

## Mapping the contribution of Allied Health Professions to the wider public health workforce : a rapid review of evidence-based interventions

FOWLER DAVIS, S., ENDERBY, P., HARROP, D. and HINDLE, L.

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## Title page

# Mapping the contribution of Allied Health Professions to the wider public health workforce- a rapid review of evidence-based interventions

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S.Fowler Davis<sup>1</sup> MEd DBA, P.Enderby<sup>2</sup> PhD.,MSc., FRCSLT, D.Harrop<sup>1</sup> BA (Hons), MA, PGCLTHE, FHEA, L.Hindle<sup>3</sup> MSc

<sup>1</sup>Centre for Health and Social Care Research, Sheffield Hallam University, UK

<sup>2</sup>School of Health and Related Research, University of Sheffield, UK

<sup>3</sup>Public Health England

Correspondence to: Dr Sally Fowler Davis, CHSCR, Montgomery House, 32 Collegiate Crescent, Faculty of Health and Wellbeing, Sheffield Hallam University, Sheffield, S10 2BP, tel: 0114 225 2439, fax: 0114 225 4377

## Abstract

**Objectives-** The objective was to identify a selection of the best examples of the public health contributions by Allied Health Professionals (AHPs) in order to encourage a wider awareness and participation from that workforce to public health practice.

**Study design-** A mapping exercise was used to identify evidence-based interventions that could lead to health improvements across a population.

**Methods-** A rapid review was undertaken to identify evidence, followed by a survey of Allied Health Profession (AHP) practitioners and an expert panel consensus method to select the examples of AHP public health interventions.

**Results-** Nine evidence based interventions are identified and selected as examples of current AHP good practice. These examples represent a contribution to public health and include screening interventions, secondary prevention and risk management.

**Conclusions-** This study contributes to a strategy for AHPs in public health by appraising the effectiveness and impact of some exemplar AHP practices that contribute to health improvement. There is a need for AHPs to measure the impact of their interventions and to demonstrate evidence of outcomes at population level.

- Keywords: public health, allied health professions, allied health professionals, health improvement, evidence-based practice, rapid review
- Permitted keywords: Management and policy, Public health, Research.

## Introduction

Most European countries are broadening and deepening their commitment to public health<sup>1</sup> in response to the health burden and the impact of non-communicable diseases in Western society. The UK also recognises the need to focus on public health that seeks to prevent illness and disability as well as improves the health of the population<sup>2</sup>. The wider health care workforce is charged with

understanding and developing opportunities to bring about health equalities and establishing a strategic commitment to delivering population benefits through health services<sup>3</sup>.

In the UK, Allied Health Professionals (AHPs) are: art therapists, dietitians, dramatherapists, music therapists, occupational therapists, orthoptists, orthotists/prosthetists, paramedics, physiotherapists, podiatrists, radiographers (diagnostic and therapeutic) and speech and language therapists. They individually and collectively provide a range of services and interventions across clinical health and social care and in some cases, within the education and voluntary sectors. AHPs have been identified as a group already making a contribution but not necessarily recognising this as public health. They have the skills, enthusiasm and opportunity to make a greater contribution to the health of the public<sup>4</sup>

AHP services typically deliver discrete interventions to individuals and groups. The challenge for public health is to build capacity for AHPs to work in partnership and across communities to achieve population outcomes and health improvements. Health improvement is defined by the Department of Health in the UK as '*People [being] helped to live healthy lifestyles, make healthy choices and reduce health inequalities*'<sup>5</sup> An awareness of the importance of demonstrating impact across populations and support to do so would allow AHPs to improve population health and wellbeing and address health inequalities.

In order to scope the evidence of the public health contribution; an intervention was defined as any uni-professional or team activity where AHPs offer a specific contribution to a service. AHP services tend not to profile their public health contribution nor use the term 'public health' to describe the objectives of their services to purchasers, providers, patients or the public, and instead are inclined to refer to these activities as either primary or secondary prevention.

## Methods

The study used two methods to identify evidence of interventions by AHPs that contribute to public health: a rapid review of the literature, and a survey of AHP practitioners. The data collection included both published evidence (empirical and observational) and reported service information related to AHP public health practices. All data yielded was screened for relevancy against pre-agreed inclusion criteria. Finally, an expert advisory group completed a consensus exercise to identify criteria for the effectiveness of the interventions and selected the AHP examples for inclusion in this study.

### Rapid review

A rapid review of the literature was selected as its purpose is to provide an 'assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing literature'<sup>6</sup>. The search strategy used terms to describe AHPs, such as dietitian, dietician or occupational therapist and combined them with public health areas where the AHP had a critical role in: early years, older people services, emotional wellbeing or 'making every contact count'<sup>7</sup>, using terms such as mental health, physical activity or falls. All search terms were looked for in the title and abstract fields and controlled vocabulary terms were used where available. The Boolean operators 'AND' and 'OR' were used, alongside truncation, phrase searches and proximity operators.

The following databases were searched: Allied and Complimentary Medicine (Ovid), CINAHL (EBSCO), the Cochrane Library (Wiley), Emerald (Emerald Group), MEDLINE (EBSCO). Only papers situated within a UK context, published between 2004 and 2015 and in the English language were included in the study.

Grey literature searches were undertaken on NICE Evidence Search. Grey literature refers to 'multiple document types produced on all levels of government, academic, business, and organization... where publishing is not the primary activity of the producing body'<sup>8</sup>. An abridged version of the search strategy was used for the grey literature.

The rapid review identified 864 papers of potential interest and the grey literature search yielded an additional 414 resources. After screening for relevancy, data was extracted from 161 papers.

### **Survey of AHP practitioners**

A concurrent survey was designed and distributed to 1200 AHPs to solicit examples of practice regarding interventions that could be seen as having an impact on public health. The examples of reports and locally provided literature references, gathered from the survey, were added to the data extracted from the literature searches.

299 participants, representing 22 per cent of the Contact, Help, Advice and Information Network (CHAIN)<sup>(9)</sup> (n=1200, 11 professional groups), completed two or more questions. AHPs identified their contribution to public health as predominantly in the areas of: 'older adults', 30 % (91 responses); 'making every contact count', 26 per cent (74 responses); 'emotional wellbeing', 9 per cent (26 responses) and 'early years', 8 per cent (55 responses). The category 'other' was selected by 25 per cent of participants (74 responses) and shows that a relatively high number of participants did not categorise their interventions within public health groups. 18 per cent of participants (53 responses) reported that their contribution related mostly to musculoskeletal health and cancer screening in adults.

### **Appraisal of data**

The purpose of the Expert Advisory Group was to agree what constitutes good practice and an AHP public health contribution that could be developed at scale. The individuals were nominated by their professional bodies and deemed to have specific knowledge of public health. They were therefore able to develop a set of criteria using a nominal group technique<sup>10</sup> and draft a set of criteria by which to select AHP interventions.

The group met three times and the process included selecting examples of AHP practice from collated information and making a group-judgement<sup>11</sup> based on; strength of evidence, current practice and expert opinion. The selected examples demonstrated AHP interventions that contribute to health improvements, where public health or health improvement was the core purpose.

## **Results**

The nine examples listed below achieved through a professional expert consensus, are supported by evidence. The order represents recognition of the strength of evidence of the effectiveness of the intervention as a contribution to public health using the criteria agreed for the purpose of this study.

#### A. Orthoptic led school entry vision screening

The screening of children for poor vision at school entry age (4-5 years) has a strong evidence base<sup>12</sup> and in this study, the screening capture rate of participating children was 99.7 per cent. Of the children referred, 53 per cent had refractive errors and required glasses and 42 per cent had squints. Therefore an orthoptist led, time-of-school-entry vision screening service is demonstrated to be a valuable source of information regarding the prevalence of common visual problems among children. A large scale study to identify the accuracy of referrals<sup>13</sup> in Walsall (UK) has confirmed that even earlier testing can allow for better outcomes.

Anecdotally, children whose visual problems have been detected and corrected demonstrate benefits in many ways. They can demonstrate less challenging behaviour and cope better with school work, leading to improved achievement in the foundation year. In addition, fewer interventions can result in less need for an orthoptic 'patching' intervention'. At four years, most children were found to be old enough to cooperate with tests, but young enough for treatment to be effective but earlier screening may be even better<sup>14</sup>.

Many commissioning groups have instigated orthoptist led school based vision screening based on gold standard evidence in 'Health for All Children'<sup>15</sup>

#### B. Diagnostic radiography - breast cancer screening

The goal of breast cancer screening is to reduce breast cancer mortality rates based on early diagnosis and referral for interventions. There is evidence of the effectiveness of the intervention based on high quality empirical studies, suggesting the comparison between service performance<sup>16</sup> and cancer awareness raising interventions increases the likelihood that a woman will present promptly should she develop breast cancer symptoms<sup>17</sup>.

Screening performance is intended to increase detection rates for cancer and where outcome measures were calculated, and logistic regression was used to compare performance between the pilot and comparison units, this resulted in strong evidence for screening<sup>18</sup>.

#### C. Podiatry management in peripheral arterial disease (PAD)

A recent commissioning specification for foot care<sup>19</sup> identifies the importance of early intervention by podiatry services as a preventative intervention for people at risk of peripheral neuropathy that can lead to ulceration and possible leg, foot or toe amputation. In the UK, 6,000 people with diabetes underwent lower extremity amputation as a result of ulceration and the amputation substantially reduced their quality of life and is associated with high mortality<sup>20</sup>. Preventative podiatry is extremely important; early diagnosis of PAD by a vascular multidisciplinary team (MDT) or the diabetic foot team, followed by specialist advice and treatment for the management of pain, results in better outcomes for patients. The interventions can include further guidance and education on smoking cessation and exercise to support self management of diabetes<sup>21</sup>.

There is evidence of prevalence of PAD<sup>22</sup> and cost effectiveness of routine podiatry interventions<sup>23</sup> to support a change in commissioning practices. Significant gains in wellbeing and other social and economic benefits may be achieved through self-management, foot care and regular health checks to prevent ulceration and deterioration in vasculature<sup>24,25</sup>. International evidence supports podiatric

interventions to manage foot care, resulting in a reduction in the incidence of major amputations in patients with diabetes<sup>26,27</sup>.

#### D. Speech and language therapist management of communication disorders in children

A Cochrane Review<sup>28</sup> shows that overall there is a positive effect of speech and language therapy interventions for children with expressive phonological and vocabulary difficulties. Approximately 6 per cent of children have speech, language and communication difficulties, of which the majority will not have any other significant developmental difficulties. However, children whose difficulties persist may experience long-term problems concerning literacy, socialisation, and behaviour and school attainment.

The impact and effectiveness of speech and language therapy interventions with pre and primary school age children has been evidenced in a systematic review which synthesised data from 19 studies<sup>29</sup>. This review provides evidence of improvements in behaviour, spontaneous speech, imitative speech and language. In addition, classroom based co-operative skills programmes improve expressive and, receptive language and social skills<sup>30</sup>. Without support, poor communication can impact on academic success as well as social and emotional development<sup>31</sup>.

Furthermore, the impact of speech, language and communication interventions as prevention to reduce further social exclusion was evidenced in a longitudinal intervention programme delivered to 72 young offenders<sup>32</sup>.

#### E. Dietitians - weight management for adults and children

Dietitians promote weight management through behaviour change techniques<sup>33</sup>, motivational interviewing<sup>34</sup>, patient centred approaches<sup>35</sup>, and technological methods. In general, calorie counting, contact with a dietitian and use of behaviour change techniques that compare participants' behaviour with others were associated with the greatest weight loss<sup>36, 37</sup>. Brandt *et al.*<sup>38</sup> demonstrated the effect of internet-based complex interventions aiming to promote weight loss and optimize healthy behaviours. Specialist roles and evidence for dietitian interventions with people with diabetes show significant reductions in weight, based on weekly consultations<sup>39</sup>. These interventions are effective because they can demonstrate quality of life outcomes and in addition act as a preventative measure for a range of conditions including reduced incidence of co-morbidities<sup>40,41,42</sup>.

#### F. Occupational therapy, and paramedic interventions as secondary prevention and risk management in falls

When an older person falls there are a number of services they can access where AHPs are leading physical, psychological and social interventions to minimise recurrence and maximise recovery. There are three million reported falls per year in the UK, resulting in considerable cause of morbidity and mortality in over 65s and in major health care spending<sup>43</sup>. Falls cost the NHS £4.6 million each day and £1.7 billion per year<sup>44</sup>. In a trial of a clinical decision-making tool, twice the number of fallers were referred to falls services and costs per patient reduced from £22K to £15K<sup>45</sup>. However the literature suggests that falls reporting and falls management as a secondary prevention is by no means secured and in many cases national guidance is not followed<sup>46</sup>.

Occupational therapy (OT) interventions include compensatory interventions using assistive technology and rehabilitation. There are high user-satisfaction rates for aids and adaptation provision when they are provided in a timely way<sup>47</sup>. One study evaluated service effectiveness based on the impact of an occupational therapy environmental assessment (home hazard and risk assessment) and modifications to prevent falls and used a three armed randomised controlled trial with follow up at 3, 6, and 12 months. The group which received the intervention from the OT had significantly fewer falls than the control group at 12 months follow up<sup>48</sup>.

Paramedic interventions are effective as hyper acute risk management interventions<sup>49</sup> particularly for those older people who repeatedly fall. A study of the effectiveness of patient care undertaken by paramedic emergency care practitioners across five care settings, (ambulance services, GP out of Hours, urgent Care Centre, care home, and Minor Injuries Unit) undertaking an 'extended role' in ultra acute/ emergency settings over 5525 patient episodes, showed some evidence of patient benefit, measured in terms of reduced admissions. The suggestion is that paramedics have a differential impact on patients, resulting in fewer urgent referrals to hospital and more referrals to primary care.

#### G. Physiotherapy and incontinence as a secondary prevention intervention

It has been estimated that urinary incontinence affects 20.4 per cent of people aged 40 years and over and this equates to five million people in the UK. In women, this figure increases to 35.6 per cent at aged 80 years and over. Physiotherapists offer exercise based advice to develop pelvic floor muscles, lifestyle advice and counselling based on NICE guidance and expert consensus. Of significance in a number of studies associated with gynaecological recovery, are the positive effects of goal setting and professional contact<sup>50</sup>.

The intervention can be offered as a primary prevention in pregnancy or as a secondary prevention where urinary and faecal incontinence may cause challenges to emotional wellbeing or limit normal activity and work retention in pregnancy or maternity<sup>51</sup>.

#### H. Physiotherapy musculoskeletal pain management

Musculoskeletal health and pain management for the back, neck and shoulders are now recognised as requiring public health scrutiny and increased focus within priorities for research.

Musculoskeletal conditions account for the largest number of years lived in disability in the UK<sup>52</sup>.

The Arthritis Research UK report on musculoskeletal health makes a case for maintaining a healthy weight and increasing physical activity to reduce the risks of osteoarthritis and osteoporosis in later life by offering a range of preventative management methods and for more attention to be given to the risk factors for developing arthritis<sup>53</sup>. Similarly, the World Health Organization is leading on the development of educational tools to avoid non-communicable diseases, including musculoskeletal conditions<sup>54</sup>.

A number of protocols are published which identify randomised controlled studies that are currently seeking to identify the impact of exercise on musculoskeletal health in so far as exercise and self-management to alleviate pain and improve emotional wellbeing<sup>55,56,57</sup>. Some studies were found that demonstrated how physiotherapy interventions reduced pain and disability in neck pain<sup>58</sup> and shoulder pain<sup>59</sup>.

## I. Speech and language therapy in aphasia and dysphagia following stroke

People with aphasia are at risk of depression and have been shown to benefit from approaches to support and encourage communication, including aphasia group therapies and individual counselling<sup>60</sup>. Improvements in communication, quality of life and self-reports of improved self-confidence are reported. Further research should evaluate reorganised services that support functional communication practice early in the stroke pathway<sup>61</sup>. Similarly, management of dysphagia (swallowing disorders) which allows recovering patients to eat normally has been shown to reduce chest infections and improve quality-of-life<sup>62</sup>. These are worthy of further investigation as a secondary prevention and risk avoidance intervention<sup>63</sup>.

## Discussion and Conclusion

### Main findings of this study

This study has elicited examples of AHP interventions which demonstrate their contribution to making health improvements which could have greater impact if scaled up and made more widely available. The study represents an initial scoping and is a novel approach to the topic, enabling policy and practice leaders to identify opportunities for developing AHP's roles in Public health<sup>64</sup>. The work was undertaken in 2015, at the beginning of an increased focus on the role of the wider workforce in public health, it does not claim to be an exhaustive list of AHP interventions.

### What is already known on this topic

A previous systematic review of AHPs and health promotion found evidence of health promotion activity and recommended greater focus on health promotion via quality evaluations<sup>65</sup>. Nurses in the UK have highlighted their public health contribution and agreed a framework for engagement in upstream public health<sup>66</sup> but all health care professionals consistently highlight measurement of the public health impact of their day to day interventions to be a challenge<sup>4</sup>. The impact of AHP interventions across populations is not often measured and as a consequence, professional practitioners often term their public health work as primary or secondary prevention. AHPs are not commonly involved in the strategic development of public health planning at a local level.

### What this study adds

These examples of interventions are intended to engage AHPs and public health specialists in further dialogue about the widening participation of health practitioners in public health. AHP interventions and professional roles within the public health workforce could be recognised and extended through better integration in public health departments, with an emphasis on using AHPs to lead and develop health improvements across communities and populations. AHPs need additional continuous professional development opportunities alongside the public health workforce<sup>67,68</sup>. There are opportunities for greater levels of strategic collaboration with public health services if AHPs are enabled to focus on prevention and population impact of their interventions.

Further opportunities AHP involvement in public health partnerships could be achieved if the exemplar interventions detailed above were generally adopted.



## Limitations of the study

The rapid review was carried out within the parameters of the timescale and within a limited budget; the strength of evidence is not uniform and further research is needed to verify the cost and effectiveness of these and further AHP interventions.

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## References

1. World Health Organization. Health 2020. A European policy framework and strategy for the 21st century, 2013. <http://www.euro.who.int/en/health-topics/health-policy/health-2020-the-european-policy-for-health-and-well-being/publications/2013/health-2020.-a-european-policy-framework-and-strategy-for-the-21st-century-2013> (7 October 2015, date last accessed)
2. Department of Health. Living Well for Longer: A call to action to reduce avoidable premature mortality, 2013. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/181103/Living\\_well\\_for\\_longer.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/181103/Living_well_for_longer.pdf) (9 October 2015, date last accessed)
3. NHS England. Five year forward view, 2014. <http://www.england.nhs.uk/wp-content/uploads/2014/10/5yfv-web.pdf> (7 October 2015, date last accessed)
4. Royal Society for Public Health. Rethinking the Public Health Workforce, 2014. <https://www.rsph.org.uk/en/policy-and-projects/areas-of-work/wider-public-health-workforce/> (6 October 2015, date last accessed)
5. Great Britain, Department of Health. Public Health Outcomes Framework for England, 2013-2016. Gateway reference: 16891. England: Department of Health; 2012.
6. Booth A, Papaioannou D, Sutton A. Systematic approaches to a successful literature review. London: Sage; 2012.
7. Council of Deans of Health. Focusing our efforts to raise the profile of AHPs in public health, 2014. <http://www.councilofdeans.org.uk/2014/05/focusing-our-efforts-to-raise-the-profile-of-ahps-in-public-health-report-from-the-first-phe-ahp-leadership-event-23-april-2014/> (6 October 2015, date last accessed)

8. GreyNet. About GreyNet, no date. <http://www.greynet.org/home/aboutgreynet.html> (12 October 2015, date last accessed)
9. Contact, Help, Advice and Information Network (CHAIN), 2016. <http://chain.ulcc.ac.uk/> (7 January 2016, date last accessed).
10. Delbecq A, Van de Ven A. A group process model for problem identification and program planning. *The J. Of Appl. Behavioral Science* 1971; 7:467-492.
11. Murphy MK, Black NA, Lamping DL, et al. Consensus Development Methods, and their use in clinical guideline development. *Health Technol Assess* 1998;2(3).
12. Toufeeq A, Oram A J. School-entry vision screening in the United Kingdom: Practical aspects and outcomes. *Ophthalmic Epidemiol* 2014;21(4):210-216.
13. Hu VH, Starling A, Baynham S N, Wager H, Shun-Shin G. Accuracy of referrals from an orthoptic vision screening program for 3- to 4-year-old preschool children. *J APPOS* 2012;16(1):49-52.
14. Garretty T. Development of manifest strabismus and reduced visual acuity following initial normal orthoptic examination/pseudo-strabismus under the age of 30 months. *Strabismus* 2014;22(1):26-31.
15. Hall DMB, Elliman D. *Health for All Children*. 4th ed. Oxford: Oxford Medical Publications; 2003.
16. Bennett RL, Sellars SJ, Blanks RG, Moss SM. An observational study to evaluate the performance of units using two radiographers to read screening mammograms. *Clin Radiol* 2012;67(2):114-121.
17. Forbes LJJ, Linsell L, Atkins L, et al. A promoting early presentation intervention increases breast cancer awareness in older women after 2 years: a randomised controlled trial. *Br J Cancer* 2011;105(1):18-21.
18. Bennett RL, Sellars SJ, Blanks RG, Moss SM. An observational study to evaluate the performance of units using two radiographers to read screening mammograms. *Clin Radiol* 2012;67(2):114-121.
19. NHS England, London Diabetes Strategic Clinical network. Footcare service for people with diabetes guidance for commissioners: service specification, 2015. <http://www.londonscn.nhs.uk/wp-content/uploads/2015/05/dia-foot-svc-spec-052015.pdf> (16 November 2015, date last accessed)
20. All Party Parliamentary Group on Vascular Disease. *Tackling Peripheral, Arterial Disease More Effectively: Saving Limbs, Saving Lives*, 2013. [http://appgvascular.org.uk/media/reports/2014-03-tackling\\_peripheral\\_arterial\\_disease\\_more\\_effectively\\_saving\\_limbs\\_saving\\_lives.pdf](http://appgvascular.org.uk/media/reports/2014-03-tackling_peripheral_arterial_disease_more_effectively_saving_limbs_saving_lives.pdf) (16 November 2015, date last accessed)
21. Kerr M, Insight Health Economics. *Foot care for people with diabetes: The economic case for change*, 2012. <https://www.diabetes.org.uk/documents/nhs-diabetes/footcare/footcare-for-people-with-diabetes.pdf> (17 November 2015, date last accessed)
22. All Party Parliamentary Group on Vascular Disease. *Tackling Peripheral, Arterial Disease More Effectively: Saving Limbs, Saving Lives*, 2013. [http://appgvascular.org.uk/media/reports/2014-03-tackling\\_peripheral\\_arterial\\_disease\\_more\\_effectively\\_saving\\_limbs\\_saving\\_lives.pdf](http://appgvascular.org.uk/media/reports/2014-03-tackling_peripheral_arterial_disease_more_effectively_saving_limbs_saving_lives.pdf) (17 November 2015, date last accessed)

23. All Party Parliamentary Group on Vascular Disease. Tackling Peripheral, Arterial Disease More Effectively: Saving Limbs, Saving Lives, 2013. [http://appgvascular.org.uk/media/reports/2014-03-tackling\\_peripheral\\_arterial\\_disease\\_more\\_effectively\\_saving\\_limbs\\_saving\\_lives.pdf](http://appgvascular.org.uk/media/reports/2014-03-tackling_peripheral_arterial_disease_more_effectively_saving_limbs_saving_lives.pdf) (16 November 2015, date last accessed)
24. Health and Social Care Information Centre. National Diabetes Audit 2011-2012, Report 1- Care Processes and Treatment Targets, 2013. <http://www.hscic.gov.uk/catalogue/PUB12258/nda-audi-cg-eng-harr-11-12-rep1.pdf> (16 November 2015, date last accessed)
25. National Diabetes Inpatient Audit 2013, National Summary, 2014. <http://www.hscic.gov.uk/catalogue/PUB13662/nati-diab-inp-audi-13-nat-rep.pdf> (7 January 2016, date last accessed)
26. Rubio JA, Aragon-Sanchez J, Jimenez S, et al. Reducing Major Lower Extremity Amputation After the Introduction of a Multidisciplinary Team for the Diabetic Foot. *Int J Low Extrem wounds* 2014;13(1):22-26.
27. Robbins J, Nicklas B, Augustine S. Reducing the rate of amputations in acute diabetic foot infections. *Cleve Clin J Med* 2006;73(7):679-683.
28. Law J, Garrett Z, Nye C. Speech and language therapy interventions for children with primary speech and language delay or disorder. *Cochrane Database Syst Rev* 2003;(3):CD004110.
29. Law J, Plunkett C, Stringer H. Communication interventions and their impact on behaviour in the young child: a systematic review. *Child Lang Teach Ther* 2012;28(1):7-23.
30. Law J, Reilly S, Snow PC. Child speech, language and communication need re-examined in a public health context: A new direction for the speech and language therapy profession. *Int J Lang Commun Disord* 2013;48(5):486-496.
31. I CAN. Speech, language and communication in secondary aged pupils. I CAN Talk Series – Issue 10, 2011. [http://www.ican.org.uk/~media/ican2/Whats%20the%20Issue/Evidence/ICAN\\_TalkSeries10.ashx](http://www.ican.org.uk/~media/ican2/Whats%20the%20Issue/Evidence/ICAN_TalkSeries10.ashx) (16 November 2015, date last accessed)
32. Gregory J, Bryan K. Speech and Language Therapy intervention with a group of persistent and prolific young offenders in a non custodial setting with previously undiagnosed speech, language and communication difficulties. *Int J Lang Commun Disord* 2011;46(2):202-215.
33. Carnie A, Lin J, Aicher B, et al. Randomised trial of nutrition education added to internet-based information and exercise at the work place for weight loss in a racially diverse population of overweight women. *Nutr Diabetes* 2013;3(2):e98.
34. Grace C. A review of 1:1 dietetic obesity management in adults. *J Hum Nutr Diet* 2011;24(1):13-22.
35. Bhopal RS, Douglas A, Wallia S, et al. Effect of lifestyle intervention on weight change in south Asian individuals in the UK at high risk of type 2 diabetes: a family-cluster randomised controlled trial. *Lancet Diabetes Endocrinol* 2014;2(3):218-227.

36. Hartmann-Boyce J, Johns DJ, Jebb SA, Aveyard P. Effect of behavioural techniques and delivery mode on effectiveness of weight management: Systematic review, meta-analysis and meta-regression. *Obes Rev* 2014;15(7):598-609.
37. Flodgren G, Deane K, Dickinson HO, et al. Interventions to change the behaviour of health professionals and the organisation of care to promote weight reduction in overweight and obese people. *Cochrane Libr* (3), CD000984. 2010.
38. Brandt C J, Brandt V, Pedersen M, et al. Long-term effect of interactive online dietician weight loss advice in general practice (LIVA) protocol for a randomized controlled trial. *Int J Family Med* 2014;245347.
39. Harding S. Dietitians in primary care promote weight loss and glycated haemoglobin reductions. *J Hum Nutr Diet* 2011;24(4):389-390.
40. Morrison Z, Douglas A, Bhopal R, Sheikh A. Understanding experiences of participating in a weight loss lifestyle intervention trial: a qualitative evaluation of South Asians at high risk of diabetes. *BMJ Open* 2014; 4:e004736
41. Krampola M, Papandreou D, Makedou K. The role of Mediterranean diet in health and enhanced wellbeing across the life course, as well as reducing the cost for the NHS. disease: an updated mini review. *Food Sci Nutr* 2011;41(1):63-72
42. Banks J, Sharp DJ, Hunt LP, et al. Evaluating the transferability of a hospital based childhood obesity clinic to primary care: A RCT. *Br J Gen Pract* 2012;62(594):e6-e12
43. Age Concern England and the Mental Health Foundation, Seymour L, Gale E. Literature and policy review for the joint inquiry into mental health and wellbeing in later life. London: Mentality; 2004 <http://www.seniorspolicyLens.ca/Root/Materials/Litandpolicyreview-Fulltextofreport%5B1%5D.pdf> (19 June 2015 date last accessed).
44. Age UK Annual report 2010. <http://www.ageuk.org.uk/about-us/our-work/annual-report-2010-11/> (1 June 2015, date last accessed)
45. Snooks HA, Carter B, Dale J, et al. Support and assessment for fall emergency referrals (SAFER 1): Cluster randomised trial of computerised clinical decision-support for paramedics. *PLoS One* 2014; 9(9):e106436-e106436.
46. Hiscock A, Dewar L, Parton M, et al. Frequency and circumstances of falls in people with inclusion body myositis: A questionnaire survey to explore falls management and physiotherapy provision. *Physiotherapy* 2014;100(1):61-65.
47. National Institute for Health and Care Excellence. Falls: assessment and prevention of falls in older people. NICE Clinical Guideline 161. 2013 <https://www.nice.org.uk/guidance/cg161/resources/guidance-falls-assessment-and-prevention-of-falls-in-older-people-pdf> (22 June 2015 date last accessed).
47. Littlechild R, Bowl R, Matka E. An independence at home service: The potential and the pitfalls for occupational therapy services. *Br J Occup Ther* 2010;73(6):242-250.)

48. Pighills AC, Torgerson DJ, Sheldon T A, et al. Environmental assessment and modification to prevent falls in older people. *J Am Geriatr Soc* 2011;59(1):26-33
49. Mason S, O'Keeffe C, Knowles E, et al. A pragmatic quasi-experimental multi-site community intervention trial evaluating the impact of emergency care practitioners in different UK health settings on patient pathways (NEECaP trial). *Emer Med J* 2012;29(1):47-53.
50. Donnelly CM, Lowe-Strong A, Rankin JP, et al. A focus group study exploring gynecological cancer survivors' experiences and perceptions of participating in a RCT testing the efficacy of a home-based physical activity intervention. *Support Care Cancer* 2013;21 (6):1697-1708.
51. Price N, Dawood R, Jackson SR. Pelvic floor exercise for urinary incontinence: A systematic literature review. *Maturitas*. 2010;67(4):309-315
52. Vos T, Barber R, Bell B, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013 *The Lancet* 386(9995). p.743-800
53. Arthritis Research UK. Musculoskeletal Health- A public Health approach. 2014  
[www.arthritisresearchuk.org/%2F~%2Fmedia%2FFiles%2FPolicy%2520files%2F2014%2Fpublic-health-guide.ashx&ei=D3tIVZCgLS3maKK0gKgL&usg=AFQjCNGPjSSlVn1q7vUvAikATC8tyVYs5g&bvm=bv.92291466,d.d2s](http://www.arthritisresearchuk.org/%2F~%2Fmedia%2FFiles%2FPolicy%2520files%2F2014%2Fpublic-health-guide.ashx&ei=D3tIVZCgLS3maKK0gKgL&usg=AFQjCNGPjSSlVn1q7vUvAikATC8tyVYs5g&bvm=bv.92291466,d.d2s) (22 June 2015, date last accessed).
54. World Health Professions Alliance (WHPA). Health Improvement Card. No date  
[http://www.whpa.org/ncd\\_campaign\\_health\\_improvement\\_card.htm](http://www.whpa.org/ncd_campaign_health_improvement_card.htm) (28 September 2015, date last accessed)
55. Walsh N, Cramp F, Palmer S, et al. Exercise and self-management for people with chronic knee, hip or lower back pain: A cluster randomised controlled trial of clinical and cost-effectiveness. *Study protocol. Physiotherapy* 2013;99(4):352-357.
56. Underwood M, Lamb S, Eldridge S, et al. Exercise for depression in elderly residents of care homes: A cluster-randomised controlled trial. *The Lancet*, 2013 382(9886), 41-49.
57. McDonough SM, Tully MA, O'Connor SR, et al. The back 2 activity trial: Education and advice versus education and advice plus a structured walking programme for chronic low back pain. *BMC Musculoskelet Disord* 2010,11:163-163.
58. Hudson JS, Ryan CG. Multimodal group rehabilitation compared to usual care for patients with chronic neck pain: A pilot study. *Man Ther* 2010;15 (6):552-556.
59. Littlewood C, Ashton J, Mawson S, et al. A mixed methods study to evaluate the clinical and cost-effectiveness of a self-managed exercise programme versus usual physiotherapy for chronic rotator cuff disorders: Protocol for the SELF study. *BMC Musculoskelet Disord* 2012;13:62.
60. Van der Gaag, A, Smith L, Davis S, et al. Therapy and support services for people with long-term stroke and aphasia and their relatives: a six-month follow-up study. *Clin Rehab* 2005;19(4):372-380.

61. Bowen A, Hesketh A, Patchick E, et al. Effectiveness of enhanced communication therapy in the first four months after stroke for aphasia and dysarthria: A randomised controlled trial. *BMJ* 2012;345:e4407.
62. Geeganage C, Beavan J, Ellender S, et al. Interventions for dysphagia and nutritional support in acute and subacute stroke. *Cochrane Database Syst Rev* 2012;10:CD000323.
63. Archer SK, Wellwood I, Smith CH, et al. A survey of speech and language therapists. *Int J Lang Commun Disord* 2013;48(3):283-296.
64. Public Health England, Allied Health Professions Federation, A strategy to develop the capacity, impact and profile of allied health professionals in public health 2015-2018 Strategy from the Allied Health Professions Federation, 2015. [http://www.ahpf.org.uk/AHP\\_Public\\_Health\\_Strategy.htm](http://www.ahpf.org.uk/AHP_Public_Health_Strategy.htm) (11 November 2015, date last accessed)
65. Needle JJ, Petchey RP, Benson J, Scriven A, Lawrenson J, Hilari K. The allied health professions and health promotion: a systematic literature review and narrative synthesis. Final report. NIHR Service Delivery and Organisation programme; 2011. [http://www.netscc.ac.uk/hsdr/files/project/SDO\\_FR\\_08-1716-205\\_V01.pdf](http://www.netscc.ac.uk/hsdr/files/project/SDO_FR_08-1716-205_V01.pdf) (10 January 2016, date last accessed)
66. Royal College of Nursing Going upstream: nursing's contribution to public health 2012 <https://www.rcn.org.uk/professional-development/publications/pub-004203> (date last accessed 15 January 2016)
67. Jayatilleke N, Mackie A. Reflection as part of continuous professional development for public health professionals: a literature review *J Public Health* 2013 35 (2): 308-312
68. Reid J.A. Reflection as part of continuous professional development for public health professionals - further evidence *J Public Health* 2015 37 (2): 360

Requests for access to data and documents underpinning the project will be considered on a case by case basis, but wherever possible access will be granted.