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**Embedding public health practice amongst Allied Health Professionals: A rapid scoping review of international approaches**

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## 8 **Abstract**

9 The UK Allied Health Professions Public Health Strategic Framework outlines their commitment to embed disease prevention and public health. Yet there is no clear  
10 guidance on how best to embed public health into practice. The aim of this study was to examine international approaches which embed public health practices amongst  
11 Allied Health Professionals. Given the exploratory nature of this study a rapid scoping review was conducted. Seventy unique references reporting 69 studies were included  
12 representing a breadth of countries, extensive timeline (1987-2022) and different Allied Health Professionals. Worldwide Allied Health Professionals are involved in all four  
13 domains of public health outlined in the UK Allied Health Professions Public Health Strategic Framework model. Best practice was evidenced in the form of well-designed  
14 studies (n=21) which reported the effectiveness of Allied Health Professionals public health practice. Nine key success factors for embedding public health approaches  
15 within Allied Health Professional practice were identified. Embedding public health practice should involve interventions targeting Allied Health Professionals behaviour  
16 change and behaviour change techniques targeting barriers to and facilitators for Allied Health Professionals public health practice. Multi/interdisciplinary working,  
17 innovative settings/roles, culturally tailored public health interventions along with cultural competence as a core skill should also be encouraged.

## 18 **Introduction**

19 Alcohol consumption, tobacco use, poor diet and lack of physical activity are all recognised as significant public health problems. Worldwide, harmful alcohol use causes 3  
20 million deaths annually and 5.1% of the global burden of disease <sup>1</sup> while tobacco use continues to be one of the leading global cause of preventable death <sup>2</sup>. Globally, 39%  
21 of adults were overweight and 13% were obese in 2016, with raised body mass index a major risk factor for non-communicable diseases <sup>3</sup>. The recent COVID-19 pandemic  
22 has further highlighted the importance of public health <sup>4</sup> while national and global agendas have subsequently focussed on public health and prevention as cost-effective  
23 solutions to reduce the rising rate of non-communicable diseases <sup>5 6</sup>.

24 Many individuals have the opportunity to “Make Every Contact Count” an approach to behaviour change that utilises the millions of day-to-day interactions that  
25 organisations and people have with other people <sup>7</sup>. Those working in health services are often considered to be in the best place to intervene since they develop trusting  
26 and sometimes long-term relationships with people accessing health and care services and have a high level of interaction with the population <sup>8</sup>. However, the potential of  
27 Health Care Professionals (HCPs) to reduce the prevalence of behavioural risk factors contrasts sharply with practice. Research has shown that even when General  
28 Practitioners are encouraged to screen for alcohol problems they under-deliver health-promoting advice <sup>9</sup>, while nurses report avoiding engagement with people about  
29 alcohol use as they worry about depriving them of the social benefits of drinking <sup>10</sup>. HCPs are also not maximising opportunities to advise patients who use tobacco, to quit  
30 <sup>11</sup> and are not engaging in weight conversations <sup>12</sup>. HCPs report concern about the potential negative impact of intervention on the patient and professional relationship <sup>13</sup>  
31 and are unsure about their capabilities to facilitate behaviour change with patients, unwilling to discuss behaviours perceived as unrelated to the patient’s visit and  
32 perceive interventions as burdensome <sup>14</sup>.

33 Extending the role of Allied Health Professionals (AHPs) into public health practice has been promoted as a key component to developing a flexible health workforce <sup>15</sup>.  
34 While the Rethinking the Public Health Workforce report identified a number of occupations which have already started to support public health work including AHPs <sup>16</sup>.  
35 For the purpose of this review, we have used the UK NHS definition of AHPs which states that they are, in the main, degree level professions and are professionally  
36 autonomous practitioners (<https://www.england.nhs.uk/ahp/about/>). According to the NHS there are 14 AHPs (Art Therapists, Drama Therapists, Music Therapists,  
37 Podiatrists, Dietitians, Occupational Therapists, Operating Department Practitioners, Orthoptists, Osteopaths, Paramedics, Physiotherapists, Prosthetists and Orthotists,  
38 Radiographers, Speech and Language Therapists) with 13 of the 14 AHPs regulated by the Health and Care Professions Council (HCPC) and Osteopaths regulated by the  
39 General Osteopathic Council (GOC) (<https://www.england.nhs.uk/ahp/about/>). In the UK AHPs collectively make up the third largest workforce in the NHS with each  
40 profession having its own professional body, one or more designated titles that are protected by law and professionals must be registered to use them

41 [\(https://www.england.nhs.uk/ahp/about/\)](https://www.england.nhs.uk/ahp/about/). AHPs provide system-wide care to assess, treat, diagnose and discharge patients across social care, housing, education, and  
42 independent and voluntary sectors (<https://www.england.nhs.uk/ahp/about/>).

43 In the UK, the definition of AHPs is complicated by the fact that the HCPC also regulates Biomedical Scientists, Clinical Scientists, Hearing Aid Dispensers and Practitioner  
44 Psychologists. In addition, some documents report slightly different numbers of AHPs for example the UK AHP Public Health Strategic Framework included fifteen  
45 professions with the addition of clinical psychology <sup>17</sup>. Globally, the definition of AHPs also varies. For example, in Australia there are 23 AHPs recognised by the government  
46 (<https://www.health.gov.au/health-topics/allied-health/about>) while in New Zealand the allied health workforce is made up of health professionals who are not part of the  
47 medical, dental or nursing professions and there are at least 43 professions that are classified as AHPs by the New Zealand government  
48 (<https://www.health.govt.nz/about-ministry/leadership-ministry/allied-health>).

49 The UK AHP Public Health Strategic Framework outlines the commitment to continue to embed disease prevention into all AHP roles and to support AHP leadership in  
50 public health <sup>17</sup> and calls on AHPs to continue to embed public health within their roles, services and partnerships however, there is no clear guidance on how best to  
51 embed public health into practice. The framework calls for progress to support and enable AHPs to improve population health and reduce inequalities and ensure that  
52 public health becomes AHPs core way of working which is informed by evidence and learning from good practice by AHPs across the UK and internationally <sup>17</sup>. Whilst there  
53 is an overall willingness of AHPs to engage in healthy conversations; AHPs identified several challenges to doing this in practice including their confidence to initiate a  
54 conversation, particularly if it is about an issue not directly connected to the reason they are seeing a client; pressures on time; the need to gauge the appropriate time  
55 within the clinical relationship to initiate a conversation; and the lack of easily accessible information about local services and community assets to support signposting <sup>18</sup>.

56 AHPs have recently become part of the World Health Organisation Collaborating Centre for Public Health Nursing, Midwifery and AHPs ([https://ukhsalibrary.koha-  
57 ptfs.co.uk/whoccpnhm/](https://ukhsalibrary.koha-ptfs.co.uk/whoccpnhm/)). This collaborating centre aims to: strengthen disease prevention, health promotion and build resilience in health care systems, generate evidence

58 and frameworks of practice for nurses, midwives and AHPs; collate and collect evidence about the nurses, midwives and AHPs' role and impact across the life course; and  
59 provide technical assistance and support WHO in informing the development of policy advice, about public health nursing, midwifery and AHPs.

60 A range of extended practice roles, including public health, for allied health professionals have been promoted and are being undertaken but evidence of their health  
61 outcomes has rarely been collated <sup>19</sup>. There is also little evidence as how best to introduce such roles, or how best to educate, support and mentor these practitioners <sup>19</sup>.  
62 Therefore, the aim of this study was to examine international approaches which embed public health practices amongst AHPs in order to learn from these different  
63 approaches. Specifically, we sought to examine the following objectives: to determine who the AHPs are within different nations and assess the differences to AHPs in the  
64 UK; to determine where and how AHPs operate with respect to public health activities; to establish the evidence of best practice where AHPs embed public health in their  
65 work and to identify the key success factors in increasing AHPs appetite for public health practice.

## 66 **Method**

67 A rapid scoping review following the principles of systematic reviewing as set out by the Cochrane Collaboration and reported according to the PRISMA extension for  
68 scoping reviews (<http://www.prisma-statement.org/Extensions/ScopingReviews>) <sup>20</sup> with the protocol published on the Open Science Framework (<https://osf.io/4zrx/>).

## 69 ***Search strategy***

70 The following databases and resources were searched in February 2022 to identify both published and grey literature: Allied and Complementary Medicine Database  
71 (AMED) and Cumulative Index to Nursing & Allied Health (CINAHL) via Ebsco, Applied Social Sciences Index and Abstracting (ASSIA), Health Research Premium Collection  
72 (Family Health Database; Health & Medical Collection; Health Management Database; MEDLINE; Nursing & Allied Health Database; Psychology Database; Public Health  
73 Database) and PsycARTICLES via ProQuest, OpenGrey, Think Tank Search, NICE evidence search, Websites (Public Health Departments, Department of Health, Professional

74 Bodies, Royal Society for Public Health, The Kings Fund, The Health Foundation, Local Government Association (LGA), Social Care Institute for Excellence (SCIE)) and Key  
75 Public Health/Prevention Journals. The AHP Public Health UK Strategy Board were also asked, in November 2021, to share any relevant literature.

76 ***Inclusion/exclusion criteria***

77 Inclusion and exclusion criteria followed the PICO(C)(S) (participants, interventions, comparators, outcomes, context and study design) framework with the aim of being as  
78 inclusive as possible. Included participants were the fourteen AHPs as defined by the UK NHS but could be differently named and trained according to the health system in  
79 the country where the research took place. Interventions were those aimed at prevention, wellbeing, health protection, health promotion, health inequalities or no  
80 intervention. Comparators could be any or none and outcomes were any public health practices amongst AHPs. Context for included studies was international literature of  
81 any study design in both published and grey literature. Studies carried out in the UK or international reviews which included UK studies were excluded along with studies  
82 that focussed on Clinical Psychologists, Pharmacists, Nurses, Midwives, Doctors and other health or care professionals.

83 ***Search Terms***

84 Search terms, based on the key concepts of AHPs and Public Health, were developed during a scoping exercise and confirmed at the AHPs Public Health UK Strategy Board  
85 in November 2021. Keywords (see supplementary material) were searched in title and limited to English language and humans. No limits were placed on year of  
86 publication.

87 ***Study Selection***

88 References were exported into Rayyan systematic reviewing software and duplicates removed. Initial screening of title and abstract against the inclusion criteria was made  
89 by one of the authors (CH) to identify potentially relevant papers followed by screening of full text papers identified as possibly relevant in the initial screening. The first

90 10% of the sample was checked at each stage by another author (JAL). Disagreements were discussed and a decision agreed with clarifications made to the protocol as  
91 necessary, before proceeding with screening.

## 92 ***Quality Assessment***

93 As scoping reviews are designed to provide an overview of the existing evidence base regardless of quality a formal assessment of methodological quality of the included  
94 studies is generally not performed. This is in line with the Joanna Briggs Institute's current guidance for carrying out scoping reviews <sup>21</sup>. Therefore, a formal assessment of  
95 methodological quality of the included studies was not carried out (<https://jbi.global/scoping-review-network/resources>).

## 96 ***Data Extraction***

97 One of the authors (CH) extracted relevant data. The first 10% of the data extraction was checked by another author (JAL). Disagreements were discussed and a decision  
98 agreed with clarifications made to the protocol as necessary, before proceeding with data extraction.

## 99 ***Data Synthesis***

100 A content analysis with narrative synthesis was carried out by one of the authors (CH). Content analysis allows the qualitative data collected in research to be analysed  
101 systematically and reliably so that generalisations can be made from them in relation to the categories of interest <sup>22</sup>. Therefore, for each included report every explicitly  
102 identified key success factor for public health practice was extracted. In addition to those explicitly identified success factors any reported barriers or facilitators to public  
103 health practice were also extracted. Similar success factors, barriers and facilitators were combined, and occurrences were counted, in order to extrapolate the most  
104 important factors necessary for successful AHP public health practice. Narrative synthesis refers to an approach to the synthesis of findings from multiple studies that relies  
105 primarily on the use of words and text to summarise and explain the findings of the synthesis <sup>23</sup>.

106 **Results**

107 Seventy unique references <sup>24-93</sup> reporting 69 studies were identified which met the inclusion criteria (see Figure 1). The studies were published between 1987 and 2022 and  
108 the majority were carried out in the USA (n=17) <sup>25 29 36 45 52 60-62 65 68 69 71 81 86 87 90 93</sup>, Australia (n=15) <sup>24 26-28 31 33 34 42-44 47 48 53 56 85</sup> and Canada (n=8) <sup>37 38 50 54 57-59 78</sup>. Five studies  
109 were carried out in Ireland reported across six references <sup>46 55 63 64 74 75</sup>. Three studies were carried out in each of Brazil <sup>39 51 66</sup>, Norway <sup>49 88 91</sup> and Nigeria <sup>82-84</sup>. One study was  
110 carried out in Singapore <sup>30</sup>; Germany <sup>32</sup>; Finland <sup>34</sup>; Indonesia <sup>40</sup>; Israel <sup>41</sup>; Sweden <sup>67</sup>; Rwanda <sup>73</sup>; South Africa <sup>76</sup>; Switzerland <sup>77</sup>; the Netherlands <sup>79</sup> and Ghana <sup>80</sup>. Finally, four  
111 studies were carried out in multiple locations including one in Belgium, Spain, USA, South Korea and Brazil <sup>70</sup>, one in Australia, Brazil, USA, South Korea, Finland, Norway  
112 and Turkey <sup>72</sup>, one in 139 Countries <sup>89</sup> and one described as Worldwide <sup>92</sup>.

113 While one study focussed on AHPs as a whole group <sup>26</sup> most focussed on just one profession. It must be noted that some of the AHPs were registered professionals in some  
114 countries but not in others and some held different titles in different countries. Physical Therapists/Physiotherapists/Sports Physical Therapists/Athletic trainers (n=32)  
115 were the most commonly studied, reported across 33 references <sup>60-93</sup> followed by Occupational Therapists (n=15) <sup>41-55</sup>, Dietitians/Nutritionists (n=5) <sup>36-40</sup>, Ambulance  
116 Officers/Paramedics (n=4) <sup>56-59</sup>, Art Therapists (n=2) <sup>30 31</sup>, Music Therapists (n=2) <sup>32 33</sup> and Podiatrists (n=2) <sup>34 35</sup>. The remaining studies examined particular groups of  
117 professionals including: Physiotherapists, Occupational Therapists and Social Workers <sup>24</sup>; Occupational Therapists, Occupational Therapy Assistants, Physical Therapists and  
118 Physical Therapy Assistants <sup>25</sup>; Physiotherapists, Occupational Therapists, Specialist Geriatric Medics, Pharmacists and Optometrists <sup>27</sup>; Physiotherapists, Occupational  
119 Therapists, Exercise Physiologists and Podiatrists <sup>28</sup>; and Occupational Therapists and Physical Therapists <sup>29</sup>.

120 **Figure 1 Here**

121 **Who are the AHPs within different nations? What are differences to AHPs in the UK?**



122 Only one study made any comparisons between AHPs in different nations <sup>40</sup>. This study from 2021 focussed on Nutritionists management of Type 2 Diabetes Mellitus  
123 patients at a Public Health Clinic in Padang, Indonesia. In their discussion the authors stated that, in Indonesia, the minimum requirement to be a nutritionist is a diploma,  
124 thus making the qualification lower compared to other developed countries. The authors also reported that the numbers of patients with diabetes seen by Nutritionists in  
125 Indonesia were relatively low compared to Australia for example <sup>40</sup>.

126 **Where and how do AHPs operate with respect to public health activities?**

127 The UK AHPs Public Health Strategic Framework proposes a model of how AHPs may contribute to public health<sup>17</sup>. The framework outlines the following four domains:  
128 wider determinants, health improvement, population healthcare, and health protection. The model from this framework is used here to demonstrate where and how AHPs  
129 operate internationally in respect to the four domains of public health.

130 **Wider determinants**, also known as social determinants, are a diverse range of social, economic and environmental factors which impact on people's health and wellbeing.  
131 Addressing the wider determinants of health and wellbeing has a key role to play in reducing health inequalities <sup>17</sup>. In terms of addressing the wider determinants of health  
132 and wellbeing, five studies focussed on AHPs supporting vulnerable communities <sup>45 57-59 91</sup> while two studies <sup>41 47</sup> were classified as supporting nurturing environments for  
133 children.

134 **Health improvement** describes the work to improve the health and mental wellbeing of individuals, communities or populations through enabling and encouraging healthy  
135 lifestyle choices and developing resilience <sup>17</sup>. The most common theme (n=23) in relation to health improvement provided by AHPs spanning more than three decades  
136 (1987-2021) was that of health promotion and disease prevention<sup>26 36 46-51 56 58-61 67 69 71 73-76 80 83 90</sup> although two studies specifically focused on AHPs involvement in  
137 improving mental health <sup>31 33</sup>.

138 **Population healthcare** aims to maximise value, equity and good outcomes by focusing on the needs of the population and delivering person centred services across the  
139 entire health and care system <sup>17</sup>. By far the most commonly cited approach (n=22) to population healthcare in the international literature spanning more than two decades  
140 (1999 - 2020) was falls prevention <sup>27 28 35 42-44 52 53 55 58 62-65 72 77 81 82 84-86 88</sup> while another popular theme (n=18) was AHPs prevention (and management) of long-term  
141 conditions <sup>25 29 30 32 34 37-40 47 57 58 66 68 70 78 79</sup>. One study focussed on admissions prevention in adult orthopaedic patients <sup>24</sup> while five studies reported AHPs involvement in  
142 injury prevention <sup>47 54 87 92 93</sup>.

143 **Health protection** aims to protect the population's health from communicable diseases and other threats, while reducing health inequalities <sup>17</sup>. Only one study focussed on  
144 health protection in the form of infection (COVID-19) prevention and control <sup>89</sup>.

#### 145 **What evidence is there of best practice where AHPs embed public health in their work?**

146 Best practice was mainly evidenced in the form of well-designed studies (n=21) which reported the effectiveness of AHPs public health practice <sup>24 27 30-34 41-45 51 52 58 66 68 70 79 81</sup>  
147 <sup>86</sup>. Two studies demonstrated the effectiveness of teams of AHPs working together to prevent either hospital admissions<sup>24</sup> or falls <sup>27</sup> while two studies provided evidence  
148 for the effectiveness of Art Therapy in improving memory<sup>30</sup> and coping skills <sup>31</sup>. Two studies also provided evidence for the effectiveness of Music Therapy in prevention of  
149 paediatric migraine <sup>32</sup> and mental health problems <sup>33</sup>. One study provided evidence for the effectiveness of paramedics in reducing the number of ambulance calls to  
150 subsidised housing for older adults <sup>58</sup> while another reported the effectiveness of Podiatrists in prevention of foot problems in diabetic patients <sup>34</sup>. Seven studies provided  
151 evidence for the effectiveness of Occupational Therapists <sup>41-45 51 52</sup> with four of these studies providing evidence of their effectiveness in falls prevention <sup>42-44 52</sup>.  
152 Occupational Therapists were also effective in early intervention in children's development <sup>41</sup>, increasing knowledge of sexual and reproductive health in adolescents <sup>51</sup> and  
153 improving health, function, and quality of life in older adults <sup>45</sup>. Six studies provided evidence for the effectiveness of Physiotherapist in a variety of public health activities  
154 <sup>66 68 70 79 81 86</sup>. Preoperative respiratory physiotherapy significantly reduced the risk of pulmonary complications in postoperative paediatric (<6 years old) cardiac surgery in  
155 Brazil <sup>66</sup> while Physical Therapists in the USA effectively contributed to a successful community diabetes self-management education programme <sup>68</sup>. An exercise

156 intervention led by Physiotherapists in the Netherlands was reported to slow down decline in self-reported daily functioning in community dwelling older persons (75+)  
157 with daily activity limitations <sup>79</sup>. While the Home-based Older Person Upstreaming Prevention Physical Therapy Programme was shown to be effective in improving  
158 function, environment, fall risk, and wellness in the USA<sup>81-86</sup>. A review of empirical evidence regarding preventive Physiotherapy interventions for low back pain in children  
159 and adolescents (aged below 19 years) identified research in Belgium, Spain, USA, South Korea and Brazil which showed the combined treatment of postural hygiene with  
160 physiotherapy exercise exhibited the best results <sup>70</sup>.

161 **What are the key success factors in increasing AHPs appetite for public health practice?**

162 Only 21 of the included studies explicitly identified key ‘success factors’ for public health practice <sup>26 28 36 37 46 48 51 53-55 57 59 61 62 69 71 73 74 76 84 88</sup>. Therefore, reported barriers and  
163 facilitators were extracted from all included studies in order to extrapolate the factors necessary for successful public health practice. Key success factors were:

164 ***1. AHP workforce skilled, knowledgeable, and motivated in public health***

165 The most frequently cited success factors related to AHPs receiving appropriate and accessible training and education for continued opportunities to develop up to date  
166 knowledge and experience in public health. Importantly cost should not be a barrier to updating skills. For success, public health needed to be one of the core  
167 competencies of AHPs and integrated into both pre- and post-registration education. Placements also needed to involve opportunities for public health practice. Public  
168 health needed to be a fundamental part of the AHPs role and responsibility. Role legitimacy was an important aspect of embedding public health. Cultural competence also  
169 needed to be a core skill to enable AHPs to understand, appreciate and interact with people from different cultures and belief systems. Education, training and continuing  
170 professional development needed to include familiarisation with guidelines and guidance, evidence-based practice, searching and evaluating research evidence, critical  
171 appraisal and knowledge of behaviour change theory as well as challenge the traditional biomedical model of health. Having skills, knowledge and experience in public  
172 health was key to building confidence and improve self-efficacy.

173 For example, in a study to collect data on the continuing education needs of Canadian Dietitians in relation to health promotion and preventive practice one of many  
174 enabling factors was identified as skill development (in accurate current information and behaviour change theory)<sup>37</sup>. Another study of Irish Occupational Therapists'  
175 reported one of the perceived opportunities was Occupational Therapists' skills and knowledge of preventative strategies<sup>46</sup>. Enablers to engagement of Australian  
176 Occupational Therapists in health promotion practice included undertaking further education, gaining clinical experience and establishing a professional identity<sup>48</sup>. In a  
177 study of Canadian Occupational Therapists, the key to success in the effective practice of injury prevention was considered to be opportunities for professional  
178 development in this area<sup>54</sup> while in a study of American Physical Therapists the greatest facilitator to fitness assessment was the educational background of the Physical  
179 Therapists<sup>69</sup>. Health promotion training at undergraduate level and over 10 years of experience were also identified as predictors of adequate health promotion practices  
180 in South African Physiotherapists<sup>76</sup>. Finally, opportunities to learn and grow at work facilitated the uptake of evidence-based practice in fall prevention among  
181 Physiotherapists in Norway<sup>88</sup>.

## 182 **2. Positive personal health behaviour, beliefs and confidence**

183 Positive personal health behaviour, beliefs and confidence of AHPs were associated with public health practice. AHPs health habits (e.g., smoking, physical activity, and  
184 dietary patterns) have been found to be better than those of the general population<sup>36 73</sup> and were significantly associated with belief in the importance of that behaviour  
185 for others<sup>36</sup>. AHPs confidence in their counselling skills has also been significantly correlated with intensity of counselling and the likelihood of client compliance<sup>36</sup>. AHPs  
186 confidence in being able to perform a behaviour (self-efficacy) has also been shown to be the best predictor of perceptions of practice patterns in four areas of public  
187 health (psychological well-being, nutrition and overweight, physical activity and fitness, and tobacco use)<sup>61</sup>. AHPs positive attitude to health promotion has also been  
188 shown to be a predictor of health promotion practice<sup>74 76</sup> as was a compatible philosophy<sup>46</sup>.

## 189 **3. Evidence of (cost) effectiveness and impact with associated knowledge translation**

190 Demonstrating cost-effectiveness and impact was frequently cited as a key success factor to embedding public health in AHPs practice<sup>71 78 86 92</sup> however, this knowledge  
191 needed to be translated into practice<sup>88</sup>. Knowledge translation ensured that evidence was embedded within practice and that AHPs were aware of current evidence-based  
192 practice and interventions<sup>88</sup>. AHPs needed access to key journals and easily understandable summaries of evidence<sup>88</sup>. Funding for research was also central to providing  
193 this evidence<sup>61</sup>. Reinforcement from patients on areas of positive influence was cited as important in nurturing positive attitudes towards public health by improving  
194 outcome expectations<sup>36</sup>.

#### 195 **4. Adequate resourcing of Allied Health Professional public health practice**

196 Adequate resourcing for AHPs to embed public health practice was cited as essential to success particularly in countries where there is no government-sponsored universal  
197 healthcare system. For some organisations this might involve reallocating resources from a 'curative' to a 'preventive' paradigm. Necessary resources included simple and  
198 consistent funding for; research, patient access to services, equipment, environmental modifications including tradesman labour, and interdisciplinary teams. Other  
199 resources included adequate time (affected by number of visits per patient, number of patient referrals, number of staff, length of appointments, competing demands,  
200 workloads and caseloads), public health educational materials including public health guidelines as well as available and appropriate settings and space for public health  
201 practice. Incentives in the form of reimbursement for public health practice (especially for private practitioners) was seen as an important way to resource the activity. For  
202 example, availability of proper resources was reported as just one enabling factor for Canadian Dietitians in relation to health promotion and preventive practice<sup>37</sup> while a  
203 resourceful work environment, having access to information about research-based knowledge, and enough human resources helped to facilitate the uptake of evidenced  
204 based practice in fall prevention among Physiotherapists in Norway<sup>88</sup>. Adapting and streamlining funding systems was also reported as important for facilitating falls  
205 prevention work by AHPs in Australia<sup>28</sup> and by Irish Occupational Therapists<sup>55</sup>.

#### 206 **5. Organisational and Allied Health (and other) professional body support for public health**

207 Support from Allied Health and other professional bodies was cited as an important factor to embed public health in AHP practice. Frameworks, strategic initiatives, action  
208 plans, joint and position statements recognising the need for public health, mandating the integration of public health in practice or emphasising the use of public health  
209 techniques and supporting/endorsing policy were all cited as success factors. Importantly national policy needed to work hand in hand with organisational policies.  
210 Organisational support was seen as essential for empowering AHPs to embed public health practice. Organisations needed to see public health as a priority and an  
211 expected part of their AHPs clinical responsibility nurturing a receptive culture, environment, and ethos for public health. This included support from leadership and  
212 management within the organisation in the form of good role models, champions, mentors and practice facilitators. For example, Physiotherapists in Norway reported that  
213 supportive leadership facilitated the uptake of evidence-based practice in fall prevention<sup>88</sup>.

## 214 **6. *Nurturing relationships to increase the profile of Allied Health Professionals public health role***

### 215 **a. Working in Multidisciplinary and Interdisciplinary teams**

216 While working in multidisciplinary teams, with professionals from different disciplines working together each drawing on their disciplinary knowledge was cited as a success  
217 factor, interdisciplinary working which integrated knowledge and methods from different disciplines using a synthesis of approaches was seen as more important<sup>24</sup>. Goals  
218 were set collaboratively, and assessment and treatment done co-jointly with no designated leader giving team members greater autonomy to explore ways of solving  
219 problems<sup>24</sup>. This approach allowed other professionals to gain greater awareness of AHPs role in public health and vice versa<sup>24</sup>. Multidisciplinary and interdisciplinary work  
220 also allowed for better continuity of care and a smoother referral process<sup>24</sup>. Multidisciplinary training and education were cited as important for AHPs to know “why, when  
221 and how” to collaborate with other health and social care professionals<sup>84</sup>.

### 222 **b. Enhancing patient relationship**

223 Enhancing relationships with patients was seen as vital to AHPs ability to embed public health in practice. Dedicated one on one time with patients and removing financial  
224 barriers for patients were suggested as strategies for increasing patient interest in, adherence to and compliance with public health messages particularly where patients  
225 had complex health needs<sup>51 57 69 71</sup>. In return AHPs felt that they would benefit from reinforcement from patients on areas of positive influence and opportunities to  
226 develop business based on positive client word-of-mouth. Building relationships with patient’s caregivers, relatives and family was also seen as important when practicing  
227 public health. Finally, AHPs cited the importance of understanding cultural influences that can affect assessment and intervention processes for example it was reported by  
228 Physiotherapists that Rwandan women were not permitted to participate in physical activity<sup>73</sup> while Physiotherapists in Nigeria reported that understanding the  
229 characteristics of older adults with a history of recurrent falls was important for effective fall prevention practices<sup>84</sup> this included the knowledge that many older adults  
230 used “traditional bone setters/healer” leading to a higher risk of having multiple falls<sup>84</sup>.

### 231 **c. Strengthening ties with local and private stakeholders**

232 The need for AHPs to strengthen their ties with representatives from the community and private sector was reported as an enabling factor in relation to health promotion  
233 and preventive practice<sup>37</sup>

### 234 **7. Embedding AHPs public health practice in evidence-based guidelines, national policy and international charters/declarations**

235 To successfully embed public health into AHP practice it also needed to be embedded into evidence-based guidelines<sup>25 26 29 39 40 53 55 65 68 78</sup>, national policy<sup>60 61 71 73</sup> and  
236 international charters/declarations<sup>46 48 49 51 67 80</sup>. However, it is also important that evidence-based guidelines are appropriately disseminated and that national policies are  
237 implemented.

### 238 **8. Identification of missed opportunities for public health practice**

239 Opportunities were identified where AHPs could further embed public health into practice particularly where they were missing from the care cycle such as pre-op,  
240 admissions and discharge. In addition, AHPs cited particular success with public health initiatives tailored to diverse subpopulations within the community and  
241 implemented in culturally comfortable settings such as temples<sup>59</sup>. Use of interpreters and translators was also cited as a success factor<sup>59</sup>.

## 242 **9. *Involvement in professional behaviour change interventions/workshops***

243 Finally, behaviour change interventions<sup>26 62</sup> or workshops<sup>28 53</sup> targeted at changing AHPs behaviour were successful at increasing public health knowledge and practice  
244 among AHPs.

## 245 **Discussion**

### 246 *Summary of findings*

247 Seventy unique references reporting 69 studies were identified which met the inclusion criteria and represented a breadth of countries, an extensive timeline (1987-2022)  
248 and a number of different AHPs. Only one study made comparisons between AHPs internationally. Worldwide AHPs were involved in all four areas of the UK Allied Health  
249 Professions Public Health Strategic Framework model although not all 14 professional groups were found to be participating in all four areas. Best practice was evidenced  
250 in the form of well-designed studies which reported the effectiveness of AHPs public health practice. Nine key success factors for embedding public health approaches  
251 within Allied Health Professional practice were identified.

### 252 *Comparison to the literature*

253 We were surprised that we did not find more academic literature outlining AHPs contribution to reducing health inequalities given that a rapid review of the impact of  
254 AHPs on health inequalities identified 36 articles<sup>94</sup>. Yet, authors found no evidence demonstrating the direct and independent impact of AHPs on the gap in health



255 outcomes between groups or across the socio-economic gradient although they did find a large body of research describing how AHPs could affect inequalities in health  
256 outcomes indirectly<sup>94</sup>.

257 The identified key success factors not only reflect the five goals outlined in the UK allied health professions public health strategic framework<sup>17</sup> but suggest further areas for  
258 development. UK AHPs can learn from examples of best practice and key success factors including interventions that support system architecture to embed public health  
259 practice within AHP work (for example, behaviour change through education/training; leadership development; research opportunities)

260 A rapid review of AHPs contribution to public health outcomes in the UK included 11 studies which were grouped into two areas of interventions; health  
261 intervention/public health and secondary prevention/health improvement, based on the UK AHP Public Health Strategic Framework 2019–2024<sup>95</sup>. AHP interventions were  
262 effective for Chronic Fatigue Syndrome and Osteoarthritis and specifically used to manage musculoskeletal conditions (e.g. frozen shoulder)<sup>95</sup>. AHPs leading vocational  
263 rehabilitation and falls management were also effective<sup>95</sup>. These areas were additional to those previously identified<sup>96</sup> and represented some additional specialist activity  
264 undertaken to affect health outcomes<sup>95</sup>. In the previous rapid review, there were nine evidence-based interventions identified and selected as examples of current AHP  
265 good practice in public health including screening interventions, secondary prevention and risk management<sup>96</sup>. These rapid reviews along with the current scoping review  
266 provide evidence of a variety of opportunities for AHPs involvement in public health practice across all four areas of the UK Allied Health Professions Public Health Strategic  
267 Framework model<sup>17</sup>. However, evidence of best practice differs between nations and therefore there is the opportunity to learn from and share these findings.

268 Transdisciplinary approaches, where people skilled in a range of disciplines work together on public health problems, have been suggested as an approach to improving  
269 people's health<sup>97</sup>. This was echoed in our review where working in either multidisciplinary or interdisciplinary teams was cited as a key success factor for embedding public  
270 health by AHPs. Interdisciplinary working, which integrated knowledge and methods from different disciplines using a synthesis of approaches, was seen as more important  
271 than simple multidisciplinary working. This approach allows other professionals to gain greater awareness of AHPs role in public health and vice versa. Interdisciplinary

272 working allows for better continuity of care and a smoother referral process although training and education is important for AHPS to know “why, when and how” to  
273 collaborate with other health and social care professionals.

#### 274 *Strengths and limitations*

275 This is the first scoping review to examine international approaches to AHPs work in public health and included searching for both published and grey literature. The  
276 diversity of health systems and approaches covered is a key strength of this review as we were able to identify knowledge and practice globally and reduce bias or  
277 preference for one type of health system theory over others in the search for knowledge on public health approaches. However, not all professional groups were equally  
278 represented in the review. Professional commitment to research and reporting population health outcomes is more developed in some AHPs and we must acknowledge  
279 the challenges associated with defining AHPs and their roles. Only one study made comparisons between AHPs in different nations despite one of the objectives being to  
280 assess the differences to AHPs in the UK. While one study focussed on AHPs as a whole group most focussed on just one profession and did not provide definitions of the  
281 professional’s role. Therefore, comparisons between AHPs in different nations could not easily be extrapolated. As with all reviews while every effort was made to develop  
282 a comprehensive search strategy some studies may have been missed. Included studies were also limited to those written in English so there is potential that important  
283 international studies could have been overlooked. As with all public health research it is difficult to attribute outcomes or impact from interventions as there are other  
284 influencing factors, this may be why there was less evidence of effectiveness than public health practice by AHPs.

#### 285 **Conclusions/Recommendations**

286 Based on our findings we would suggest that further research is needed to understand the differences and similarities between AHPs in the UK and internationally. In  
287 addition, embedding public health practice amongst AHPs could be facilitated via interventions targeting AHPs behaviour change as well as behaviour change techniques  
288 targeting barriers to and facilitators for AHPs public health practice. Multidisciplinary and interdisciplinary working should be encouraged, supported with training and

289 education on why, when, and how to collaborate with other health and social care professionals. We would also suggest greater use of innovative settings and roles for  
290 AHPs public health practice along with culturally tailored public health interventions implemented in culturally comfortable settings with use of interpreters and translators  
291 where necessary. Cultural competence should be a core skill to enable AHPs to understand, appreciate and interact with people from different cultures and belief systems.

292 **Conflicts of interest**

293 KA and LH are both employed by the Office for Health Improvement and Disparities who provided funding for this study.

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480 **Supplementary Material**

481 **Search Terms**

482 "allied health\*" OR "non-medical health\*" OR "non-medical profession\*" OR "non-medical clinician\*" OR "non-nursing health\*" OR AHP OR "health and care professions  
483 council" OR HCPC OR "rehabilitation assist\*" OR "therapy assist\*" OR "art therap\*" OR "art psychotherap\*" OR "drama therap\*" OR dramatherap\* OR "music therap\*" OR  
484 podiatr\* OR chiropod\* OR pedorthist\* OR dietetic\* OR dieti?ian\* OR nutritionist\* OR "occupational therap\*" OR OT OR ergotherapy\* OR "operating department practi\*"  
485 OR ODP OR "perioperative practice" OR "an?esthetic technician\*" OR "an?esthesiologist assistant\*" OR "surgical technologist\*" OR scrub OR "scrub tech\*" OR "surgical  
486 technician\*" OR "operating room technician\*" OR autotransfusionist\* OR "perioperative blood management technologist\*" OR perfusionist\* OR "cardiovascular  
487 technician\*" OR "electrocardiograph technician\*" OR "electrocardiogram technician\*" OR "E?G technician\*" OR "endoscopy technician\*" OR orthopti\* OR ophthalmic\* OR  
488 osteopath\* OR prostheti\* OR orthoti\* OR paramedic\* OR "emergency medical technician\*" OR EMT OR "ambulance technician\*" OR "emergency medical responder\*" OR  
489 EMR OR "ambulance officer\*" OR "emergency care practitioner\*" OR "emergency care assistant\*" OR "emergency care technician\*" OR physiotherap\* OR "physical  
490 therap\*" OR "athletic trainer\*" OR "exercise physiologist" OR "recreational therap\*" OR "therapeutic recreation" OR "speech and language therap\*" OR "speech &  
491 language therap\*" OR "speech–language path\*" OR SLP OR "speech therap\*" OR SLT OR SALT OR "SLT assistant\*" OR SLTA OR "SL assistant\*" OR "speech path\*" OR  
492 "speech language path\*" OR "speech and language path\*" OR "speech language therap\*" OR "communication therap\*" OR "language therap\*" OR radiograph\* OR  
493 "radiology technologist\*" OR angiographer\* OR mammographer\* OR "radiation therapist\*" OR "medical dosimetrist\*" OR "cardiac sonographer\*" OR "vascular  
494 technologist\*" OR "vascular specialist\*" OR "vascular sonographer\*" OR "medical radiation scientist\*" OR MRS OR sonographer\*

495 AND

496 "public health" OR "disease prevention" OR "mortality prevention" OR "morbidity prevention" OR "preventing disease" OR "health promotion" OR "promotion of health"  
497 OR "promoting wellbeing" OR "promoting resilience" OR "improve health" OR "health inequality\*" OR "health disparit\*" OR "population health\*" OR "health equity" OR  
498 preventi\* OR protect\* OR "prolonging life" OR "promoting health" OR "health equalit\*" OR "health improvement" OR "wider determinants of health"

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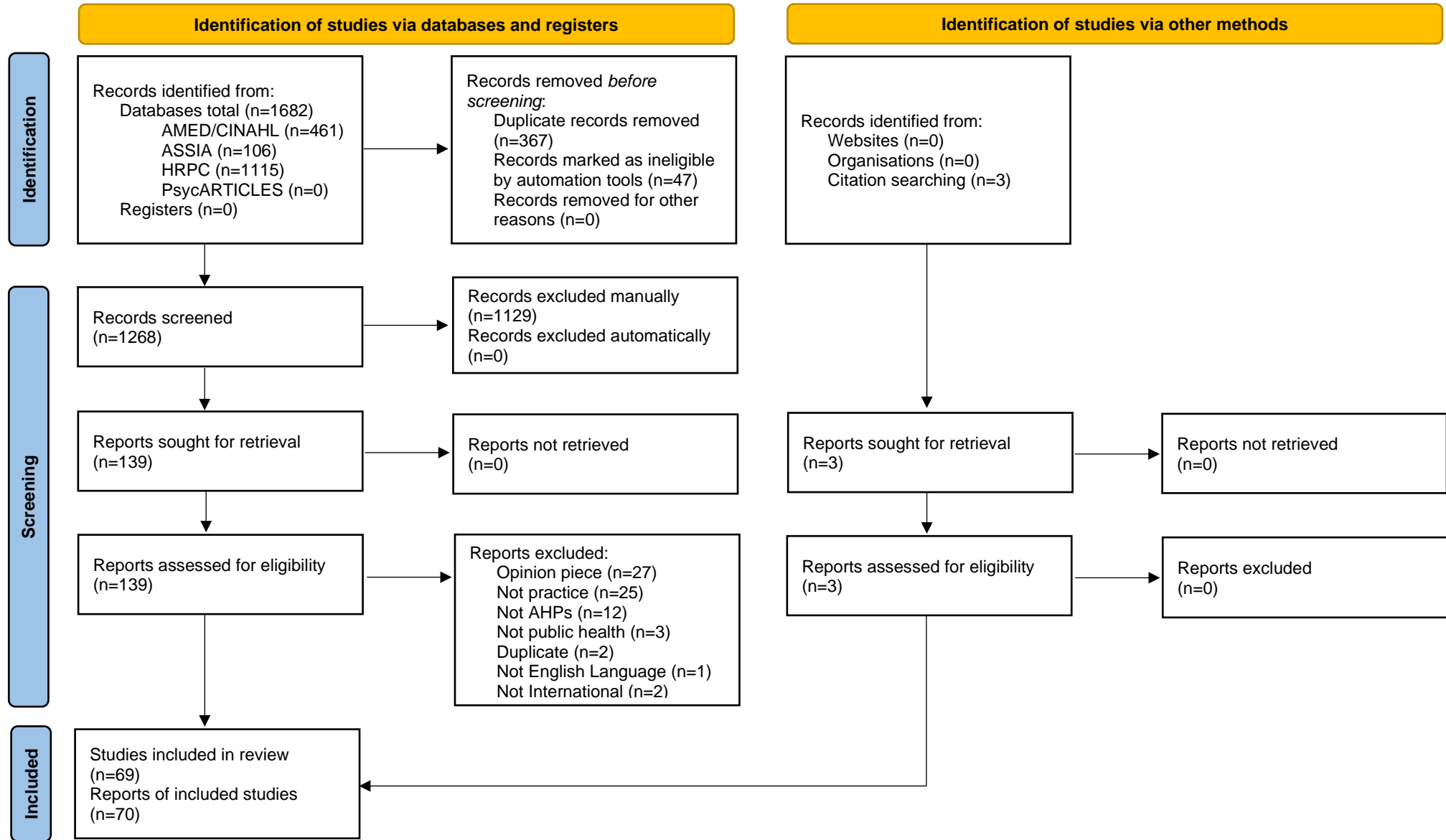
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