areas with seven studies in Oncology, four studies in Musculoskeletal Physiotherapy, three studies in Neurology, three studies in Paediatrics, two studies in Cardiology, two studies in multiple clinical areas and one study in Respiratory. Where studies included a single discipline, the professional disciplines cited were Physiotherapists (n = 8) followed by Occupational Therapists (n = 3), Paramedics (n = 1) and Radiographers (n = 1). The remaining nine studies included only partial sample populations of AHPs. Included within these nine studies was a combination of occupational therapists, physiotherapists, and a speech and language therapist (n = 1); an undefined combination of AHPs and other healthcare professionals (n = 1); and undefined hospital-wide healthcare professionals likely to incorporate AHPs (n = 7). See Table 4 the full study characteristics and Fig. 2 for the relevancy to the protocol's inclusion criteria of all included studies.

## Importance

There were six papers of high importance, and sixteen papers of low importance. Papers highlighted as important are starred in Table 4 and Table 5.

## Level of study engagement

There were eleven studies which focused on research engagement at the clinician level. Ten studies focused on research engagement at the organisational level, and one study referring to both.

## Impact

Thirteen studies reported a specific impact; all of which showed positive findings in relation to healthcare performance, specifically processes of care. Nine studies reported a broad impact, all of which showed positive findings in relation to processes of care (n = 6) and health outcomes (n = 3).

### Type of research engagement intervention

Ten studies were judged to meet the protocol's inclusion criteria for intervention with clear 'engagement in research' (5, 16–24). Examples of engagement in research within these studies included:

- (a) being directly involved in delivering an intervention within a clinical research study;
- (b) hospitals which were involved in the participation of a clinical research; and
- (c) self-reports of participation in research that they had participated in research.

Of these, 5 of these studies were judged to meet the protocol's inclusion criteria for population (5, 16, 17, 22, 23) and of these only 2 papers were judged to meet the protocol's inclusion criteria for study type to indicate an association between engagement in research and health outcomes (5, 16). These two studies

were judged to be of high importance. Both of these studies had mixed-positive (16) and positive (5) outcomes on processes of care with both specific and broad impacts respectively.

A further six studies were judged to meet the broadened inclusion criteria for intervention: research engagement with a mixed scenario of 'engagement in research' and 'engagement with research' (25–30). Examples of mixed scenarios of research engagement included:

knowledge translation implementation including research activity such as scoping reviews, research implementation, reading research articles, evidence-based learning

1. knowledge translation implementation including research activity such as scoping reviews, research implementation, reading research articles, evidence-based learning
2. knowledge translation programme including research studies, journal clubs, and critically appraised topics
3. participatory action research cycles
4. hospitals which were involved in a research network group
5. participation in a Partnering for Change stakeholder group to transform service delivery
6. participation in a clinical trial quality assurance programme

Of these, five studies met the protocol's inclusion criteria for population (25, 26, 28–30) and of these only one met the criteria of study type (25) and therefore was evaluated to be of high importance. This study had positive findings in relation to processes of care which had a specific impact.

The remaining six studies were judged to meet the broadened inclusion criteria for intervention that described 'engagement with research' (31–36). Examples of engagement with research included:

1. knowledge translation toolkit programme
2. engagement with a e-learning modules containing evidence base and clinical cases
3. engagement with a research facilitator
4. hospital implementation of guidelines as part of a clinical trial
5. participation in education for actionable knowledge translation

Of these, four met the protocol's inclusion criteria of population (31, 32, 35, 36) and of these, one met the inclusion criteria of study type (31). This was judged to be of high quality and therefore of high importance due to the high relevance to the inclusion criteria. This study showed positive findings for processes of care with a specific impact.

Studies reporting positive findings

Of the 22 included studies one randomised controlled trial (high quality) (31), one quasi-experimental study (high quality) (25) and one cross-sectional study (low quality) (5) were judged to meet the

protocol's inclusion criteria for both population of interest and study type. However, the degree of research engagement was questionable and was not explicitly described in two of the studies (25, 31). Despite this, these three studies were identified to be of high importance because of the combined relevance to the protocol's inclusion criteria for study type and overall quality, population, and intervention. All three studies reported a positive impact of research engagement on specific (25, 31) and broad (5) processes of care.

Four mixed methods studies were included and were judged to meet the protocol's inclusion criteria for the population of interest (16, 17, 26, 32). Only two studies used an intervention which would meet the protocol's inclusion criteria of engagement in research (16, 17). None of the four studies used a study type incorporated within the protocol's inclusion criteria; however, these studies were included following the decision to broaden the inclusion criteria (16, 17, 26, 32). Out of these four mixed methods studies, three studies were judged to be of high quality (16, 17, 32) and one was judged to be of low quality (26). Based upon relevancy to the protocol's inclusion criteria and quality of the studies, three studies were identified to be of high importance. These studies showed both mixed-positive findings with broad impact (26) and mixed-positive findings with specific impact (16, 17) for improving processes of care. The remaining study was evaluated to be of low importance and was classified to have positive findings with broad impact for improving processes of care (32).

Seven of the cross-sectional studies included only partial populations of AHPs, (18–21, 27, 33, 34). Four of these seven cross-sectional studies were judged to meet the protocol's inclusion criteria for the intervention in that the study made explicit reference to engagement in research (18–21). Six out of the seven studies were graded to be of high quality (18–20, 27, 33, 34) and one study was judged to be of low quality (21). Due to the mixed population of health professionals and variation of the research engagement intervention, the seven studies were judged to be of low importance. Four of the studies had positive findings with regard to whether research engagement had a specific and broad impact and improved processes of care (20, 27, 33, 34). Furthermore, three of the studies had positive findings with regard to whether research engagement had a broad impact and improved health outcomes (18, 19, 21).

Six out of the eight qualitative studies were judged to meet the protocol's inclusion criteria for the population of interest (22, 23, 28, 29, 35, 36), the remaining two studies having a partial population of AHP (24, 30). Only two of these qualitative studies were judged to make explicit reference to engagement in research (22, 24). Furthermore, the majority of the studies were classified to be of low quality (23, 24, 28, 29, 35, 36). Thus, due to the methodological design and the variation in appropriate intervention, all eight qualitative studies were judged to be of low importance. All eight qualitative papers were positive with regard to whether research engagement improved specific (22, 23, 28–30, 35) and broad processes of care (24, 36).

### Mechanisms of the intervention

The most common mechanism (Additional file 2) identified through which healthcare performance improved across the included studies was that AHP research engagement may facilitate a 'change in

human capital'. This is in both enhancement of group and individual behaviour, including more rapid uptake of new treatments and greater likelihood of following clinical guidelines (n = 16) and training/updating staff through research engagement leading to the acquisition and use of new skills, and change in attitudes towards research and research findings (n = 13). Mechanisms of 'improvements in the processes of care related to conducting a specific trial' were commonly identified, these were a more rigorous process of defining the standard of care (n = 6) and closer monitoring and support (n = 3).

Mechanisms of improvement were also identified at organisational and clinician levels.

'Organisational mechanisms' were identified in seven studies; these were a global category of conducting research to address known issues in the healthcare system, allowing AHPs time to conduct research and thus being an attractive organisation to work for, and conducting research to identify best performance targets and using research in quality improvement. Mechanisms of improvement related to 'collaborative working between organisations, teams and individuals' were identified in seven studies. Mechanisms were: linkage and exchange that improves the relevance of research and policy-makers'/managers'/clinicians' willingness to use it (n = 6); and research networks (n = 2). Finally, mechanisms of improvement which were less commonly identified were 'action and participatory research' (n = 2) and 'changes in the structures of institutions' (n = 2).

## Discussion

The original intention of this review was to adopt the methodology (1, 2) by Hanney et al. and Boaz et al. to generate a contemporary update of the impact of engagement in research that specifically summarises the published evidence in relation to the AHP disciplines. Due to the significant lack of studies, the review was subsequently adapted to include evidence relating to the broader concept of research engagement (defined as either engagement *in* or *with* research) and a range of study types. Whilst we are unable to discuss definitively the degree of effectiveness in traditional terms, the tentative information we have collected from this review supports existing policy which calls for an AHP workforce that is research engaged and the infrastructure to support this (7). Consequently the studies included allow us to open the debate and discuss the value of research engagement more widely; this may be more beneficial to stakeholders of health and social care systems. It therefore remains important to acknowledge and summarise the current limited evidence-base and make recommendations for future research designs in academia and evaluation approaches in practice. The findings generated in this review comprise a reference point to drive the agenda for future studies documenting the value of AHP research engagement.

This review indicates that AHP research engagement appears related to positive findings in improvements to processes of care. This finding supports the value of AHP research engagement but falls short of providing evidence of the degree of effectiveness. The review findings highlight the both broad and specific impacts in relation to improvements to processes of care. Examples of the broad impacts included: improved services and patient care in general (36), association between participation in

research and using research in practice (5), and impact on self-reported evidence-based practice behaviour and implementation of research into practice (32). Examples of specific impact included: the development of clinical guidance (25), number of academic outputs (25), self-reported confidence in clinical patient management (22, 28, 31), and embracing a different service delivery model (22, 23, 37). These findings correlate to the findings of Boaz et al. who similarly identified positive findings in the wider population of healthcare professionals (1).

Amongst the generally positive findings and impact of AHP research engagement, there are a small number of studies (16, 17, 24, 26) which highlight a more balanced picture of where AHP research engagement may be associated with mixed-positive findings (i.e. the findings within these studies were mostly positive with a small degree of negative findings in comparison). The studies which showed mixed-positive findings were mostly qualitative evaluations of research engagement, such as AHP perceptions of the impact on AHPs willingness to follow research protocols which deliver interventions different to usual care, and the additional responsibilities on clinical AHPs to be engaged in a trial (17). The included studies suggest positive and mixed-positive findings, therefore a positive reporting bias amongst these studies is acknowledged. These findings further demonstrate that recommendations to practice cannot be firmly made based on this review.

Mechanisms which linked research engagement and improved healthcare performance were explored using the framework from the previous review by Hanney et al. (2). It is acknowledged that this was a secondary aim of our review and furthermore, that exploration of these mechanisms was not the primary aim of the studies included. However, during the review process it was highlighted that consideration of these mechanisms has a particular importance and significance for future research in practice. Two most common mechanisms have been identified: 1) 'Changes in human capital' and 2) 'Organisational mechanisms within healthcare settings'. The mechanism 'Changes in human capital' may relate to building research capability, for example facilitating changes in the knowledge, skills, education and attitudes of staff through research engagement. This mechanism may lead to more rapid uptake of new treatments and greater likelihood of following clinical guidelines (2). 'Organisational' mechanisms relate to the influence of allowing time for AHPs to be research engaged, being an attractive organisation to work for, and using research in improvement projects (2). In addition, this also related to a wider mechanism of collaborative approaches between organisations, teams and individuals that improves research relevancy and willingness to use research findings (2). These workforce and organisational mechanisms identify the contextual factors that provide clinician time and capacity to undertake research activities which may lead to improvements to processes of care.

Identifying the mechanisms which facilitate the realisation of research engagement benefits for impact on service quality is crucial. Clearer definitions of such mechanisms are essential to enable more meaningful future evaluation, but most importantly for systematic facilitation of strategic approaches that may be implemented within organisations. As discussed, the mechanisms that currently appear to hold the most promise for supporting research engagement may already be available and achievable within current organisational systems and processes provided that there is a more equitable and

proportionate investment commitment to facilitate this proactively for the AHP workforce. To secure the requisite investment, the value of AHP research engagement needs to be 'sold' to service providers and commissioners in the currency of the organisations' priorities for workforce transformation, safety culture and quality of service user experience (38, 39).

The process of conducting this review with a specific lens on the evidence for AHP research engagement has highlighted the need for a number of significant methodological refinements in future studies specifically around the population, intervention and outcomes. The variation suggests that the literature is still immature and the community has not yet managed to adopt and consistently use a systematic approach. This is problematic and invites a standardisation exercise in the future, and a systematic means of appropriately capturing the value and impact of research engagement on healthcare performance in addition to other outcome measures.

## **Ahp Population**

This review provides a specific focus on AHPs as opposed to incorporating the wider healthcare disciplines. Whilst it is very encouraging to see explicit evidence of AHP research activities in this review sample, further clarity of reporting is recommended about the AHP participants, especially within multi-disciplinary teams and services. In some of the included studies, for example rehabilitation teams in specified clinical specialisms, the AHP contingent of the workforce is implicit only. Of the included studies, only five of the registered AHPs were named (occupational therapists, physiotherapists, speech and language therapists, paramedics, and radiographers). Whilst AHPs collectively are regulated by common competency standards (40), it is acknowledged that the respective disciplines are at difference stages of self-efficacy of research engagement. This agenda is being addressed by the recently launched HEE AHP Research and Innovation Strategy (7), to secure more equitable access and progress in support context and infrastructure. More detailed reporting of the specific AHP disciplines in future studies would enable synthesis of findings to increase the collective evidence for value and impact. In addition, this would help to demonstrate differential needs for greater support where needed. The widespread adoption of common evaluation approaches and tools is strongly advocated, to facilitate collective benchmarking and progress monitoring at three distinctive levels – organisational, team and the individual practitioner (41–43).

## **Research Engagement Interventions**

The research team addressed the challenge of the ambiguous terminology used for research engagement that was identified in the current published evidence base. The loose distinctions between research or service improvement activities, in comparison with knowledge transfer, implementation and evidence-based continuing professional development were problematic. The broadened inclusion criteria therefore maximised inclusivity and a shift was made to encompass engagement 'with research' as well as 'in research', so that all publications that could potentially contribute relevant insights would be examined. It



is highly recommended that future studies could benefit from more standardised common reporting, for example CONSORT guidelines (44). Prospective designs to sub-group distinctive types of these activities are also recommended. This recommendation is in line with the universal call for explicit support strategies to facilitate implementation of research into practice, as highlighted in the joint position statement issued in 2021 by the Professors of Allied Health embedded in Health Services in Australia (45). A structured framework has been developed for the evaluation of a suite of proposed strategies to support research engagement (46).

## Measurement Of The Value Of Research Engagement

A range of relevant and appropriate approaches to evaluation of outcomes will be an essential component of future study protocols, to generate the robust evidence sources needed by managers of AHP services to support the agenda that research engagement by the workforce may credibly lead to improved healthcare performance. The findings from this review will inform the design of prospective future research, to more specifically and appropriately reflect and evaluate the impact and value of AHP research engagement. In line with the four domains addressed in the HEE Research and Innovation Strategy (7), the protocols of future studies need to differentiate more precisely between outcomes in terms of capability building of skills and careers for individuals, versus capacity building for evidence-based practice and implementation of research in routine practice by the wider workforce. These refinements in specificity will assist greater clarity and understanding in communicating the concepts of engagement 'in' and 'with' research respectively.

### Strengths and Limitations

This study intended to provide an update of a previous systematic review with a focus on AHPs. The strengths of this review include the use of a multi-database search and that we broadened the inclusion criteria from our protocol which resulted in the highest possible recall. Dual paper screening was conducted at all stages with high inter-rater reliability indicated with a kappa score. The frameworks and data extraction forms were tested to ensure relevancy and parity, with ongoing discussions with the research team to ensure consistency and consensus.

The methodological design of the studies included were not wholly appropriate for establishing effect, hence the re-focus to describe the value of research engagement. The decision to broaden the protocol's inclusion criteria maximised inclusivity and as a result, the overall quality of evidence was suboptimal. Furthermore, sub-group analysis to evaluate the importance of mechanisms was not possible due to the heterogeneity of studies. Accordingly, we are making clear recommendations for future research designs. However, it is appropriate for us to make only cautious recommendations in relation to the implications for organisations and services.

The heterogeneity of studies, and limitations in level of indirectness and quality may have called for alternative review methods. A series of reviews to scope the available literature may have been useful to

conduct a contemporary evaluation of 'research engagement' terminology to gain greater conceptual clarity. Furthermore, a more recent taxonomy and range of mechanisms and outcomes relating to AHPs specifically may have been facilitated by a series of alternative research questions. The limitations are framed through reflective hindsight and evaluation of the review method chosen, leading to caution in recommendations.

## Implications

This review supports existing policy that aims to drive the agenda to accelerate the growth of AHP research and innovation. By providing a benchmark of evidence which shows the value of AHP research engagement, this information can support AHP leaders and managers whose roles involve the implementation of current HEE AHP Research and Innovation strategy (7). However as reported here, the current sample included a range of study designs. This demonstrates the need for a more consistent and coherent approach in the future. One feasible way to prospectively evaluate the impact of local research engagement could be to align a before and after study within current primary AHP research activities. This may also perpetuate more specific reporting of variables such as AHP profession, clinical areas of practice, research engagement intervention types and outcomes, with sub-group analysis of important mechanisms or instigators of change. Those study designs could better enable AHP leaders to capture the broader impact on the local workforce, service delivery and clinical outcomes. This in turn would actively contribute to the wider AHP agenda by adding to the knowledge base.

On a larger scale, cross-sectional studies are advocated for the future, as being more appropriate to demonstrate effect by comparing engaged and non-engaged workforce groups across organisations (47). A shift in expectation for pre-post studies of research engagement within clinical trials is advocated. In the United Kingdom in particular, the existing infrastructure of Clinical Research Networks could facilitate this as a standard approach, to more efficiently capture and reflect the collective impact of research engagement in Portfolio studies. In summary, studies are urgently needed that expressly address this research question to evaluate the impact of research engagement by AHPs, not only as a secondary outcome.

As identified, there is lack of clarity around mechanisms. Deeper examination of the importance of the varying mechanisms in this review was not possible, however, the most common mechanisms identified in studies that indicated effect may suggest that these are important. This prompts a recommendation for further exploratory research into the mechanisms which pose a link between research engagement and healthcare performance. Due to the inconsistencies in outcomes and unknowns of effect, the value of qualitative research could be used to explore the unexpected impacts of research engagement, similar to a review in 2019 (9) but with a specific focus on AHPs, and the mechanisms that link research engagement and the associated impacts.

## Conclusion

The findings of this review have affirmed that the current published sources comprise a limited, although generally positive evidence base for research engagement by AHPs with broad and specific impacts. The review also identifies the most common mechanisms which may link research engagement with improvements to processes of care. These workforce and organisational mechanisms correspond to the cultural and contextual factors highlighted by the HEE AHP Research Strategy and which may be important for future exploration and evaluation.

Recognition of the value, importance and reputation of AHP research engagement is wholly dependent upon the development and implementation of agreed evaluation approaches and metrics. Our review has highlighted the need for greater specificity in future study protocols. Specifically, this includes the transparency of AHP workforce participation in uni- and multi-professional contexts, research engagement activities and outcomes. In addition, our review has demonstrated the priority need for explicit consensus on the most relevant and appropriate indicators of value and impact of AHP research engagement.

Recommendations are made for approaches which would enable more transparency and could explicitly capture and evaluate the impact and value of clinicians who are research engaged. It is more time-critical than ever before to develop and refine more standardised methodologies, frameworks and infrastructure to promote AHP research engagement evaluation. Suggestions have been made in which AHP leaders, managers, clinical academics, and researchers may contribute to the needed evidence to demonstrate the value of research engagement for clinical services and the collective AHP workforce. That collective evidence base is needed to support the strategic leverage for research engagement to be embedded in national agendas (7, 8) by AHP managers and leaders who are calling for sustainable investment and facilitation of AHP research and innovation.

## Abbreviations

**AHP** Allied Health Professional/s

**HEE** Health Education England

**NHS** National Health Service

## Declarations

Ethics approval and consent to participate The study on which the paper has been based does not require ethical approval due to the use of secondary evidence. Consent for publication Not applicable Availability of data and materials All data generated or analysed during this study are included in this published article and its additional information files. Competing interests James Hill was funded by the National Institute for Health Research Applied Research Collaboration North West Coast (ARC NWC). The views expressed in this publication are those of the authors and not necessarily those of the National Institute for Health Research or the Department of Health and Social Care. Sophie Chalmers declares that they

have no competing interests. Louise Connell declares that they have no competing interests. Suzanne Ackerley declares that they have no competing interests. Amit Kulkarni declares that they have no competing interests. Hazel Roddam declares that they have no competing interests. Funding Sophie Chalmers is on a secondment placement jointly funded by the University of Central Lancashire (UCLan) and Bolton NHS Foundation Trust. Authors' contributions SC prepared the original manuscript and was involved in all aspects of the study. HR is acknowledged as senior author for this work with substantial input in the interpretation of the findings. JH, LC, SA and AK have all made substantial contributions to the design, analysis, interpretation and draft of the work, including substantial revisions throughout.

**Acknowledgements** The team wish to thank Professor Chris Nester for his helpful comments on earlier drafts of this manuscript. Authors' information Authors of this work are experts in their field and/or are stakeholders in the agenda for AHP research and innovation. HR is the Subject Matter Expert for AHP Research at Health Education England and author of the Health Education England AHP Research and Innovation Strategy, 2022. JH is a senior research fellow with expertise in evidence synthesis methods at UCLan. LC is a Professor of Allied Health Neurorehabilitation at UCLan. SA is a research fellow at UCLan working with LC in the School of Sport and Health Sciences. AK is the Head of Research and Outcomes at the professional body for speech and language therapists, RCSLT. SC is a AHP clinical academic researcher on a joint secondment placement between UCLan and Bolton NHS Foundation Trust.

Additional file 1 Search strategy adapted from Boaz et al. (1) Additional file 2 Mechanisms in research-active settings through which healthcare improved (Hanney et al. 2013, page 79, box 4)

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## Table 4,5

## Figures

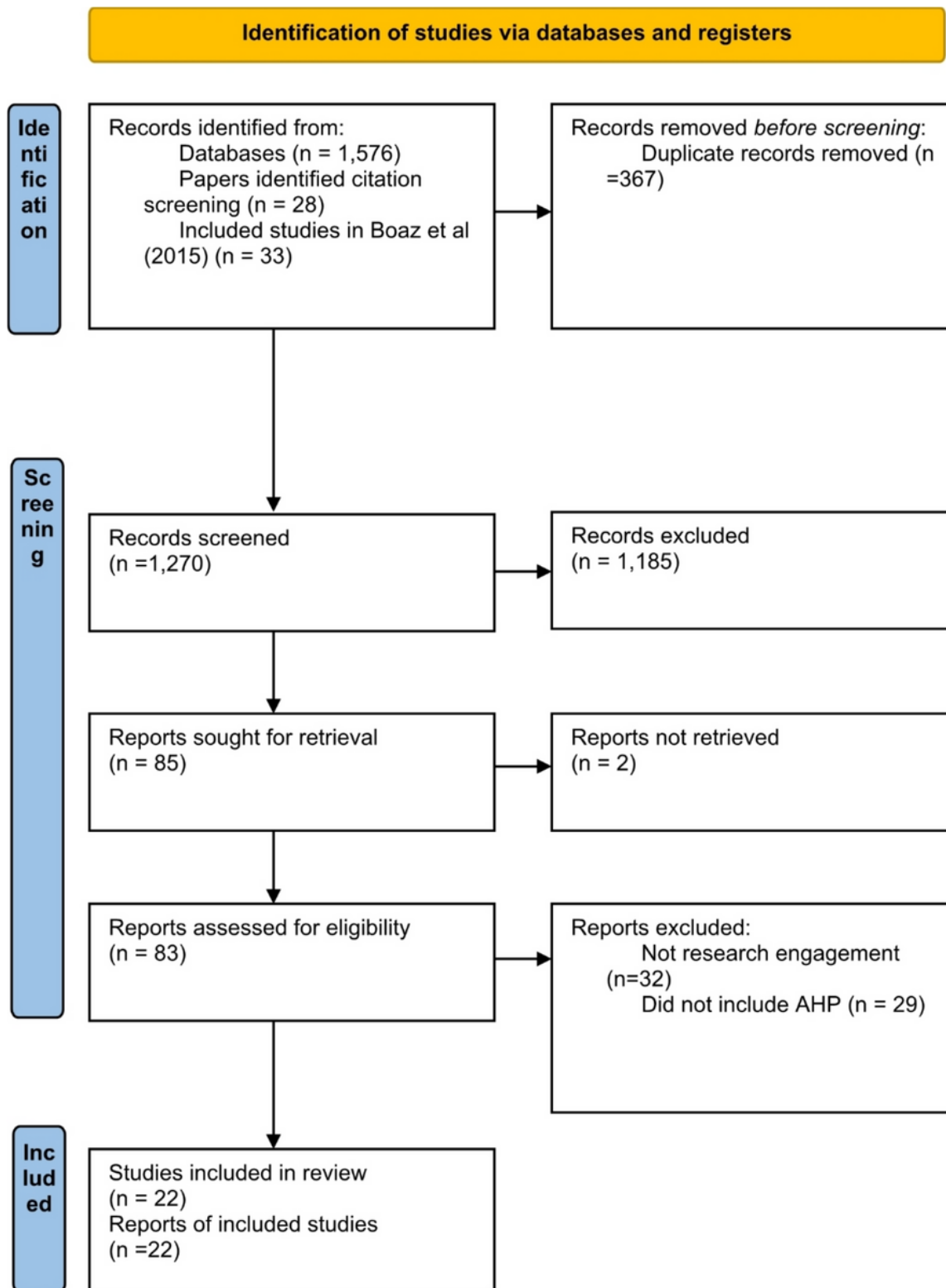
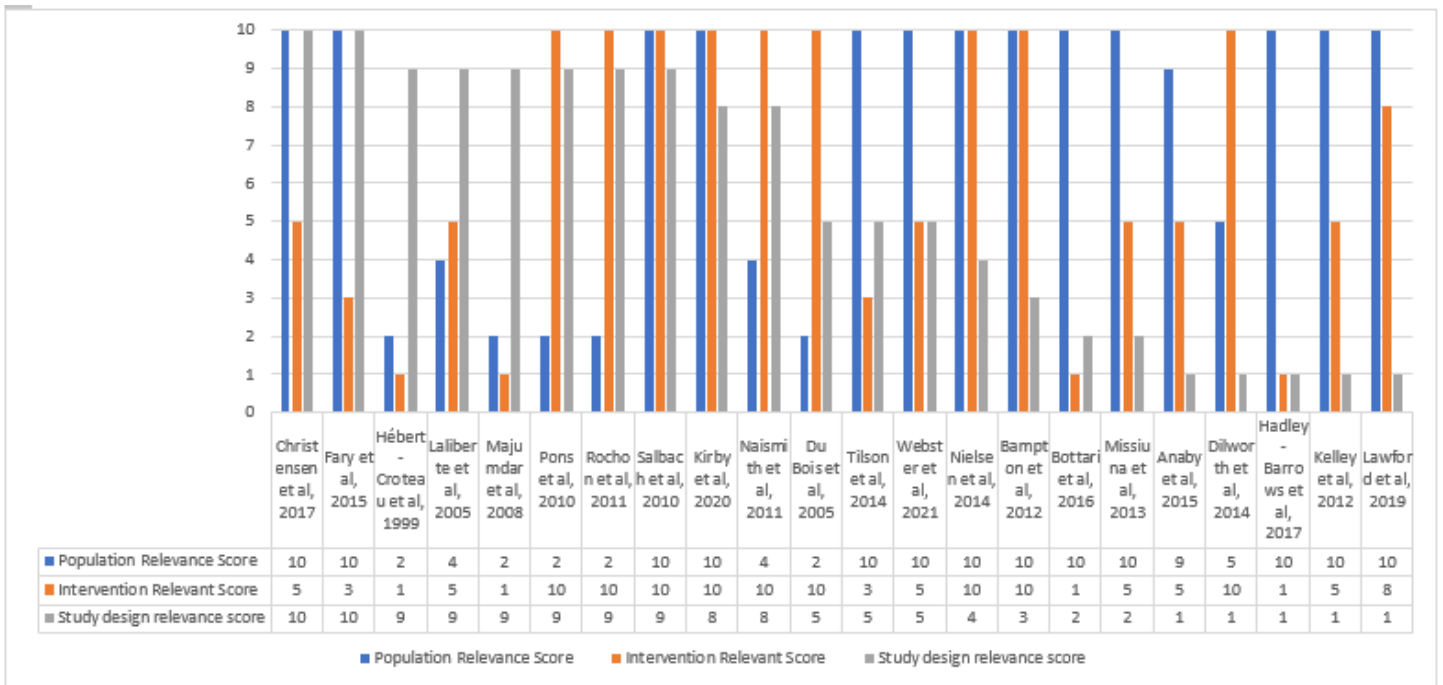


Figure 1

Identification of studies via databases and registers





**Figure 2**

Relevancy of all included studies to the inclusion criteria set out in the protocol

Key: **Population:** 1 = No indication of including AHP, 10 = Only includes AHP; **Intervention:** 1 = *Engagement with research*, 10 = *Explicitly describes engagement in research*; **Study design:** 1 = Qualitative studies, 10 = RCT or repeated measures,

## Supplementary Files

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