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## RESEARCH REPORT

# Allied health professional research engagement and impact on healthcare performance: A systematic review protocol

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## Abstract

**Background:** Existing evidence suggests that clinician and organization engagement in research can improve healthcare processes of care and outcomes. However, current evidence has considered the relationship across all healthcare professions collectively. With the increase in allied health clinical academic and research activity, it is imperative for healthcare organizations, leaders and managers to understand engagement in research within these specific clinical fields. This systematic review aims to identify the effect of engagement in research by allied health professionals (AHPs) and organizations on healthcare performance.

**Methods:** This systematic review has a two-stage search strategy. The first stage will be to screen a previous systematic review examining the effectiveness of engagement in research in health and social care to identify relevant papers published pre-2012. The search strategy used in the previous review will then be rerun, but with a specific focus on allied health. This multi-database search will identify publications from 2012 to date. Only studies that assessed the effectiveness of allied health engagement in research will be included. All stages of the review will be conducted by two reviewers independently, plus documented discussions with the wider research team when discrepancies occur. This systematic review protocol follows the EQUATOR reporting guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Protocols (PRISMA-P).

**Discussion:** The findings of this review will make a significant contribution to the evidence base around the effect of allied health engagement in research on healthcare performance. It will provide insights for clinicians and managers looking to understand the consequences of developing AHP research capability and capacity. The findings of this review will also aim to make recommendations for future evaluation approaches for engagement in research interventions.

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**Trial registration:** This systematic review protocol has been registered with PROSPERO, registration number CRD42021253461.

#### KEYWORDS

allied health professionals, healthcare performance, research engagement

#### What this paper adds

*What is already known on the subject*

- This study will provide valuable evidence for professionals and policymakers seeking to understand engagement in research in the allied health disciplines. Where supported by the data, there may be recommendations for future research regarding specific variables to be considered when planning and evaluating engagement in research in allied health practice.

*What this paper adds to existing knowledge*

- A previous systematic review identified a positive association between clinician and organization engagement in research and improved processes of care and health outcomes. The reviews' findings have been used as a justification for clinicians and organizations to increase research capacity. That review evaluated literature published before 2012 and the studies that were identified predominantly reported on engagement in research by medics and nurses. An updated review is now required to include research published since 2012. This review will specifically focus on the effect of engagement in research within allied health disciplines.

*What are the potential or actual clinical implications of this work?*

- Research activity among AHPs is gaining momentum. Given this growth in AHP research activity and the rise in dedicated clinical academic roles, a contemporary review to identify the specific effect of AHP engagement in research on healthcare performance is prudent. The findings will inform clinicians, clinical managers and leaders of the potential impact of research activities by AHP clinicians and organizations. This will support the planning and development of initiatives focused on research capacity, capability and culture within allied health.

## BACKGROUND

Clinicians and healthcare organizations who engage in research have been associated with improved healthcare performance; specifically processes of care (Boaz et al., 2015; Hanney et al., 2013). Allied health professionals (AHPs) are the third largest workforce in health and care in the UK, and it has been acknowledged that AHPs could

become one of the key drivers of innovative patient care as clinical academics (Jones & Keenan, 2021). However, it is yet to be evidenced whether specific AHP research engagement results in similar outcomes.

A previous review, conducted by Hanney et al. (Hanney et al., 2013) and published in a full report and an abridged publication by Boaz et al. (Boaz et al., 2015), used a three-stage approach, described by the authors as 'hourglass

shaped', incorporating a mapping stage, a focused review and a wider review (Boaz et al., 2015; Hanney et al., 2013). The study addressed the impact of clinicians and organizations that engage in research. The review was inclusive of clinicians and organizations from medical, nursing, midwifery and allied health backgrounds, and concluded that when clinicians and organizations engage in research, it is likely that healthcare performance improves. In the original review of 2013 by Hanney et al. (Hanney et al., 2013), the researchers took 'engagement in research' to mean a 'deliberate set of intellectual and practical activities undertaken by healthcare staff and organisations ...' (2). This was in contrast to 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' (3). The authors investigated the question of whether the engagement of clinicians and organizations in research improves healthcare performance<sup>1</sup> (defined by processes of care or health outcomes), whilst also exploring the possible mechanisms at play (defined as the levers that instigate a relationship between research engagement activities and improved healthcare, such as improvements in infrastructure, staff training, linkage and exchange between organizations, research networks) (Boaz et al., 2015). Due to the paucity of relevant studies at the time of the review by Hanney et al. (Hanney et al., 2013), there were limited publications identified which focused specifically on AHPs. The papers identified from the 2012 search strategy were predominately set within the context of medicine, surgery, nursing or pharmacotherapies, with one paper specifically referencing the involvement of physical therapists (Salbach et al., 2010).

The semantic differences between clinical academic activity and clinicians who engage in research, and the consistency of such terms within the literature, is problematic (Carrick-Sen et al., 2019). Terminology to describe research engagement is varied and includes phrases such as *engagement in research* and *engagement with research*, which are often used interchangeably despite efforts made by Hanney et al. (Hanney et al., 2013) to define these distinctly. The contrast in terminology used across the current literature highlights the reality of the conceptual complexities surrounding the topic. Throughout, we will refer to the terms 'engagement in research' and 'engagement with research' as defined by Hanney et al., and the term 'research engagement' as an umbrella term referring to both.

More recently a qualitative systematic review included 20 papers exploring a broad range of impacts of clinical academic activity by healthcare professionals outside of medicine (i.e., nursing, midwifery, AHPs, clinical

psychologists, healthcare scientists and pharmacists) (Newington et al., 2021); in which two included papers exclusively involved AHPs. The paper identified impacts which mapped to seven themes. Impacts for patients, for example, demonstrated the beneficial changes to service provision that arose from clinical academic activity and broadly improved access to evidence-based healthcare. Impacts on service provision highlighted that clinical academic activity was regarded as beneficial to the clinical service through 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 reported in the review by Boaz et al. (Boaz et al., 2015), the question remains whether engagement in research specifically by AHPs has an effect on these outcomes.

Over the past decade, research engagement among AHPs has gained momentum with an increase in access for AHPs 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 (Jones & Keenan, 2021). The increase in AHP research engagement is also recognized through the increase in the literature pertaining to: allied health participation in research (Wenke et al., 2020), strategies for research engagement in allied health (Mickan et al., 2017), supported funding to promote allied health research activity (Wenke et al., 2018), research capacity-building frameworks for AHPs (Matus et al., 2018), evaluation of research capacity of AHPs (Matus et al., 2019), and frameworks for embedding research culture in allied health (Slade et al., 2018). The recently published Allied Health Professions' Research and Innovation Strategy for England (Health Education England, 2022) identifies strategic aims to accelerate this growth as 'securing and sustaining excellence in research and innovation for the Allied Health workforce is a global priority agenda' (5). The strategy therefore also calls for a sharper focus and recognition of the value of these activities and impact on healthcare.

The original review conducted by Hanney et al. (2013) and Boaz et al. (2015) is a seminal paper which is highly cited in the field of allied health research and has been used within the Department of Health and Social Care priorities to develop more research delivery roles. Given that AHP clinical academic roles and activities are increasing, there is a need to understand the effect of AHP engagement in research on healthcare performance. This systematic review therefore provides a timely update drawing on the methodology from the original review by Hanney et al. (Hanney et al., 2013) with a narrower focus on the 14



AHP disciplines<sup>2</sup> as specified in the AHP Research and Innovation Strategy for England 2022 (2022).

## Objectives

- To describe the effect of engagement in research by AHP clinicians and organizations on healthcare performance.
- To identify levers that instigate a relationship between engagement in research activities and improved healthcare performance.

## METHODS

This systematic review protocol follows the EQUATOR reporting guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Systematic Review Protocols (PRISMA-P) (Moher et al., 2015). This protocol is registered with the international prospective register of systematic reviews: PROSPERO (registration number CRD42021253461). The completed systematic review will be reported using the PRISMA 2020 statement (Page et al., 2021). Any protocol amendments will be reported in the final systematic review publication.

## Eligibility criteria

The following study characteristics specified below for this systematic review have been adopted from the original study (Boaz et al., 2015) with only the population being changed to the 14 AHPs. Preliminary screening of the included studies in the original review was conducted to provide an estimate of included studies with an updated review, based on the population of allied health. Preliminary searches of the literature will determine whether the focus remains specific to the original inclusion criteria or requires a more pragmatic approach by broadening the intervention and study type criteria to maximize inclusivity:

**Population:** Allied health clinicians/AHPs, teams and/or organizations. Any of the 14 registered AHPs that work within health, social and/or educational settings, as specified in the AHP Research and Innovation Strategy for England 2022 (2022). Nursing, midwifery or medical professionals will be excluded. To maximize inclusivity following preliminary screening, a wide approach has been taken to include studies with a mixed population of healthcare professionals with a partial sample of AHPs, stated explicitly or implied by the clinical context.

**Intervention:** Studies that make explicit reference to *engagement in research* in any way including: (1)

agenda setting, (2) conducting research, (3) action research or (4) research networks where the research involvement is noted will be included. *Engagement with research*, for example, clinical professional development, evidence-based practice, implementation efforts, critical appraisal without formal review, or patient engagement/participation in research, just research utilization, adoption of research in policymaking, and improvements in staff retention or morale, will initially be excluded. Preliminary searches of the literature in the completed review will determine whether a more pragmatic approach is needed to broaden the focus to ‘research engagement’ which is inclusive to ‘engagement *with* research’ to capture relevant studies in relation to this topic and population.

**Comparison:** Any evidence of improved performance that can be linked to any form of engagement in research will be included; this may include studies with or without a comparator.

**Outcomes:** The primary outcome of this review is healthcare performance (processes of care or health outcomes) assessed pre- and post-engagement in research. The secondary outcomes are the mechanisms at play, that is, the levers that instigate an effect between engagement in research and improved healthcare performance. Some examples of mechanisms from in the additional supporting information [Material 1](#) include: improvements in infrastructure, training of staff, enhancement of group and individual behaviour, improvements in processes of care related to conducting a specific trial, linkage and exchange between organizations, and research networks. These will be coded using a pre-existing framework, documented by Hanney et al. (Hanney et al., 2013).

**Study type:** Empirical research studies will be identified from effectiveness studies including randomized control trials, repeated measured or quasi-experimental study designs, where the concept of engagement in research by AHP clinicians/organizations was an input and a measure of healthcare performance was an output. Mixed method studies will be considered where an effectiveness component is included in the study and this directly relates to the outcome of healthcare performance and the data used to demonstrate engagement in research. Only articles published in English will be considered. Full documentation of methodology will enable reupdate if required.

## Information sources

A comprehensive search strategy using a multi-database search includes literature published between 2012 and 2021 in the following databases: Medline, Embase, HMIC, PsychINFO, Cumulative Index to Nursing and



**TABLE 1** Search strategy adapted from Boaz et al. [(Boaz et al., 2015)]

1. ((engag\$ adj2 research\$) or (engag\$ adj2 trial?) or (engag\$ adj2 case stud\$) or (engag\$ adj2 clinical stud\$) or (engag\$ adj2 experimental therap\$) or (engag\$ adj2 RCT?) or (engag\$ adj2 randomi?ed controlled trial?) or (engag\$ adj4 clinical trial?) or (participat\$ adj4 research\$) or (participat\$ adj4 trial?) or (participat\$ adj4 case stud\$) or (participat\$ adj4 clinical stud\$) or (participat\$ adj4 experimental therap\$) or (participat\$ adj4 RCT?) or (participat\$ adj2 randomi?ed controlled trial?) or (participat\$ adj4 clinical trial?) or (involv\$ adj2 research\$) or (involv\$ adj2 trial?) or (involv\$ adj2 case stud\$) or (involv\$ adj2 clinical stud\$) or (involv\$ adj2 experimental therap\$) or (involv\$ adj2 RCT?) or (involv\$ adj2 randomi?ed controlled trial?) or (involv\$ adj4 clinical trial?) or (interact\$ adj2 research\$) or (interact\$ adj2 trial?) or (interact\$ adj2 case stud\$) or (interact\$ adj2 clinical stud\$) or (interact\$ adj2 experimental therap\$) or (interact\$ adj2 RCT?) or (interact\$ adj2 randomi?ed controlled trial?) or (interact\$ adj4 clinical trial?) or (tak\$ part adj3 research\$) or (tak\$ part adj5 trial?) or (tak\$ part adj3 case stud\$) or (tak\$ part adj3 clinical stud\$) or (tak\$ part adj3 experimental therap\$) or (tak\$ part adj3 RCT?) or (tak\$ part adj2 randomi?ed controlled trial?) or (tak\$ part adj4 clinical trial?) or (initiat\$ adj2 research\$) or (initiat\$ adj2 trial?) or (initiat\$ adj2 case stud\$) or (initiat\$ adj2 clinical stud\$) or (initiat\$ adj2 experimental therap\$) or (initiat\$ adj2 RCT?) or (initiat\$ adj2 randomi?ed controlled trial?) or (initiat\$ adj4 clinical trial?) or (follow\$ adj2 research\$) or (follow\$ adj2 trial?) or (follow\$ adj2 case stud\$) or (follow\$ adj2 clinical stud\$) or (follow\$ adj2 experimental therap\$) or (follow\$ adj2 RCT?) or (follow\$ adj2 randomi?ed controlled trial?) or (follow\$ adj4 clinical trial?) or (introduc\$ adj2 research\$) or (introduc\$ adj2 trial?) or (introduc\$ adj2 case stud\$) or (introduc\$ adj2 clinical stud\$) or (introduc\$ adj2 experimental therap\$) or (introduc\$ adj2 RCT?) or (introduc\$ adj2 randomi?ed controlled trial?) or (introduc\$ adj4 clinical trial?) or (conduct\$ adj2 research\$) or (conduct\$ adj2 trial?) or (conduct\$ adj2 case stud\$) or (conduct\$ adj2 clinical stud\$) or (conduct\$ adj2 experimental therap\$) or (conduct\$ adj2 RCT?) or (conduct\$ adj2 randomi?ed controlled trial?) or (conduct\$ adj4 clinical trial?) or learning organi?ation? or research intensive organi?ation? or academic medical centre? or academic medical center? or academic health science centre? or academic health science center? or research network? or research collaboration? or study hospital? or teaching research facilities or trial hospital? or veterans health administration).ti,ab. (226705)
2. ((improve\$ or influence\$ or determine\$ or affect\$ or effect\$ or increase\$ or decrease\$ or declines\$ or diminish\$ or weake\$ or worse\$ or benefi\$ or impact\$ or better or worse or greater or lesser or lower or higher or evaluat\$ or compar\$) adj5 (performance or (patient\$ adj4 outcome?) or process quality or process assessment? or (health care adj4 outcome?) or (healthcare adj4 outcome?) or (clinical adj4 outcome?) or (quality adj4 care) or (compar\$ adj4 outcome?) or (patient\$ adj4 mortality) or (routine adj clinical practice) or (mortality adj4 outcome\$) or organi?ational process\$ or organi?ational determinant\$ or organi?ational characteristic? or organi?ational innovation? or organi?ational culture or organi? ational support or (clinical adj2 care) or treatment outcome or (adhere\$ adj4 guideline?) or ("u"e\$" adj4 guideline?) or clinical practi?e or patient\$satisfaction)).ti,ab. (710962)
3. ((practice adj4 change?) or (service adj4 change?) or organi?ational change? or treatment change? or prescri\$ change?).ti,ab. (26321)
4. (allied health practit\* or allied health clinician or allied health personnel or art therap\* or drama therap\* or music therap\* or chiropod\* or podiatr\* or dietitian or dietician or dietetic or occupational therap\* or operating department pract\* or orthopt\* or osteopath\* or paramedic\* or physiotherapy\* or physical therap\* or prosthet\* or orthoti\* or radiograph\* or speech language therap\* or speech language patholog\*).ti,ab. (370026)
5. 1 and 4 (5496)
6. 2 or 3 (734130)
7. 5 and 6 (760)
8. 7 (760)
9. limit 8 to english language (754)
10. limited 8 to yr = "2012-2021") (574)
11. 9 and 10 (568)

Allied Health Literature, British Nursing Index and OpenGrey.

## Search strategy

The first step of the systematic review was a full paper screen of all included studies from the original review (Boaz et al., 2015) using the eligibility criteria and full paper screening methods described above to identify and include any relevant studies published before 2012. The original search strategy was then updated (Table 1) and

rerun with the additional filter of population to focus the search to AHPs, whilst remaining representative of the studies found by Boaz et al. (Boaz et al., 2015). With the expertise of a librarian, the search strategy for Medline (Table 1) was updated from the original search strategy used by Boaz et al. in order to focus the review specifically on the stated research objective. Initial scoping following the results of the search strategy (Table 1) was conducted to enable confidence that the papers were relevant to the topic in question, in relation to the population and intervention.



## Study records

### Data management

Identified titles and abstracts from the search were input into the reference manager EndNote and checked for duplication. Duplicate sources were deleted. References were uploaded and managed on the Rayyan web database (Ouzzani et al., 2016) to complete a collaborative screening and study selection process. Additional duplication removal was carried out in Rayyan.

### Selection process

The inclusion and exclusion criteria was pre-established as set out above and tested on 10 papers to ensure it could be applied consistently between the assessors. All titles and abstracts underwent a complete dual review process using independent assessors. This included the use of a single first reviewer (SC) and multiple second reviewers (SA, LC, AK, HR) to share screening efforts. Interrater reliability using the kappa statistic was calculated following completion of the dual screening process to provide an interpretation guideline for readers regarding the level of agreement in the screening process. Following the independent screening process, all reviewers met at this point to ensure parity and resolve any inconsistencies. Backwards snowball sampling was used, whereby the citations of all the included studies from this search process were screened for any additional papers.

The use of the Rayyan web application aided this initial screening process. Rayyan has an automated ordering facility that allows the quick identification of the most relevant papers and helps the identification of inconsistencies (Ouzzani et al., 2016). The overall aim at this stage was to be inclusive, only rejecting papers clearly out of scope of the review question and specified inclusion and exclusion criteria.

All full papers were screened by two reviewers (SC, JH) for relevance by applying the inclusion and exclusion criteria. Both reviewers agreed on the papers taken through to the final data extraction stage and any disagreements were resolved by discussion using a third reviewer to reach consensus where necessary. All reasons for selection or rejection of full papers were recorded on the Rayyan software.

### Data collection process

Data were extracted from reports onto the data extraction sheet, based on the matrix developed by Boaz et al. (Boaz

et al., 2015). This was piloted on a sample of included studies to ensure relevant information was captured for this review. The data extraction table was stored as an Excel spreadsheet. Two reviewers independently completed data extraction. Any disagreements were resolved by discussion, and if consensus could not be achieved, arbitration was carried out by third reviewer.

### Data items

Data items included: title, authors, year, country, allied health profession, organization, clinical setting, study design, research question, nature of the engagement in research activity (intervention), methods, outcome measures and quality assessment. All data extraction items were tested on a selection of full papers to ensure the matrix identified remained appropriate for this review. Further information using the theoretically driven matrix originally developed and published by Hanney et al. (Hanney et al., 2013) was extracted from each paper to identify key components of intervention. The matrix was developed through an iterative process taken by Hanney et al. which evaluated existing reviews and theories. This matrix enables extraction of salient information across the following dimensions: degree of intentionality, level of study, impact, findings and improvement identified, which is represented in Table 2, to highlight the association between engagement in research and whether healthcare performance outcomes were positive, mixed or negative.

### Outcomes and prioritization

The primary outcome of this review is whether AHP engagement in research can improve healthcare performance, that is, being processes of care or health outcomes. The secondary outcomes are the possible factors reported by the studies included in the review, which act as levers that instigate a relationship between engagement in research activities and better healthcare performance. Pre-defined coded categories of the possible mechanisms were used as published by Hanney et al. (Hanney et al., 2013).

### Risk of bias in individual studies

Quality appraisal was carried out by two independent reviewers with arbitration by a third reviewer. It was expected that the diversity of methods used in the papers means that one quality appraisal tool cannot be applied universally. Therefore, the most appropriate crit-

**TABLE 2** Data analysis dimensions identified in the theoretically driven matrix (Boaz et al., 2015; Hanney et al., 2013)

| Data item                 | Category                 | Key          | Full definition  |
|---------------------------|--------------------------|--------------|--|
| Degree of intentionality  | Least intentionality     | By-product   | Papers demonstrating engagement in research and healthcare performance as a study by-product   |
|                           | Mid-range intentionality | Network      | Papers reporting on impact of research networks  |
|                           | Greatest intentionality  | Intervention | Papers reporting on impact of research intervention  |
| Level of study engagement | Organizational level     | O            | Level of engagement discussed at either organizational or clinician level  |
|                           | Clinician level          | C            |  |
| Impact                    | 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' |
| Findings                  | Positive                 | +            | Findings of the paper in relation to the review question, i.e., if healthcare processes or outcomes improved or not  |
|                           | Negative                 | -            |  |
|                           | Mixed                    | M            |  |
|                           | Mixed-positive           | M+           |  |
|                           | Mixed-negative           | M-           |  |
| Improvement identified    | Processes of care        | P            | The nature of the healthcare improvement identified in the paper   |
|                           | Healthcare outcomes      | HO           |  |

ical appraisal tool based on the design of the studies was used by the Joanna Briggs Institute (Tufanaru et al., 2020). The implications of the quality assessment for interpreting results was explicitly considered during data synthesis by reporting on the strength and robustness of the evidence and exploring consistencies or inconsistencies across the studies with reasoning.

## Data synthesis

There was no minimum number of studies required for the synthesis, and exclusion was not made due to risk of bias because of the potential paucity of research in this area. Similar studies to this review have reported heterogeneity of studies and thus have been unable to conduct a meta-analysis (Boaz et al., 2015). An account of each paper will be made in tabular form in relation to: (1) importance of the review based on quality, (2) whether the findings were positive, negative or mixed, (3) the degree of intentionality of the link between engagement in research and healthcare performance, (4) the scope of the impact made by engagement in research, and (5) the level of engagement discussed (Boaz et al., 2015) (see Table 2 for coding).

A narrative synthesis draws the results from the data extraction sheet together to analyse the similarities and differences between and within studies, compare types of engagement in research, and describe study designs, population, outcomes and author conclusions. The strength and robustness of the evidence will also be considered and described. This will enable reliable conclusions to be drawn from the body of evidence. To aid the transparency and trustworthiness of the narrative synthesis, a general framework consists of three components (Akers, 2009):

- Developing a preliminary synthesis of findings of included studies.
- Exploring relationships within and between studies.
- Assessing the robustness of the synthesis.

## Subgroup analysis

Each paper included within this review will be examined to report any moderating factors that the authors propose as potential components of the improvement in healthcare performance. Following the wider review



by Hanney et al. (Hanney et al., 2013), the researchers developed a taxonomy of the various mechanisms and sub-mechanisms through which outcomes may be superior in research-active settings. The taxonomy of mechanisms and sub-mechanisms was developed through a combination of the findings from the focused review by Hanney et al., an evaluation of existing reviews and theories such as absorptive capacity, research adopters, the role of research networks, and collaborative research across a range of healthcare contexts (Hanney et al., 2013). The taxonomy of mechanisms framework (see in the additional supporting information 1) is tested on a selection of full papers and altered as necessary to ensure appropriacy. Therefore, the 12 mechanisms identified and described in the original review are used in a predefined coding framework as a standard process the reviewers use to code and report these factors (see in the additional supporting information 1) in each of the papers included in this review. Each factor will be assessed and a ratio of number of positive studies will be given for each factor.

## DISCUSSION

There is already compelling evidence that the engagement in research of clinicians and organizations, including medics, nurses and professions allied to health, is associated with improved healthcare performance (Boaz et al., 2015). However, in the context of an increased volume of research activities undertaken by AHPs, the specific impact of AHP engagement in research on healthcare performance remains unknown. The focus of this systematic review is therefore to identify the effect of engagement in research by AHPs on healthcare performance. This will be achieved by carrying out an updated search based on the original study by Boaz et al. (Boaz et al., 2015), with the additional narrowing of focus to AHP only. This systematic review will use the theoretically driven matrix determined by Hanney et al. (Hanney et al., 2013) to identify the dimensions that indicate effect, including degree of intentionality, level of study engagement, specific or broad impact, positive, negative or mixed findings, and improvements in processes of care or health outcomes.

This review will update and add to the existing knowledge base regarding the effect of AHP engagement in research on healthcare performance. It will significantly contribute evidence for clinicians and organizations seeking to understand and develop AHP research capability and capacity. It will also aim to make evidence-based recommendations regarding the outputs that should be measured, reported and described when planning and evaluating interventions which aim to promote or facilitate clinicians to engage in and with research.

## Trial registration

This protocol is registered with the international prospective register of systematic reviews: PROSPERO (registration number CRD42021253461).

## ENDNOTES

<sup>1</sup>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' (3). To focus the review and to reflect the methods conducted by Hanney et al., healthcare performance will specifically denote improvement in clinical 'processes of care' and 'health outcomes'.

<sup>2</sup>The Allied Health Professions (AHP) in England include all the following disciplines: art therapists, dramatherapists, music therapists, chiropodists/podiatrists, dietitians, occupational therapists, operating department practitioners, orthoptists, osteopaths, paramedics, physiotherapists, prosthetists and orthotists, diagnostic radiographers, therapeutic radiographers, and speech and language therapists.

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## CONFLICT OF INTEREST

The authors report no conflicts of interest and are responsible for the content and writing of the paper.

## DATA AVAILABILITY STATEMENT

Data-sharing is not applicable to this article as no datasets were generated or analysed during the current study

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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