

# Rapid Review of the Impact of Allied Health Professionals on Health Inequalities

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## Executive summary

### Introduction

The global pandemic is exacerbating existing health and care inequalities. Allied Health Professionals (AHPs) are a foundational building block of health and care services and are keen to play their role in addressing inequalities. However, there is a lack of existing research exploring AHPs' impact on health inequalities.

### Aim

To explore the impact of AHPs' practice on health inequalities with a particular focus on the following questions:

1. In what ways can allied health professionals decrease or increase health care or health outcome inequalities at an individual, organisational or system level?
2. In what ways can allied health professionals address inequalities in the social determinants of health at an individual, organisational or system level?
3. In what ways can allied health professionals support disadvantaged groups at an individual, organisational or system level?
4. What interventions or principles in non-AHP settings have been found to increase or decrease inequalities and are likely to be effective in AHP settings?

### Methods

In Stage 1, we undertook a main rapid review of AHP interventions addressing health inequalities (questions 1-3). Stage 2 involved an ancillary rapid review to identify learning from non-AHP settings (question 4). The main review involved an electronic search of MEDLINE, EMBASE, CINAHL, Web of Science and AMED from January 2010 to February 2021. Key inclusion criteria were quantitative or qualitative review articles focusing on AHPs which examined health care or health outcome inequalities, their impact on the social determinants of health or targeted disadvantaged groups. We conducted an additional search of broad grey literature and assessed risk of bias using the AMSTAR tool. Meta-analysis was not possible, and a narrative synthesis was produced as the final output of the review.

The purpose of the second review was to identify key learning through a focused search and involved an electronic search of MEDLINE from January 2015 to February 2021. Broad inclusion criteria were: 1) articles reporting literature reviews, 2) articles focusing on health inequalities and interventions targeted to disadvantaged groups, 3) articles which report findings that may be transferable to AHPs and 4) quantitative or qualitative studies. Key transferrable learning was identified, synthesised and integrated by theme into Stage 1 review findings.

## Findings

In Stage 1, a total of 8,727 records were screened and thirty-six articles were included in the final synthesis. Twenty-two studies (61%) were of critically low quality, six (17%) of low quality and eight (22%) of moderate quality. In Stage 2, a total of 1,723 articles were screened and 29 articles were included in the final analysis.

We identified no evidence demonstrating the direct and independent impact of AHPs on the gap in health outcomes between groups or across the socio-economic gradient. However, we found a large body of research describing how AHPs can affect inequalities in health outcomes indirectly. In order to present this evidence in a coherent way, we organised the patterns found in the data into patient and organisational, and system level themes which are applicable across the different AHP groups.

The themes at the patient and organisational level concerned: 1) more equitable access to allied health services for lower socio-economic groups, ethnic minority groups, people with mental health problems or in rural areas and specific disadvantage groups (e.g. homeless people, people on the autism spectrum or with disabilities, offenders or those at risk of offending, and those who have experienced intimate partner violence); 2) high-quality care and patient experience in terms of avoiding bias in decision making, having culturally appropriate services and meeting clinical standards; 3) addressing the social determinants of health through supporting employment and housing; and 4) supporting mental wellbeing through specific AHP services and incorporating mental wellbeing considerations in routine AHP services.

Themes at the system level were 1) ensure equitable distribution of workforce in underserved areas and allocation of funding proportionate to need, and 2) better representation of minority groups, such as gender minorities, in clinical guidelines.

A final cross-cutting theme was engaging and empowering communities to support the co-design and delivery of culturally relevant services.

## Discussion and recommendations

Although the evidence regarding the direct impact of AHPs on inequalities in health outcomes between groups or across the socio-economic gradient is limited, we identified a large volume of evidence describing the indirect impact that AHPs can have on health inequalities.

Key limitations of this review include its rapid nature which implies the possibility that relevant studies may have been missed; the fact that evidence was adjusted from international research with limited generalisability; and finally, the fact that the key themes identified may not be equally applicable to AHP groups. To address these limitations, we undertook a broad grey literature search, consulted experts and abstracted themes to a sufficient level to ensure transferability across countries and professional groups.

## Policy recommendations

1. A programme of equity-focused quality improvement project which will be based on a national assessment of inequalities in access to AHP services, focusing on socio-economic and ethnic minority groups.
2. AHP inequalities actions should be developed, implemented and evaluated at system, organisational and patient level, including the equitable distribution of funding and workforce.
3. Services should be designed and delivered in culturally appropriate ways. This does not simply mean adapting services for different ethnic groups, but rather fundamentally rethinking the intrinsic, predominantly biomedical, western approach to health which may not be equally relatable to all communities.
4. An economic assessment is needed to understand the distributional costs and benefits of AHP actions and identify where resources should be used to maximise the impact on inequalities both for the health care system, partner organisations, communities and individuals.

## Research recommendations

1. This review has been able to map the existing evidence, however, a series of further reviews focusing on specific inequalities and AHPs' roles should be undertaken to build an integrated evidence base.
2. A focused review of the impact of certain AHPs' roles on the distribution of specific social determinants of health, like employment, housing, social participation and education, is needed. Furthermore, AHP researchers should endeavour to integrate social outcomes as well as traditional biomedical outcomes.
3. More research is needed to understand how to meaningfully co-design allied health services with communities. Existing efforts to co-design services should be evaluated to identify the guiding and transferable principles.

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# 1. Introduction

## 1.1 What are health inequalities?

Health inequalities are systematic, avoidable and unfair differences between populations, within populations or across a socio-economic gradient[1]. Health inequalities arise because of the unequal conditions in which we are born, grow, live, work and age, including the social determinants of health (e.g. income, wealth, education, welfare, housing and access to green space), personal resources, access to services and power[2], [3]. Not only do these fundamental causes lead to the compounding of disadvantage over the course of an individual's life but should also be seen as the accumulation of historical events that determine the relative disadvantage of individuals, places and communities. While many people alive today have not experienced events such as the deindustrialisation and disinvestment of mining communities or the overt racism against people emigrating to the United Kingdom (UK) from the Caribbean and Indian subcontinent, the legacy of these events continues to contribute to the disadvantage individuals in these communities experience[4].

Health inequalities are complex phenomena, which however can be unpacked into inequalities in health care and health outcomes (see Figure 1); with health care inequalities referring to differences in access, diagnostics, treatment, experience or health care funding and workforce and health outcomes inequalities referring to differences in morbidity and mortality. These differences can be viewed across the socio-economic gradient, disadvantaged groups (e.g., ethnic minority groups, LGBTQ+) or inclusion health groups (e.g., homeless, undocumented migrants). Health care inequalities are under the control of health care organisations, but health outcome inequalities are primarily driven by wider factors, such as the social determinants of health.

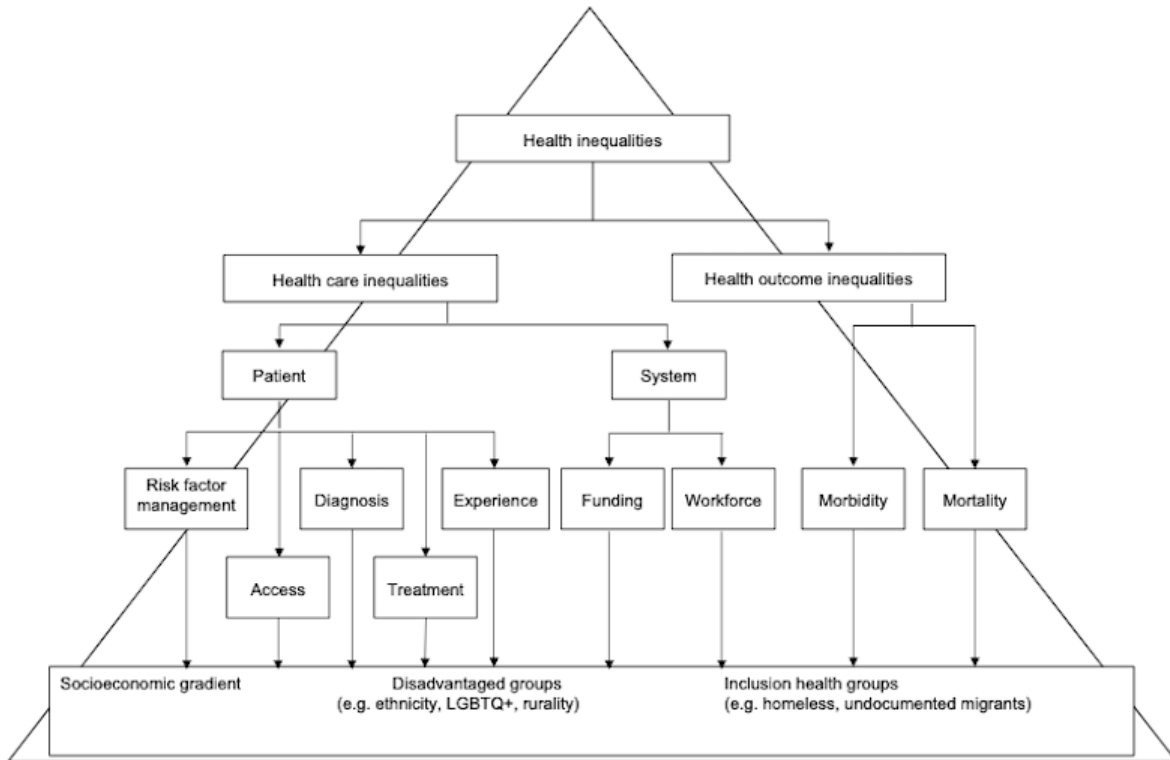


Figure 1. Unpacking health inequalities

Source: Ford et al. Transforming health systems to reduce health inequalities. Future Healthcare Journal 2021 (in press)

The global pandemic is exacerbating existing health inequalities. Members of disadvantaged communities are more likely to be infected with COVID-19 and to ultimately die of the virus. Moreover, the indirect impact of the pandemic is and will be more severe on these communities, through its long-term impact on healthcare services, the economy and mental health[5], [6]. An analysis by the Office for National Statistics (ONS) found that in the most deprived areas of the country there was a 118% increase in death rates from COVID-19 compared with the least deprived[7]. Compared to white individuals, the relative risk of COVID-19 mortality in South Asian and Black individuals was 4.04 (CI: 2.54, 5.55), with material deprivation being a key driver[8].

### 1.2 Who are allied health professionals?

Allied Health Professionals (AHPs) are a foundational building block of health and care services. They make up the third largest workforce in the NHS with over 4 million client contacts per week[9] and have a salary bill of over £2billion/year[10]. The NHS England/Improvement definition includes 14 different professions, shown below ordered by number of professionals registered in England with the Health and Care Professions Council (HCPC) in 2019/2020 and the General Osteopathic Council [11], [12].

1. Physiotherapists – 58,201 professionals
2. Occupational therapists – 41,271 professionals
3. Radiographers – 36,868 professionals



4. Paramedics – 30,914 professionals
5. Speech and language therapists – 17,226 professionals
6. Operating Department Practitioners – 14,428 professionals
7. Chiropodists/podiatrists – 12,392 professionals
8. Dietitians – 10,159 professionals
9. Osteopaths – 5,429 professionals
10. Art Therapists – 4,802 professionals
11. Orthoptists – 1,514 professionals
12. Music therapists – 1,176 professionals
13. Prosthetists and Orthotists – 1,113 professionals
14. Drama therapists – 1,025 professionals

NHS England definitions of each role are shown in Appendix 1. AHPs work across health, social care, education, academia, voluntary and private sectors and deliver care to individuals, groups and in some cases, specific populations of children and older adults.

Based on data from the HCPC, AHPs are predominantly female (e.g. 95% speech and language therapists, 89% occupational therapists, 77% physiotherapist and 72% radiographers), with the exception of paramedics who are predominantly male (70% male)[13]. Ethnic minority groups tend to be under-represented in the AHP workforce. Based on the 2011 census, 14% of the population identified as an ethnicity other than white. However, among paramedics the respective percentage was only 5%, among speech and language therapists 7%, among occupational therapists 10%, and among physiotherapists 11%. Radiographers seem to be the only exception, with 16% identifying as an ethnicity other than white.

AHPs can have a substantial part to play in addressing inequalities through specific targeted interventions, more equitable routine care and/or supporting the social determinants of health such as access to housing and welfare. Still, the breadth of impact of AHPs on health inequalities remains largely unknown and more research is needed to identify the actual ways that AHPs can reduce health care and health outcome inequalities as well as the current evidence gaps.

### 1.3 AHP and health inequalities

There is a lack of routine UK data documenting inequalities in access to, quality and experience of AHP services. For example, we could not find relevant data disaggregated by deprivation or ethnic group. Furthermore, we could not find data showing the distribution of workforce or funding by socio-economic area, although workforce data are available for certain groups, such as physiotherapists working in primary care[14].

There is a large body of evidence demonstrating that those from lower socio-economic and ethnic minority groups have worse health outcomes[15], [16]. The people and communities that AHPs seek to help are no different. For example, Lowe and colleagues undertook a systematic review looking at the impact of deprivation on outcomes in physiotherapy[17]. Based on three included studies, the authors found strong evidence that lower socio-economic status is negatively associated with health outcomes. The underlying reasons for this are likely to be a combination of

social, environmental, cultural and, to a lesser extent, health services factors[18]. The contribution of health care provision (e.g. NHS services) to health outcomes (e.g. morbidity and mortality) is thought to be in the range of 15-43%[16], with the remainder being driven by wider factors, such as the social determinants of health. In a qualitative study based in the northwest of England, Hanna and colleagues found that stroke survivors often reported a complete lack of visual care and participants reported the need for care personalised to their situation[19]. In a further study, Hanna and Rowe surveyed orthoptist and found that despite the acknowledgement that some patients would benefit from home visits because of a lack of transport, cognitive impairment, stroke or learning difficulties, home visits were rarely offered to this group[20].

While health care inequalities may only contribute indirectly to health outcome inequalities, these inequalities are important. A review by Babatunde and colleagues found that more educated patients from a higher socio-economic group were more likely to use and benefit from direct self-referral physiotherapy services as compared to lower educated patients from lower socio-economic groups who were more likely to be referred by their General Practitioner (GP)[21]. Not only are inequalities in access to services important, but inequalities in experience are also important. Yam and colleagues undertook a qualitative study of the experience of South Asian older adults using occupational therapy services in the UK and found that a predominantly western approach to health and support led to barriers for people from non-western communities[22].

When developing services to address inequalities, caution is needed because some interventions can inadvertently increase inequalities[23], [24]. These intervention-generated inequalities may occur, for example, if an art therapy group is not targeted to those most in need, but rather to the general population with people from more affluent areas choosing to participate and benefit. Similarly, the acceleration in telehealth during the pandemic may not benefit populations equally, despite widening access to the general population[25]. People with certain disabilities, such as those associated with communication or cognitive disorders, will need additional support to benefit from online interventions. For example, a telerehabilitation therapy created for people with aphasia resulted in sustained improvements in social engagement and quality of life, where dedicated components supported participants to use the technology and to communicate[26].

#### 1.4 Policy context

The key role that AHPs have in improving health and wellbeing is being increasingly recognised through documents such as *All Our Health*[27] and *Rethinking the Wider Public Health Workforce*[28] publications. Furthermore, the Royal Society for Public Health and Public Health England published a report in 2015 titled *Healthy Conversations and the Allied Health Professionals* which set out the potential for AHPs to improve the health of the public through taking opportunities to discuss healthy lifestyles[9]. Concurrently, the NHS Long Term Plan, published in January 2019, set out over 20 commitments that explicitly reference AHP services including new models of care, Integrated Care Systems and expansion of the AHP workforce[29].

A UK Allied Health Professions Public Health Strategic Framework has been developed by the Allied Health Professions Federation (AHPF) and Health and Social Care Public Health Agency Northern Ireland, Public Health England, Scottish Government, Welsh Government and Welsh Therapies Advisory Committee[30]. This framework sets out the vision and ambitions for AHPs in relation to public health. Inequalities are a thread throughout the document and one of the ambitions for the period between 2019 and 2024 is increasing recognition of the impact that AHPs can have on inequalities. Two rapid evidence reviews have supported the Strategic Framework through exploring the impact of AHPs on public health outcomes. The first was a review conducted in 2015 (published in 2017) which identified nine examples of AHP interventions resulting in improved public health outcomes through screening interventions, secondary prevention and risk management[31]. The second was undertaken in 2018 (published 2020) and identified further interventions with positive public health outcomes focused on the prevention of secondary problems and disability associated with a primary condition or multiple morbidity[32].

Public Health England's flagship inequalities resource promoting a place-based approach is also applicable to AHPs[33]. Place-based approaches consist of three main aspects, civic-level interventions, community-centred interventions and service-based interventions. The report particularly highlights the need for joint working across each of these areas to maximise the impact on health inequalities.

## 2. Aims and scope

### 2.1 Approaching the problem

An initial scope of the literature suggested that there is little research looking at how AHPs can narrow the health inequality gap. However, conceptualising health inequalities through supporting disadvantaged people to live healthy, meaningful lives, opens a vast evidence base. To navigate this evidence in a coherent manner, we have used the following approach which considers the actions undertaken by AHPs to narrow the inequality gap, support certain disadvantaged groups or address inequalities in social determinants of health. Evidence from non-AHP health inequalities research is also likely to be useful for AHP service re-design and delivery when evidence gaps exist.

Allied Health Professionals	Objectives	Level of action	Outcomes
<ul style="list-style-type: none"><li>• 14 professions*</li></ul>	<ul style="list-style-type: none"><li>• Close the inequality gap</li><li>• Support the most disadvantaged**</li><li>• Address inequalities in social determinants of health***</li></ul>	<ul style="list-style-type: none"><li>• Individual</li><li>• Organisational</li><li>• System</li></ul>	<ul style="list-style-type: none"><li>• Healthcare inequalities<ul style="list-style-type: none"><li>• Access</li><li>• Quality</li></ul></li><li>• Health outcome inequalities<ul style="list-style-type: none"><li>• Mortality</li><li>• Morbidity</li></ul></li></ul>

Figure 2. Approach

\*as per NHSE/I definition; \*\*disadvantaged groups include 1) people living in deprived areas, 2) key protected characteristics (disability, LGBTQ+ and ethnicity) and 3) inclusion health groups (such as homeless and rough sleepers, vulnerable migrants (refugees and asylum seekers), sex workers, and those from the Gypsy, Roma and Traveller communities); \*\*\* social determinants of health refer to the circumstances in which people are born, grow up, live, work, and age

### 2.2 Review aim

To explore the impact of AHP practice on health inequalities, focusing on the following questions:

1. In what ways can allied health professionals decrease or increase health care or health outcome inequalities at an individual, organisational or system level?
2. In what ways can allied health professionals address inequalities in the social determinants of health at an individual, organisational or system level?
3. In what ways can allied health professionals help disadvantaged groups at an individual, organisational or system level?
4. What interventions or principles in non-AHP settings have been found to increase or decrease inequalities and are likely to be effective in AHP settings?

### 2.3 Scope

The intention is to undertake a rapid evidence review focusing on breadth rather than depth. Instead of a detailed systematic review of each of these questions, we aimed to identify the most important and relevant systematic review articles to inform service re-design and delivery, focusing on relevance and rigour, rather than comprehensiveness.

Furthermore, we aim to draw key lessons from the literature by mapping the evidence and abstracting the transferrable principles across AHP groups.

Due to time constraints, inequalities which have arisen *within* the AHP workforce (such as workplace-related stress) or equality outcomes (such as diversity amongst the AHP workforce) are outside the scope of this synthesis, unless there is evidence of their knock-on impact on patients.

### 3. Methodology

The methods are divided into two parts: First, a main review of AHP interventions to address inequalities; second, an ancillary review to identify learning from non-AHP settings. The review was guided by an *a priori* protocol with any changes to the protocol detailed below.

#### 3.1 Stage 1: Main review of AHP interventions to address inequalities

In stage 1, we aimed at answering the first three review questions. To achieve this, we undertook a literature search of peer-reviewed articles, policy and guidance documents and grey literature, in line with established methods[34]. The search focused on systematic reviews published between January 2010 and February 2021. Our electronic search covered MEDLINE, EMBASE, CINAHL, Web of Science and AMED.

Drawing on existing literature, the search strategy included three main groups of search terms: 1) allied health professionals terms based on Fowler-Davis and colleagues [32], 2) equity terms, based on Prady and colleagues and inclusion health terms [35] and 3) quantitative and qualitative review terms adapted from SIGN terms[36]. The search strategy excluded low and middle-income countries as well as conference abstracts. The MEDLINE search terms are shown in Appendix 2 and these were translated for other databases. Search strategies were piloted with the review team and an expert panel of AHPs to ensure breadth and depth with a manageable number of articles to screen.

Titles and abstracts were screened with 20% of records double screened by a senior researcher for quality purposes. Any disagreements were resolved through discussion. Articles were categorised as included, excluded or unclear using Rayyan. All articles categorised as unclear were reviewed by a senior researcher and disagreements resolved through discussion. We used the following inclusion and exclusion criteria:

#### Stage 1 Inclusion criteria

1. Studies which include care or targeted interventions delivered by AHPs
2. Qualitative or quantitative studies
3. Review articles
4. Studies which assess the impact on health care or health outcome inequalities  
OR  
Studies which assess the impact on social determinants of health  
OR  
Studies which are targeted to disadvantaged groups

#### Stage 1 Exclusion criteria

1. Review articles only including low- or middle-income countries
2. Studies published before 2010
3. Quantitative studies without a suitable comparison (e.g. control group, before and after, trend analysis)
4. Articles which do not describe secondary research (e.g. letters and editorials)
5. Conference abstracts

Full-text articles were screened with 20% checked by a senior researcher to ensure consistency and accuracy. All articles selected for inclusion were shared with our AHP experts and any remaining unclear articles were discussed with them to ensure relevance.

Our original intention was to undertake forward and backward citation tracking of the included articles, but the electronic database searches resulted in a large volume of relevant articles and therefore, this step was deemed unnecessary.

A grey literature search was undertaken to identify key documents and reports. We conducted a targeted search for each of the allied health professional roles using an internet browser and a targeted search of relevant organisations' websites (e.g. Royal College of Speech and Language Therapists, Chartered Society of Physiotherapists). Furthermore, we consulted AHP experts to identify any additional key literature which may be important.

Data were extracted from the included articles using a pre-specified data extraction table. Information extracted included aim, study design, target population, AHP group, intervention and key findings. Data were extracted by a single researcher and a second researcher checked for accuracy and completeness. Studies were assessed for quality and risk of bias using the AMSTAR 2 tool[37]. The tool is comprised of 16 quality appraisal domains/items, which are categorised into critical (7 items) and non-critical domains (9 items). Critical domains concern those that significantly affect the validity of reviews' findings and conclusions, for example, registration of a review protocol and reporting any deviations from the protocol and a comprehensive literature search. Non-critical domains include those that might not result in fatal flaws in the review findings and conclusions, for example methods of study selection and data extraction.

Meta-analysis was not possible because of heterogeneity. Therefore, data were synthesised narratively to identify the underlying main themes and principles discussed in the included articles. The synthesis process was led by one researcher, with input from the wider review team and AHP expert panel.

### 3.2 Stage 2: Identifying learning from non-AHP settings

Stage 2 sought to answer the fourth question, namely what interventions or principles in non-AHP settings that have been found to increase or decrease inequalities are likely to be effective for AHPs to implement? The purpose was to identify key lessons through a focused review.

To answer this question, we searched a single electronic database, MEDLINE, covering literature from January 2015 to February 2021. The search strategy had four main parts: 1) equity and inclusion health terms, 2) review terms, 3) broad terms to identify articles which included an intervention or service and 4) terms that related to health care or public health. Titles and abstracts were screened with 20% quality check by a senior researcher using Rayyan.

Broad inclusion criteria were: 1) articles reporting literature reviews, 2) articles which focus on health inequalities, 3) articles which report findings that may be transferable

to AHPs and 4) quantitative or qualitative studies. Exclusion criteria were 1) studies from low- or middle-income countries, 2) studies published before 2015 and 3) conference abstracts.

Rather than formal data extraction, we described the identified articles using a summary table to show the location, setting, population and type of interventions.

Key transferrable lessons were identified and synthesised together by theme and integrated into Stage 1 review findings.



## 4. Stage 1 findings: Impact of Allied Health Professionals on Health Inequalities

### 4.1 Search results

A total of 8,727 records were screened, leading to the review of 97 full text papers. Thirty-six records were included in the final synthesis (see Figure 3). The main reasons for excluding full text papers were because articles were not relevant to AHPs, not reviews, there was no inequalities angle, or it was a conference abstract.

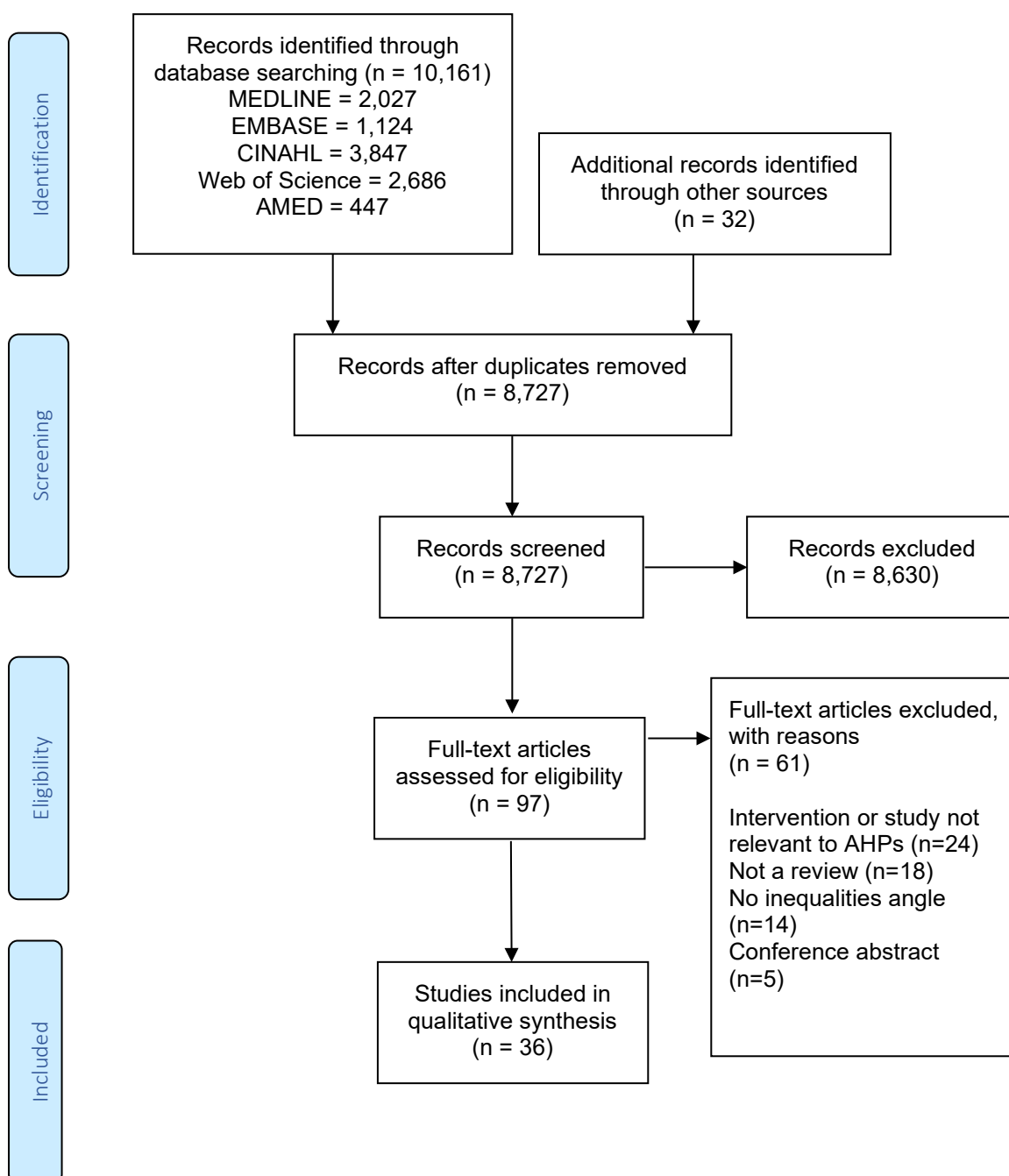


Figure 3. PRISMA search flow diagram

#### 4.1.1 Review characteristics

Thirty-six reviews, published between 2011-2020, were included. Twenty (55.55%) reviews were systematic reviews, 11 (30.55%) scoping reviews, three (8.33%) integrative reviews and two (5.55%) narrative reviews. Most of the reviews included international literature (n= 30; 83.33%), with only five (13.89%) reviews focusing on the USA and one (2.78%) focusing on the UK. Reviews included studies of qualitative, quantitative, and mixed methods designs. The number of studies reviewed across the 36 reviews in this synthesis ranged from 4 to >900. A summary of included studies is provided in Table 1.

Table 1. Summary of included reviews (N= 36)

Characteristics		Number of reviews (%)
Location(s) of included studies	International	30 (83)
	US	5 (14)
	UK	1 (3)
Review type	Systematic	20 (56)
	Scoping	11 (31)
	Integrative	3 (8)
	Narrative	2 (6)
Number of studies included	<10	4 (11)
	10-30	18 (50)
	31-50	4 (11)
	51-100	6 (17)
	>100	4 (11)
AHP groups in focus	Mixed AHPs	11 (31)
	Occupational therapists	8 (22)
	Dietitians	5 (14)
	Radiographers	4 (11)
	Art or music therapists	4 (11)
	Physiotherapists	3 (8)
	Podiatrists	1 (3)
Target population	Mental health	6 (17)
	Ethnic minority groups	6 (17)
	Mixed disadvantaged populations	5 (14)
	Rural populations	4 (11)
	People with disabilities	4 (11)
	People who are homeless	3 (8)
	Lower socio-economic groups	3 (8)
	Offenders or those at risk of offending	1 (3)
	Sexual and gender minorities	1 (3)
	Autism	1 (3)
	Women	1 (3)
	Intimate partner abuse	1 (3)
Focus of interventions	Routine AHP services	28 (78)
	Health promotion	2 (6)
	Workforce intervention or placements	2 (6)
	Telehealth	2 (6)
	Depression support specific interventions	1 (3)
	Decision making	1 (3)

<b>Relevant outcomes reported</b>	Access and use of services	10 (28)
	Mental wellbeing	7 (19)
	Employment, employability and life skills	5 (14)
	Inclusive care and implicit bias	4 (11)
	Diabetes outcomes	3 (8)
	Functioning or mobility	2 (6)
	Weight or dietary outcomes	2 (6)
	Recruitment of workforce	2 (6)
Health promotion	1 (3)	

Full details of the included studies are shown in Appendix 3 (Table A1).

#### 4.1.2 Study quality (risk of bias)

Assessment of study quality for all included studies is reported in full in Appendix 4 (Table A2). Of the 36 studies, 22 (61%) were of critically low quality, six (17%) of low quality and eight (22%) of moderate quality. None of the included studies were judged to be of high quality. No study was excluded due to methodological quality.

##### AMSTAR 2 non-critical domains (items 1, 3, 5-6, 8, 10, 12, 14, 16)

All but one study (Walsh et al., 2020) described their review questions/objectives following PICO (Item 1). Over half (n= 20; 56%) of the articles provided justification for the study designs included in their reviews (Item 3). Over half of the reviews (n= 20; 56%) performed study selection in duplicate (Item 5), whereas, just under half of the reviews (n= 16; 45%) performed data extraction in duplicate (Item 6). Most of the reviews described the studies included in their analysis in detail, with only four (11%) not doing so (Item 8). A quarter (n= 9) of reviews reported the funding sources of studies included in their reviews (Item 10). Most of the reviews (n= 31; 86%) in this synthesis did not undertake a meta-analysis (Items 11-12). Several reviews (n= 8; 22%) acknowledged and discussed the heterogeneity in the studies synthesised (Item 14).

##### AMSTAR 2 critical domains (items 2, 4, 7, 9, 11, 13, 15)

Four reviews (11%) had written a protocol prior to undertaking the review (Item 2). Except for four reviews (11%), all reported conducting comprehensive literature searches (Item 4). Eight reviews (22%) provided explanations for excluding individual studies (Item 7). Over half (n= 20; 56%) of the included reviews assessed risk of bias or study quality in included studies (Item 9). However, risk of bias of individual studies was not considered in most of the reviews (n= 23; 64%) as part of interpreting review findings (Item 13). Most reviews did not undertake meta-analyses to synthesise included studies and therefore did not discuss the potential impact of publication bias on their findings (Item 15). Finally, over half (n= 21; 58%) the included reviews declared potential sources of conflict of interest, including funding sources (Item 16).

#### 4.2 Key findings

The reviewed literature included a considerable volume of studies reporting on AHPs' impact on improving access to high quality physical and mental care for disadvantaged groups, supporting the social determinants of health, ensuring the equitable distribution of workforce and the representation of marginalised groups. Therefore, although evidence on the direct impact of AHPs on inequalities in health

outcomes between groups is lacking, we can draw a series of useful conclusions regarding the ways AHPs can contribute to narrowing health inequalities between groups in society. We have mapped this evidence and extracted the key transferrable principles. The themes presented below demonstrate the breadth of impact that AHPs can have on health inequalities. Due to the heterogeneity of the settings, professionals, interventions and population groups, the themes represent patterns in the data that have application to most, or all, AHP groups. Full details of the main results of the included studies are shown in Appendix 5 (Table A3). The existing evidence on the impact of AHPs on health inequalities can be mapped at patient and organisational level or system level (see Figure 4). Based on an exploration of non-AHP literature (see Stage 2), it is also likely that there is a cross-cutting theme related to community engagement and a system-level theme related to equal distribution of funding. These factors are included in the diagram below and explained in Stage 2.

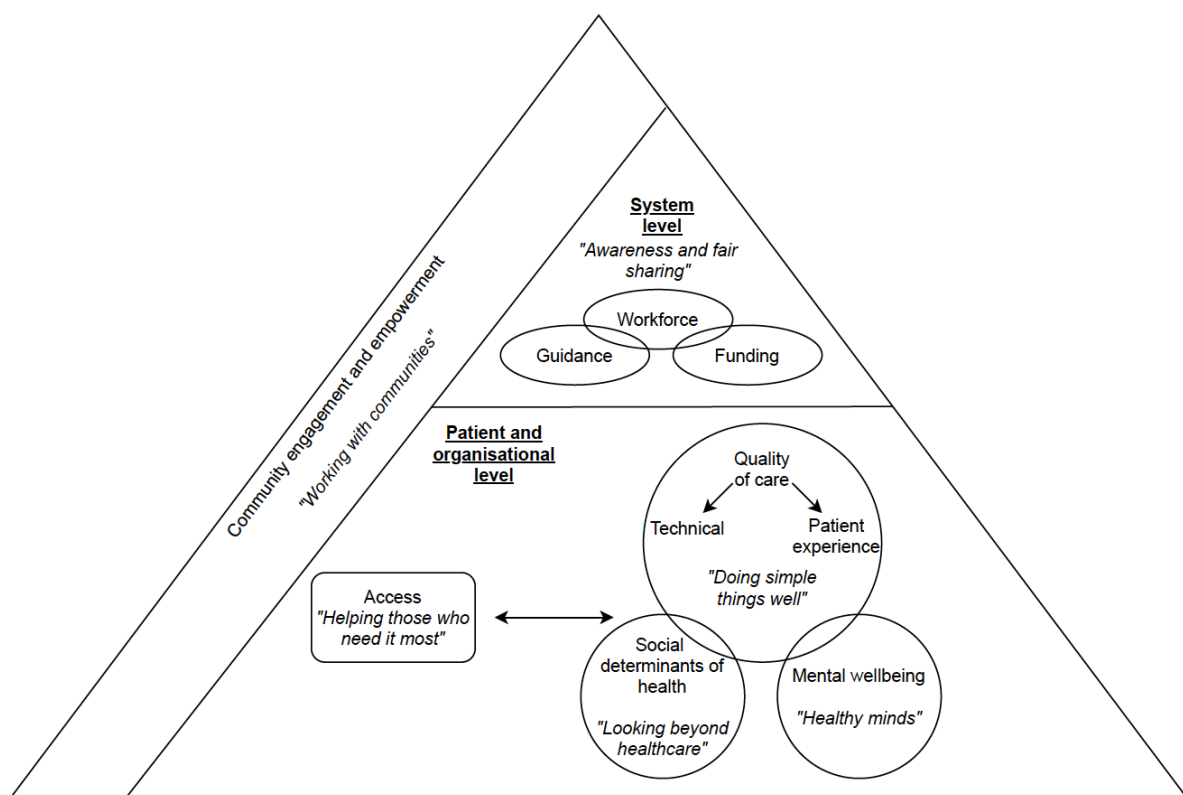


Figure 4. Map of evidence relating to how AHPs can impact health inequalities

#### 4.2.1 Patient and organisational level

##### *Access – “Helping those who need it most”*

Much of the AHP health inequalities literature focused on interventions ensuring that people from disadvantaged backgrounds were able to adequately access and use services. In this section, we present a summary of the findings.

Overcoming rural or transport inequalities through telehealth was highlighted by three studies. Speyer and colleagues (2018) included 43 studies across all AHP

groups and found that telehealth provided by AHPs was as effective as face-to-face care and in fact, when a combination of cognitive and physical approaches was used, telehealth was more effective[38]. Also, Camden and colleagues (2020) included a range of AHPs providing paediatric rehabilitation across 23 studies and found that tele-rehabilitation improved behavioural functioning compared to usual care or being on a waitlist[39]. Moreover, Dennis and colleagues (2020) focused on the provision of rapid access to radiotherapy for people in rural areas and especially those with a cancer centre[40]. The exact programmes depended on local needs but generally involved same-day consultations, treatment planning and delivery, aiming at reducing travel and expediting therapy. The authors concluded that rapid access radiotherapy improved access for the targeted groups and older people.

Helping people with serious mental illness to obtain the care they need for physical and mental wellbeing was the focus of two reviews. Arbesman and colleagues (2011) and Ikiugu and colleagues (2017) assessed the provision of occupational therapy for people with mental health problems[41], [42]. Ikiugu and colleagues undertook a meta-analysis of 11 studies and found that occupational therapy (compared to control) for people with mental health problems improves occupational performance among people with serious mental illness[42]. Similarly, Arbesman and colleagues found that occupational therapy for people with mental health problems in the form of individual placements support cognitive and social skills training[41]. They found goal setting was particularly effective in helping people with serious mental illness to obtain work.

Ackerman and colleagues (2012) explored the provision of arthritis services for people across the socio-economic gradient[43]. Six of the included studies focused on AHPs. Based on data from the Netherlands and the US, the authors suggested that although people with lower educational attainment had a greater self-perceived need for physiotherapy and occupational therapy, they were less likely to access allied health services. Similarly, Flores and colleagues (2020) assessed access to physiotherapy for ethnic minority groups in the US and found inequalities across various conditions including post-stroke rehabilitation, hip fracture rehabilitation, spinal cord injury care and traumatic brain injury care[44]. The authors suggested that inequalities in access were likely to have a subsequent impact on outcomes. In contrast, based on 10 studies from the US, Vang and colleagues (2018) found that mobile mammography was more likely to be used by ethnic minority groups and those on lower incomes[45].

Furthermore, several reviews focused on specific disadvantaged groups, such as homeless people, people on the autism spectrum or with disabilities, offenders or those at risk of offending, and those who had experienced intimate partner violence. Roy and colleagues (2017; n= 178) focused on access to occupational therapy for people who are homeless and found improving access can help to build environments and opportunities to support occupational engagement, whilst also advocating for long-term housing solutions[46]. Similarly, Marshall and colleagues (2020, n=11) looked at access to occupational therapy for people who were homeless and had transitioned to long-term housing[47]. They found evidence for the important role that occupational therapists play in improving life skills and supporting engagement in meaningful activity for people who have experienced homelessness. To and colleagues (2016) reviewed the evidence for podiatry

services for homeless people [48]. Based on 17 studies, they found that despite the high prevalence (9% to 65%) of foot problems among homeless people, there appeared to be a reluctance to access podiatric services because of embarrassment. Instead, the same groups received foot care in a range of settings, including shelters, general medical and foot clinics, medical centres, drop-in services, and emergency departments.

Dallman and colleagues (2020) reviewed access to AHPs for people on the autistic spectrum[49]. Evidence from 19 studies showed that older children, those with less severe autism symptoms, from an ethnic minority background and parents with lower income or education were less likely to receive allied health services. Moreover, King and colleagues (2014) in a review of 16 studies on access to dietitian support for people with disabilities, found that access to nutrition interventions was associated with improvements in self-efficacy and health behaviours, including healthier eating habits and more frequent physical activity[50].

Daykin and colleagues (2012) examined access to music therapy for people in youth justice settings[51]. The authors reviewed both quantitative (n=6) and qualitative studies (n=5) and found mixed results suggesting that the impact was contingent on the extent to which people felt ownership of the music. Further, Duffy and colleagues (2014; n=3) explored the impact of complementary and alternative therapies, including music therapy, on people with experiences of intimate partner abuse[52]. They found that music therapy was associated with lower anxiety and better sleep compared with a control of lying quietly for 20 minutes.

Finally and in contrast to the majority of the reviews discussed, McGill and colleagues (2015) reviewed 36 articles on healthy eating interventions, and found that downstream interventions, especially dietary counselling, seemed to increase socio-economic inequalities in fruit and vegetable consumption, cholesterol and weight[53].

#### *Quality of care – “Doing simple things well”*

Reviews also highlighted the importance of providing quality care to disadvantaged groups in addressing health care inequalities, which in turn are likely to have a subsequent impact on inequalities in health outcomes. There were two main subthemes: inequalities in technical quality (e.g., improving clinical markers) and patient experience. This section offers an overview of the most important findings.

#### *Patient experience*

Several studies explored inequalities in patient experience affecting disadvantaged groups when accessing AHP services. Most of these focused on avoiding bias in decision making and delivering culturally tailored services. Regarding bias, Featherston and colleagues (2020) assessed 149 studies exploring biases in decision making by AHPs through vignettes/hypothetical clinical scenarios[54]. They identified studies focusing on bias related to stereotyping on the basis of sex/gender or sex roles (n= 40), racial/ethnic status (n=35), socioeconomic/class status (n= 26), age (n= 8), sexual orientation (n= 5), health status (n= 3), mental health (n= 2), weight (n= 1), speech intelligibility (n= 1), drug use (n= 1), and type of child maltreatment (in the context of child protection reports) (n= 1). There were also

studies focusing on other types of bias; namely, anchoring bias (over-relying on pre-existing information), confirmation bias (looking for evidence that is consistent with one's existing belief), diagnostic overshadowing (assuming that an individual's symptoms are part of an existing condition, such as learning difficulties, rather than a new health problem) and labelling bias (having expectations of a patient because of their personal characteristics). These biases impacted AHP treatment decision-making and the way they provided care, leading to inequalities in the patient experience. Van de Venter and colleagues (2020) undertook a review of ways in which radiographers can foster a more inclusive healthcare environment for sexual and gender minorities[55]. Based on four studies, they suggested three key principles to ensure inclusion of sexual and gender minorities, namely, the use of inclusive language, relevant education during undergraduate studies and continuing professional development, and ensuring an affirming and welcoming health care environment.

Coming to culturally tailored services, a review of physiotherapy for people with persistent pain from culturally and linguistically diverse communities, by Yoshikawa and colleagues (2020), revealed six main themes pointing to the need for cultural tailoring[56]: (a) language competence, (b) active and passive strategies, (c) gendered influences on pain management, (d) cultural-spiritual beliefs, illness perceptions and expression of pain, (e) satisfaction with treatment and (f) access to physiotherapy. By the same logic, White and colleagues (2020) reviewed 25 studies on how occupational therapists work better with indigenous people and found that while access was important, shifting away from western cultural assumptions was crucial for the cultivation of reciprocal relationships[57]. Finally, Miller and colleagues (2019) reviewed barriers to breast screening for ethnic minority women in the US[58]. Drawing upon 28 studies, they described a number of barriers including lack of respect and rudeness from technicians and unsuitable appointment times.

#### Technical quality of care

Several studies highlighted the need to provide a high level of technical quality of care which is often compromised by the same mechanisms that affect patient experience. For example, stereotyping and biases in decision making not only impact on the patient experience but can also lead to misdiagnosis and poor management plans[54].

Three studies focused on the role of dietitians in diabetes care. Nam and colleagues (2011) assessed the effectiveness of culturally tailored diabetes education interventions on glycaemic control for ethnic minority groups with diabetes[59]. After reviewing twelve studies, they found that culturally tailored interventions statistically significantly reduced HbA1c by 0.29 compared to usual care. Similarly, Maez and colleagues (2014) examined 15 studies on how to reduce HbA1c levels among patients living in rural areas, and found that nutritional education by dietitians, including remote consultations, improved diabetes outcomes[60]. Finally, Carolan-Olah and colleagues (2017) reviewed gestational diabetes interventions for Hispanic women[61]. Based on seven articles, they concluded that language and culturally adapted nutritional interventions are more likely to be effective for ethnic minority groups.

Needle and colleagues (2011), the only review focusing on UK literature, described evidence of health promotion activity by AHPs in a number of settings but could not draw conclusions given the heterogeneity and limitations of the evidence[62]. Tentative recommendations included health promotion to be a standard component of daily AHP practice, but called for rigorously theorised, systemically developed and robustly evaluated interventions. They also advocated for the importance of adapting delivery including the adoption of social marketing and other behaviour change approaches to optimise quality of care.

#### *Social determinants of health – “Thinking beyond healthcare”*

The literature also provided evidence that AHPs have a role to play in enabling access to the wider social determinants of health. For example, there is considerable evidence on how occupational therapists can contribute to people accessing housing and employment. However, it is likely that several other AHP groups can have a similar, though indirect contribution, by improving individuals' mental and physical health, functioning and communication skills. Moreover, current literature suggests that social determinants of health are important for the effectiveness of interventions and therefore should be addressed by the AHPs[63].

Two reviews explored the connection between occupational therapy and employment[64], [65]. Desiron and colleagues reviewed six articles of mixed quality and suggested that occupational therapy interventions, as part of rehabilitation programmes (e.g., for low back injuries, depression, whiplash or traumatic brain injury) increase return to work rates[64]. However, Hand and colleagues in their review focusing on cardiovascular diseases, cerebrovascular disease, chronic obstructive pulmonary disease (COPD), depression, osteoarthritis (OA), and rheumatoid arthritis, reported that out of a total of 16 studies, four focused on participation in work, of which only one found an improvement in return to work among adults with major depression[65].

From a different angle, Moorcroft and colleagues (2019) undertook a review of barriers and facilitators to the provision and use of augmentative or alternative communication (AAC) systems for people with complex communication needs and their families[63]. AAC systems are introduced to supplement or replace verbal communication through low tech means (such as pointing to pictures) or high-tech electronic devices. The authors reviewed 43 articles and described the impact of wider determinants of health on the effectiveness of AAC systems, such as financial resources, suitable home environments, children who frequently move school and cultural background. The authors highlighted the need for health professionals to modify interventions in light of the wider determinants of health and work in partnership with communities to address these.

#### *Mental wellbeing – “Healthy minds”*

The ability of AHPs to support the mental health of disadvantaged groups was a dominant theme in the reviewed literature. For example, a report by Fancourt and Finn (2019) for the World Health Organisation (WHO) Europe highlighted the importance of art and music therapy for people with severe mental health problems[66]. The authors found a positive impact of art therapy on the mental health of pregnant women with anxiety and depression, in patients with severe mental illness, people with eating disorders and those who have experienced



trauma. The authors also found positive impacts of music therapy on mothers with post-partum psychosis, adolescents with depression and anxiety and people with sleeping disorders. Similarly, Uttley and colleagues (2015) assessed the effectiveness of art therapy for people with non-psychotic mental disorders and found that in 10 out of 15 included trials, there was a positive change in mental wellbeing in the art therapy group[67]. In an economic evaluation, the authors found that art therapy was also cost-effective compared to a waiting-list control.

Additionally, Baker and colleagues (2018) studied rehabilitation interventions aiming to address depression in patients with aphasia after a stroke[68]. The authors reviewed 43 studies and found that only few studies reported whether or how researchers adapted communication to make interventions more accessible to people with aphasia. However, supported communication techniques were described in some studies; for example, in one study speech and language therapists acted as “communication brokers” to support mental health interventions. D’Amico and colleagues (2018) focused on the provision of occupational therapy for people with a serious mental illness[69]. Based on 61 articles, the authors concluded that interventions focused on client-centred goals, especially with cognitive and social-based components, demonstrated better outcomes in all performance areas and social participation than programs with general expectations. Finally, Cherak and colleagues (2020) assessed the provision of dietitian support to people with mental health problems across 69 studies and found that it improved their condition; highlighting the role of dietitians in improving mental health[70].

#### 4.2.2 System level – “Awareness and fair sharing”

Three reviews highlighted AHP system-level factors that reflect health care inequalities, and ways to address them: two were related to recruitment of AHPs in underserved areas and one to inclusive clinical guidelines. Walsh and colleagues (2020) looked at the uneven distribution of allied health care staff across rural areas and interventions to promote recruitment and retention[71]. They identified 21 relevant studies examining interventions such as education strategies (n=27), regulatory change (n=11), financial incentives (n=6), personal and professional support (n=4), and approaches with multiple components (n=3). The studies were too heterogenous to draw clear conclusions, however, the authors suggested that a multifaceted approach alongside longitudinal evaluation is most likely to address workforce inequalities. Moran and colleagues (2020) focused specifically on placements in underserved rural areas for allied health students[72]. Based on 18 included studies, the authors found some evidence about the retention of staff through supported rural clinical placements, especially when the motivation for the placement, such as community development, was incorporated into the placement model.

Rathbone and colleagues (2020) examined the extent to which sex and gender considerations were included in low back pain physiotherapy clinical practice guidelines[73]. The authors identified 36 published clinical guidelines, but only 15 included sex and gender terms. Of these 15, nine referenced sex or gender in relation to epidemiology, risk factors or prognostic factors and only five included diagnostic or management recommendations.

## 5. Stage 2 findings: Learning from non-AHP settings

The purpose of the second literature search was to identify transferrable learning from non-AHP settings. A database search identified 1,723 articles which after the deletion of duplicates were reduced to 1,690. The screening of titles and abstracts resulted in 57 articles for full text screening. Of these, 29 articles were included for the data synthesis (see Appendix 6 for flow diagram, Figure A1).

### 5.1 Overall description of studies

The majority of the identified reviews concerned targeted interventions to disadvantaged groups including immigrants, racial and ethnic minorities, individuals with low socio-economic status, chronic conditions or in remote or rural areas, as well as older, LGBTQ+, or homeless people and people who deal with intersectional disadvantage across these categories (e.g., older people in rural areas), as shown in Table 2. Overall, the majority of the discussed evidence in the reviews concerned the US context and although it provides some useful directions towards the development of successful interventions for reducing health inequalities, the transferability is unclear. In the following sections, we summarise the principles which could inform AHP inequalities-reducing interventions.

Table 2. Summary of included reviews in non-AHP settings (n=29)

<b>Characteristics</b>		<b>n reviews</b>
<b>Location(s) of included studies</b>	US	22
	UK	10
	Australia & New Zealand	9
	Canada	8
	One or more European countries	5
	International High-Income Countries	4
	One or more Asian countries	2
	One or more African countries	1
	Low Middle-Income countries*	1
<b>Target population</b>	Migrants, ethnic and racial minorities	18
	People with chronic conditions or disabilities	6
	Low socio-economic position groups	4
	Homeless & socially vulnerable	3
	People in rural or remote areas	3
	Multiple disadvantaged groups	2
<b>Focus of interventions</b>	Digital interventions	5
	Community engagement	4
	Psychosocial	4
	Communication and cultural tailoring	3
	Behavioural	3
	Health promotion (literacy & screening)	3
	Patient navigation & peer support	2
	Other	5
<b>Setting</b>	Multiple settings	8
	Community and clinical	8
	Community	7
	Primary Care	4
	General Practice	2
	Mental health	1

\*Included as part of an international review

## 5.2 Community engagement and empowering services

Studies from non-AHP settings seem to agree that the reduction of health inequalities calls for an intersectoral, multi-disciplinary strategy[74] and highlight the importance of linking mechanisms between health care services and communities[75], [76]. Findings suggest that interventions which aim to create and maintain bridges between health care settings and community-based resources improve patients' social and psychological well-being and reduce healthcare services use[75]. Such interventions are particularly important because they address the psychosocial needs of patients and are more likely to be aligned with their cultural context and references[77]. Although robust findings are still scarce, preliminary evidence suggests that engaging members of disadvantaged communities in the design and delivery of interventions does not only serve the intervention's success, but it is also an empowering mechanism for the whole community, since its members eventually gain greater control over their health and its determinants[78]. Healthcare providers play a crucial role in building and maintaining these bridges by referring patients to community services, nurturing collaborations, adopting a whole community approach, engaging families and hosting programmes in group format[77], [79], and engaging with employers to promote employment as a social determinant of health[80]. The use of trauma-informed care and advocating for health and structural interventions by health care organisations is important in addressing inequalities, especially when working with groups who have been extensively exposed to marginalisation, dehumanisation and exclusion like homeless people[81] and/or refugees[82].

## 5.3 Funding allocation

A review of funding schemes by Tao and colleagues (2016) found that reimbursement and pay-for-performance schemes in primary care appear to have a limited impact on socioeconomic and racial inequalities in access, use and quality[83]. However, based on a UK study by Barr and colleagues which found that need-based resource allocation reduced inequalities in mortality amenable to health care[84], the authors highlighted that the greatest impact may be due more equitable funding allocation.

## 5.4 Personal guidance & support

Services designed to offer personal guidance to disadvantaged groups in their attempt to navigate care systems tend to have a positive outcome in terms of disease prevention and risk management. Specifically, a meta-analysis of 37 studies of patient navigation interventions for colorectal, breast and cervical cancer screening in disadvantaged populations showed that regardless of the type of cancer screening and the elements of the navigation, patient navigation helps patients overcome multiple types of access barriers and increases screening rates[85]. Patient navigators aim to address patients' needs during the course of care and may have a wide range of roles, from providing medical aid to offering advocacy services. A review on evidence-based behavioural intervention strategies for Latinos in the US showed that interventions engaging a trained community member to act as an advocate, educator, mentor and/or outreach worker to provide basic health education to the community can effectively reduce cardiovascular risk factors among at-risk individuals[86]. Similarly, offering practical assistance and

financial support has also been associated with successful interventions especially among ethnic minorities. Available evidence indicates that financial incentives should be used in a broader frame of encouraging patients to utilise healthcare services and as a tool for the removal of access barriers[77], such as stipend payments, covering travel expenses, and/or providing childcare and subsistence rather than as a motivational or rewarding mechanisms for providers[83].

### 5.5 Cultural appropriateness

Complementing the evidence from the AHP-specific literature, the majority of non-AHP setting studies highlighted the importance of the cultural context of the targeted populations and the extent that care and interventions account for it. Studies focusing on racial and ethnic minorities provide evidence that linguistically and culturally tailored interventions are likely to increase mental health treatment participation[87], participation in cancer screening[88], disease knowledge, objective clinical outcomes, and access to and satisfaction with services for patients with chronic illnesses[89]. In terms of what cultural tailoring involves, the studies discuss a series of practices that range from the use of simple and culturally appropriate language[87], [90] and appropriate use of interpreters, to incorporating specific cultural practices in the programs and services and integrating patients' worldviews, explanatory models and preferences[77]. Especially regarding the latter, Baker and colleagues (2016) in their review on effective ways to reduce the impact of depression and anxiety among culturally and linguistically diverse communities highlight that patients' cultural and linguistic background relates with the way they understand their condition, its origin and development[77]. It is therefore crucial for the practitioners to engage with these cultural contexts in order to ensure that medical concepts and treatment practices are effectively understood and accepted.

Ehrlich and colleagues in their systematic review on the impact of culturally responsive self-management interventions on health outcomes for minority populations with chronic conditions, found that the cultural adaptation of educational and health promoting interventions does not necessarily imply positive outcomes[91]. The extent to which the desired outcomes of the intervention are culturally relevant and meaningful for the targeted population is also important. They stress that western cultural constructs like self-management are neither always relevant to ethnic minority and indigenous populations nor understood as desired outcomes. They conclude by suggesting that practitioners and healthcare systems should work together with service users in order to extend their cultural health capital (i.e., their ability to provide care to patients with diverse cultural backgrounds).

Cultural appropriateness seems to be a crucial factor in the success of conventional and digital health literacy interventions as preliminary evidence shows both that these types of intervention are more likely to have positive outcomes when they are tailored to the needs of the targeted groups[79] and they are more likely to fail if they do not take into consideration the targeted groups' relation with technologies[92].

## 6. Discussion

### 6.1 Summary of principal findings

Our review showed that despite the limited evidence regarding the direct impact of AHPs on inequalities in health outcomes between groups or across the socio-economic gradient, there is a large body of research describing how AHPs can impact on health outcomes inequalities indirectly. Furthermore, by reviewing relevant research in non-AHP settings, we identified a series of useful findings about effective ways to address and reduce inequalities which are likely to be transferable to the roles of AHPs. In order to present this evidence in a coherent way, we organised the patterns found in the data into patient and organisational, and system level themes which are applicable across the different AHP groups and can be translated into actions. The themes at the patient and organisational level concerned: 1) more equitable access to allied health services, 2) high-quality care and patient experience, 3) addressing the social determinants of health and 4) supporting mental wellbeing; at the system level: 1) ensure equitable distribution of workforce and funding 2) better representation within clinical guidelines; and engaging and empowering communities was important at all levels. Risk of bias assessment found that the studies were generally of low quality.

### 6.2 Strengths and limitations

A major strength of the review is that we have been able to take a broad view of the literature and identify key patterns and principles in the data. The focus on breadth, rather than depth, allowed us to highlight the extent of the impact that AHPs can have on health inequalities through multiple pathways. A further strength is that a conceptual approach to health inequalities was agreed in the protocol, making clear the various levels of action for addressing these and related outcomes.

Despite the importance of our findings, there are a number of limitations in this review. First, the review was not systematic and therefore, we may have missed important studies. While our intention was to address the key areas in the field, rather than identifying every relevant study, we cannot be certain that important studies were not excluded. The review focused only on systematic reviews to ensure that we could cover the breadth of literature within the project timescales. This means that there may be relevant primary studies which were not included in our selected reviews. However, we are confident that by undertaking an additional broad grey literature search, seeking advice from experts in the field and co-designing the search with an experienced information scientist, we minimised the risk of missing key studies.

Second, our review covered international literature from primarily high-income countries, and it is likely that study results from non-UK studies may be less generalisable to the UK. However, we intentionally abstracted data to a transferable level to ensure relevance to the UK and across a range of AHP groups. For example, poor access to allied health services in the US due to the lack of health insurance for underrepresented groups is not relevant to the UK setting, but the broad principle of ensuring adequate access to care for underrepresented groups is.

Third, a number of the identified themes, such as equitable funding and workforce, and delivering high-quality care to disadvantaged groups, are applicable across all AHPs, however, some of the themes are more relevant to some professions than others. For example, addressing the social determinants of health is more relevant to occupational therapists. Finally, due to time constraints, we did not undertake a formal data extraction and quality assessment of the non-AHP literature but rather narratively described the learning and informally assessed the quality. However, we consider that the way we have chosen to integrate and present the data in terms of broader themes is consistent with the literature, meaningful for all the relevant professions and useful for the extraction of conclusions regarding potential ways that AHPs can contribute to the reduction of health inequalities.

### 6.3 Interpretation of the results

Our findings demonstrate the impact that AHPs can have on health care inequalities and indirectly on health outcomes inequalities, although their direct impact on the inequality gap in health outcomes cannot be quantified due to limited evidence. It is clear from the literature that ensuring equitable access to allied health services is a key strategy. This may mean targeting services to specific disadvantaged groups, such as homeless people, and developing culturally appropriate services for ethnic and racial minorities which are co-designed with the communities with cultural humility.

Ensuring high-quality care when disadvantaged groups access allied health care is also a key theme in the literature. The review highlighted two different aspects of quality; technical quality in terms of meeting performance standards[59], and patient experience affected by, for example, stereotyping[54]. Quality of care is also linked to access, with patients who expect poor quality care (due to previous personal experience or that of friends and family) being less likely to access care[93].

The importance of supporting access to services for people with severe mental health problems and incorporating mental health considerations into routine allied health care is another key theme, although more relevant to certain professions than others. Access to health care is vital for people with severe mental health problems because they are known to suffer worse physical health outcomes compared to those without mental health problems[94]. Certain AHPs, such as art and music therapists, have a direct impact on mental health[66], but it was clear that most, if not all, AHP roles could help patients' mental health[42].

The research exploring allied health services and their impact on the social determinants of health primarily focused on occupational therapists in relation to housing and employment. This may be because the existing research on AHPs tends to focus on short- and medium-term biomedical outcomes, rather than social ones. Furthermore, it is not clear if the occupational interventions which improve employment address the unequal distribution of the social determinants of health or support the general population to return to work.

Moreover, the review showed that there was a greater body of literature discussing the patient and organisational level factors compared with system factors. This may be because it is easier to undertake patient-level research or allied health professionals feel they have less ability to influence system factors.

Finally, engaging with and empowering communities was alluded to in the AHP literature but articulated to a greater extent in the non-AHP literature. This may reflect the limited research exploring partnerships between allied health services and communities or non-health care organisations, or that this type of literature was not identified through the search.

#### 6.4 Comparison with other studies and frameworks

We could not find any similar reviews, but there are a few existing reviews and policy documents which examine the impact of AHPs on public health outcomes. Fowler-Davis and colleagues (2017) undertook a review and survey of the contribution of AHPs to the wider public health workforce[31]. The authors identified nine evidence-based interventions as examples of good AHP practice. Three of these included actions on the social determinants of health. Orthoptic-led school entry vision screening and speech and language therapy in children were associated with better school, work and education outcomes and physiotherapy for incontinence was found to help work retention in pregnancy or maternity. This review was updated and published in 2020[32]. The update identified two main areas of intervention: health intervention/public health and secondary prevention/health improvement. In this updated review, the authors did not identify any interventions that could be categorised as addressing the social determinants of health. Regarding our review, the types of services and interventions we identified relating to the social determinants of health tended to focus on occupational therapists as discussed above.

In 2019, a UK Allied Health Professions Public Health Strategic Framework was published[30]. The framework highlights the potential impact that AHPs can have on public health and health inequalities through supporting the wider determinants and health protection, such as screening, immunisations, infection prevention and control, appropriate use of antibiotics and radiation protection. In this review, we found a few studies examining the wider determinants as described above. We also included studies related to screening, but not the other aspects of health protection that are referred to in the strategic framework.

The CLEAR Collaboration published a framework for health professionals examining how the social determinants of health could be addressed in clinical practice[95]. While the framework does not explicitly refer to AHPs, some of the principles are relevant. The authors suggest that action should be at the patient, organisation and community level, similar to what we have found. Actions included asking about social challenges, referring patients, improving access to quality care for underserving patients, using social navigators, partnering with community groups and advocating for social change. We found evidence for improving access to quality care, use of navigators and community engagement. Asking patients about social challenges and referring patients has a greater evidence base in primary care where social determinants of health can be screened for[96]. We did not find any research assessing the impact of AHPs advocating for social change.

Interestingly most of these existing reviews and frameworks do not focus on the health care inequalities, such as inequalities in access, quality and experience.



## 6.5 Policy and practice implications

There are a number of policy and practice implications arising from this review.

First, equitable and targeted access to allied health services is key for AHPs to have the opportunity to address health and health care inequalities. However, we could not identify research or routine data describing access to allied health services in the UK by socioeconomic group, ethnicity or inclusion health group. We recommend a national review to assess inequalities in access to allied health services, focusing first on socio-economic and ethnic minority groups. To accompany an assessment of inequalities in access, we also recommend a programme of equity-focused quality improvement projects at the organisational level to ensure that all patients are receiving the same high-quality care, both in terms of technical care and patient experience.

Second, we identified actions at a patient, organisational and system level. Addressing inequalities in health care and health outcomes is likely to call for action at all these levels. Patient and organisation level actions should focus on ensuring equity of access and high-quality patient experience for disadvantaged groups and supporting the social determinants of health. System level actions should aim to ensure a fair distribution of working and funding and ensuring the underserved groups are included and their needs are addressed in national guidance. For example, Diplock and Mehta have recently evaluated a pilot service to provide eye care for people with severe/profound learning disabilities and called for a nationally funded eye care pathway for adults with learning disabilities[97]. Workforce and funding should be distributed according to patient need taking into account physical, mental and social factors, rather than by head of population.

Third, services should be designed and delivered in culturally appropriate ways. This does not simply mean adapting services for different ethnic groups, but rather fundamentally rethinking the intrinsic, predominantly biomedical, western approach to health which may not be equally shared with all communities. For example, we found evidence that self-management may appeal to communities from a western background, but not to other communities. This links with our findings around community engagement and empowerment to co-design services. Importantly, community engagement should involve long-term, reciprocal partnerships with communities, rather than isolated co-design and engagement events.

Finally, an economic assessment is needed to understand the distributional costs and benefits of AHP actions and identify where resources should be used to maximise the impact on inequalities both for the health care system, partner organisations, communities and individuals.

## 6.6 Future research

There are a number of research recommendations arising from this review.

First, due to time constraints this review has only been able to map the evidence around AHPs and health inequalities. Future research should seek to build the evidence base for specific inequalities for certain groups. For example, reviewing the

primary research for physiotherapy interventions which improve the quality of care for socio-economic and ethnic minority groups or occupational therapy interventions which improve access to health care for disadvantaged groups.

Second, more research is needed to understand the contribution of allied health professionals to the unequal distribution of the social determinants of health. Broadly, this means AHP research including social outcomes in addition to traditional biomedical ones. A focused review examining primary studies of key pre-specified social determinants of health would be appropriate. For example, this may include a focus on the impact of AHPs on employment, housing, social participation and education. Importantly the review should examine the unequal distribution of the social determinants of health, rather than solely looking at the social determinants of health.

Third, more research is needed to understand how to meaningfully co-design allied health services with communities. Existing efforts to co-design services should be evaluated to identify the guiding and transferable principles. Alongside this, there should be an assessment of the resources required for adequate community engagement and identification of the short- and medium-term outcomes.

## 7. Conclusions

There is a lack of evidence regarding the direct and independent impact of AHPs on inequalities in health outcomes between groups or across the socio-economic gradient. However, there is a large body of research describing how AHPs can impact on health outcomes inequalities indirectly and there is also transferable evidence from non-AHP settings. Risk of bias assessment found that the reviews synthesised were generally of low quality. From the AHP-specific and non-AHP literature, we identified the following patient and organisational level themes: 1) more equitable access to allied health services, 2) high-quality care and patient experience, 3) addressing the social determinants of health and 4) supporting mental wellbeing. We identified the following system level themes: 1) ensure equitable distribution of workforce and funding 2) better representation within clinical guidelines. Furthermore, engaging and empowering communities is important at all levels.

AHPs clearly have an important role in addressing inequalities in health care and health outcomes. There is much more that could be done to unpack the impact of AHPs on health inequalities, identify and address inequalities in existing allied health services and galvanise the motivation that AHPs have for meaningful action.

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