

The Allied Health Professional Workforce: Evidence and Impact

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1. Introduction

Health workforce issues have been on the top of the policy agenda across the globe in recent years. Any dialogue with health policy makers about the health workforce is likely to engender the following key questions:

- How do we plan how many health workers to educate, and employ?
- How can we improve recruitment, retention and return?
- Which incentives are effective in motivating staff?
- How can we determine and deploy the most effective skill mix of staff?
- How do we improve productivity?

These health workforce challenges were summarised by WHO in the 2006 World Health Report, which presented an estimate that there was a world-wide shortage of almost 4.3 million health care workers, and that 57 countries, mostly in sub-Saharan Africa, had critical shortages. Sub-Saharan Africa had only 4% of health workers but 25% of the global burden of disease (GBD); in contrast the Americas had 37% of health workers but only 10% of GBD (WHR 2006). One critical dimension of “shortages” is that there is uneven distribution of health workers to meet demand, by country, by region, by sector and by occupational mix.

Against this backdrop of global shortages, and in the context of cost containment measures in many countries, developed and developing, it is critical that the allied health professional (AHP) workforce receives sufficient policy attention to enable it to make an optimal contribution to meeting health needs. At the moment, this is not happening fully in many countries and contexts. In part this is because the AHP workforce is often a newer element in the health system, and may not have developed the policy influencing mechanisms that are used by more “established” and larger in number professions such as medicine and nursing. In part it can also be because some policy makers do not understand fully just what a contribution is being made, and could be made, by the AHP workforce.

This paper summarises the recent evidence base on the contribution of the AHP workforce to health service delivery, and highlights current AHP workforce priorities.

The term “AHP” covers a range of different professions, many of which are relatively small in number compared to the larger professions of nursing and medicine. There are a range of highly relevant issues which must be addressed in order to ensure that the AHP workforce has the right “visibility” to policy makers. This includes clarity of roles and role definitions; a recognition that there can be a “small number” issue in relation to workforce planning; a “small number” issue in relation to career progression, and that being a “small number” does not mean that AHP roles are not critical in the health care chain.

In relation to role definitions, there is already much good work underway in some countries to clarify and delineate roles with the broader AHP workforce, to make the appropriate distinctions between different registered/professional roles and assistant/aide/helper roles. This is necessary work, but not in itself sufficient to get the AHP workforce firmly on the policy agenda. Indeed there is the potential for policy makers to be distracted from an understanding of the value and contribution of AHPs if they get too involved in (what they would regard as) a detailed process of professional debate and discourse. They need to be able to focus on the output of the work of AHPs and understand their contribution and potential.

This risk of distraction stems from the fact that there is no universally definitive list of what constitutes an “allied health profession”, and therefore across the globe, different countries have different definitions of which professions make up the allied health workforce (see Table 1 for examples). Within the UK, for example, fifteen professions are regulated by the Health Professions Council (HPC, <http://www.hpc-org.uk>), with whom all practising AHPs are legally required to be registered. It currently has around 205, 000 registrants. In contrast in Australia, there are fifteen professions which are members of the Allied Health Professions Australia (AHPA, <http://www.ahpa.com.au>), representing over 90, 000 AHPs. In the USA, the term “allied health” is used as a loose categorisation of professions or occupations, and some of the allied health professions have personnel regulation through licensure that is controlled by each of the 50 States. The Health Professions Career and Education Directory (published by the American Medical Association) lists 60 occupations generally considered to be allied health, however many are simply different levels within the same overall field or discipline (e.g. physical therapist/physical therapist assistant), or be very similar or use different names (e.g. clinical assistant and medical assistant).

Whilst there is diversity within the broader AHP workforce (see Table 1 for examples), there is also evidence of interprofessional collaboration, with scope for more development of common core competences across AHPs (see e.g. in Canada, Verma *et al.* 2009).

Table 1: Examples of AHP Professions

Profession	COUNTRY	UK	HONG KONG	USA
Anesthesiologist assistant				X
Arts therapist (art, music, drama)		X		X
Audiologist			X (technician)	
Biomedical scientist		X		
Certified athletic trainer				X
Certified medical assistant				X
Certified surgical assistant				X
Chinese Medicine practitioner			X	
Chiropodist/podiatrist		X	X	
Chiropractor			X	X
Clinical scientist		X		
Cytotechnologist				X
Dietitian (+ nutritionist)		X	X	X
Exercise physiologist				X
Genetic counselor				X
Hearing aid dispenser		X		
Medical/laboratory technologist			X	X
Occupational Therapist		X	X	X
Operating department practitioner		X		
Optometrist			X	
Orthoptist		X	X	X

Paramedic	X		
Pharmacist		X	X
Physiotherapist/Physical therapist	X	X	X
Prosthetist/Orthotist	X	X	X
(Practitioner)Psychologist	X	X	
Radiation therapist and/or sonographer		X	X
Radiographer	X	X	X
Respiratory therapist	X		X
Social Worker		X	
Speech & Language therapist/ pathologist	X	X	X

Notes: Hong Kong – Supplementary Medical Professions Council (SMPC, <http://www.smpc-council.org.hk/smp/english/index.htm>) only encompasses 5 professions - medical laboratory technologists, occupational therapists, optometrists, physiotherapists and radiographers. Chiropractors (Chiropractors Council, <http://www.chiro-council.org.hk>) and pharmacists (Pharmacy and Poisons Board of Hong Kong) have their own respective boards. Hospital Authority (<http://www.ha.org.hk>), (a statutory body established under the Hospital Authority Ordinance in 1990, responsible for managing Hong Kong's public hospitals and their services to the community since December 1991) employs at least 18 professions, including dispenser, scientific officer, physicist, mould technologist.

UK – All 15 allied health professions are regulated by one national body, the Health Professions Council (www.hpc-uk.org).

USA has no well defined group of professions/occupations, with even the non-governmental organization that represents many schools of allied health, The Association of Schools of Allied Health Professions (www.asahp.org) providing examples, rather than a specific listing of professions. There are many other professions than those listed above, e.g. certified athletic trainers, cytotechnologist, electroneurodiagnostic technologist, histotechnologist, kinesiotherapist, magnetic resistance technologist, ophthalmic assistant, paraoptometrist. The Health Professions Network (www.healthpronet.org), a not-for-profit association, is a nationwide collaborative group of organizations representing leading health professions associations, accrediting agencies, and educational institutions, as well as federal and state workforce analysts and licensing and certification bodies.

If there is a risk that policy makers could be “switched off” by the debate on definition of the professions, there is a bigger challenge in ensuring that the AHP workforce is fully recognised in national level health planning and policy making, and is visible in cross country comparisons. The standard definition of classifications of occupations most used in this type of approach is the International Standard Classification of Occupations (ISCO). Tables 2A

and 2B show how health profession and health “associate profession” occupations are categorised by ISCO. It becomes clear immediately when examining these tables that AHPs are not fully categorised or differentiated.

A cursory glance at Table 2A shows that some AHP categories – physiotherapists, dieticians/nutritionists, audiologists/speech therapists receive their own (or dual) classification; and some others such as occupational therapists and podiatrists are covered explicitly, but in combination, but within a catch-all category of “Health professions not elsewhere classified”. Clearly, from the perspective of some individual AHP professions, this is not a satisfactory place to be in terms of arguing the case for full recognition and visibility. The issue is even more pronounced for the “associate” role (Table 2B). Only physiotherapy technicians/assistants get their own billing; most other AHP categories are combined together and largely individually invisible, in the “Others not classified elsewhere” category.

Table 2A: Health profession classification

2211	General Medical Doctors
2212	Specialist medical practitioners
2221	Nursing Professionals
2222	Midwifery Professionals
2230	Traditional/complementary medicine profs
2240	Paramedical practitioners
2261	Dentists
2262	Pharmacists
2263	Environmental and occupational health and hygiene profs
2264	Physiotherapists
2265	Dieticians and nutritionists
2266	Audiologists and speech therapists
2267	Optometrists/ophthalmic opticians
2269	Health profs not else where classified (OT, podiatrist etc.)

Table 2B: Health “associate profession” classification

3211	Medical Imaging/equipment techs
3212	Med/path lab techs
3213	Pharmaceutical techs and assistants
3214	Med/dental prosthetic techs
3221	Nursing associate profs
3222	Midwifery associate profs
3230	Trad/compl med associate profs
3251	Dental assists
3252	Medical records techs
3253	Comm health workers
3254	Dispensing opticians
3255	Physiotherapy techs/assts
3256	Medical assistants
3257	Environmental and occupational health inspectors and associates
3258	Ambulance workers
3259	Others not classified elsewhere
3211	Medical Imaging/equipment techs

Source: ISCO (<http://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm>)

At a higher level of analysis of the health workforce, the AHP workforce becomes even less visible. In its “World Health Statistics 2010”, WHO (2010) used 6 categories to analyse and provide country comparisons of the “health workforce”: Physicians, Nursing and Midwifery personnel, Dentistry personnel, Pharmaceutical personnel, Environment/public health workers, and Community health workers. It is understandable that there is a need to aggregate up to create a small number of staffing indicators, but in this process of aggregation, the AHP workforce loses out, in part because of a lack of common roles/titles/professions across countries, and in part because of the small number issue; in total, the AHP workforce may be large, but it is comprised of a broad range of discrete professions, aides and assistant grades.

This process of aggregation of a range of smaller and discrete professions and occupations means that it is imperative that national and international policy makers develop a more

informed understanding of the actual and potential scope of contribution of AHPs to meeting current global health priorities and needs.

2. Literature Review

In order to provide a deeper insight into the contribution of AHPs, a scoping review of the evidence base was undertaken for this report. English language literature, published between 2005 and 2010, was searched using the following key terms: physiotherap*; physical therap*; occupational therap*; speech therap*; speech pathology; diet* OR nutrition*; podiatr*/chiroprac*; radiograph*; radiation therap*; arts therap*; audiolog*; prosthet*/ orthot*; psycholog*; pharmacy*; respiratory therap*; orthop*; allied health; allied health professional/AHP. An initial search was conducted in CINAHL, and relevant titles and abstracts were examined to identify related terms and synonyms. These were then combined with the following terms and a new search carried out: new/extended roles, consultant, workforce planning, shortages, recruitment and retention, skill mix, impact evaluation, outcomes, innovation. Further searches using all identified search terms were then carried out in CINAHL, PsycInfo, Web of Science, Medline, SCOPUS, and the Knowledge Network (NHS Scotland).

It is recognised that the very diversity of AHP roles, titles and contributions means that a comprehensive literature search is difficult. This scoping review does not claim to be comprehensive, it is intended to provide insight and contribute to a broader understanding of the AHP roles and contribution.

Over 200 peer-reviewed articles were identified and the titles and abstracts were assessed. Full copies of potentially relevant papers were then obtained for more detailed examination. Inclusion criteria focused on studies which gave descriptions of good practice, illustrative vignettes, innovative practices, or evaluation and findings which demonstrated improved care or cost savings through employment of allied health professionals. From the initial electronic search of over 200 papers, approximately 50 were identified for inclusion in this review. Data collected from each of the included studies included author, year of publication, type of study, country of origin, roles and responsibilities. The papers were from Australia, Canada, Hong Kong, UK, and USA. There is an acknowledged limitation that the paper only draws from English language publications.

The available literature is unequally distributed across the different professions under the umbrella term 'allied health', with the majority of papers identified relating to physiotherapy (or physical therapy), occupational therapy and speech and language therapy, the three disciplines employing the largest number of AHP professionals in most countries. The papers

that were reviewed generally fall into one of four categories (with some inevitable degree of overlap);

- change in or new way of working;
- change to, or new/extended job role;
- workforce recruitment and retention;
- and outcome measurement.

A narrative summary of the papers is presented below, using this four category typology.

CHANGE IN/NEW WAY OF WORKING

Several of the identified papers focused on ways of better meeting demand for services, whilst maintaining and improving the quality of service provision, by rethinking “traditional” means of education preparation or service delivery.

Rodger *et al.* (2008) reported on discussions by an international group of AHP educators (audiology, OT, physiotherapy and speech pathology), around clinical education and practice placement issues. The group, part of Universitas 21, has representatives from 23 universities in 15 countries (including UK, Canada, Australia, Hong Kong, USA and Singapore), who looked at educational programmes in place in the different countries, and recent changes in health and tertiary education sectors. A new approach, through partnership working, for creation of frameworks for provision of practice placements to facilitate student learning and educate and support clinical educators, has been put forward. The group has proposed to develop a set of guidelines to enhance partnerships and collaborative practice for the benefit of clinical education, within the complex and rapidly changing health and human service and educational environments.

In England and Wales there was a national policy focus on supporting changes in the way that AHPs were trained and deployed. The New Ways of Working Programme for Allied Health Professionals (CSIP/NIMHE 2008) was a national workforce programme represented a move to dispersed responsibility in multi-disciplinary teams with a person centred/recovery focus, within the field of mental health care. As part of the programme, a collection of good practice/innovation examples was produced in order to reflect the range of work in which

AHPs were involved, in terms of service development/ change and positive practice for service users and carers. The programmes were categorised into four themes, Education and Training, New Roles, System Reform and Working in Teams. Examples of ‘system reform’ projects are the development of an in- to out-patient art psychotherapy service within adult mental health; the development of enhanced day therapy services within a recovery model, involving occupational therapists, cognitive behavioural therapists and psychologists; and a weight management programme, run by a senior physiotherapist and exercise specialist, with input from dietetics, pharmacy, psychiatry, psychology, and nursing staff. Examples from the ‘working in teams’ theme include a speech and language therapy service working within a multi-disciplinary team, who work with people with Huntington’s disease; a community homes health team to provide support and intervention for young offenders and looked after children, involving speech and language therapy, art therapy and music therapy; and occupational therapists working in Adult Community Mental Health Teams, forming resource Therapy Teams, providing a range of services to service users in the locality.

Another recent UK study explored the use of business process design (BPR) techniques within an occupational therapy (OT) setting, in an attempt to address insufficient capacity to meet growing demand for services, insufficient funding, difficulties in filling posts and long waiting lists for treatment (Horton & Hall 2008). BPR is the systematic critical examination and reworking of systems to improve the quality and efficiency of services. The study focused on an OT service within one Primary Care Trust (PCT), in England. Problems with the existing service were identified, such as long waiting lists, non attendees, insufficient staff numbers, inappropriate referrals and insufficient physical space, resulting in low staff morale, high staff turnover and vacant posts. Possible solution and implementation strategies were developed and evaluated, whilst adhering to best practice guidelines from the College of Occupational Therapists. Waiting list strategies were devised and a demand/capacity analysis was carried out; a realistic workload was determined, to prevent staff burnout and increase retention. Care pathways were developed via identification of differing levels of service delivery, ranging from optimal to minimal. Staff retention was enhanced by changes to continued professional development (CPD), introduction of flexible working hours and a clear supervision structure, and streamlining of duties. Evaluation was positive. Overall, verbal and formal complaints dropped significantly, and waiting times reduced dramatically from an average of 2.3 years to eight weeks. All posts were filled with permanent staff, dramatically reducing the turnover rate. Therapists had manageable caseloads, and a high

level of work satisfaction, and additionally were able to focus on research and project development.

In Scotland, Hall and Curzio (2008) conducted a survey of 1714 allied health professionals relating to implementation of clinical governance. The participants were representative of physiotherapy, radiography, occupational therapy, dietetics, speech and language therapy and podiatry. The survey revealed that AHPs were positive towards, and partially involved in clinical governance, but felt that they did not have appropriate skill, attitude or support to fully engage or take leadership roles. Barriers related to instigating change in practice, sharing and putting evidence into practice were encountered. Certain professions felt more supported and confident in their practice of clinical governance than others. Levels of engagement, awareness, skill, attitude and perception of support increased with grade, with part-time and newly qualified professionals less aware. Five predictors of clinical governance were found; perception of support for clinical governance; values and belief towards clinical governance; knowledge and skill in clinical governance; grade; and hours of service. The authors suggested a multifaceted change management approach would be the most successful strategy to facilitate future engagement of Scottish health professionals in clinical governance.

Within some countries, owing to geographical size and remote and scattered populations, telehealth has become an important tool in the delivery of services. One study looked at the achievements and challenges to policies for allied health professionals using telehealth in the Canadian Arctic (Hailey *et al.* 2005). The authors developed policies and procedures for professionals providing services within audiology, dietetics/nutrition, midwifery, occupational therapy, ophthalmology, pharmacy, physiotherapy, psychology, respiratory therapy, social work and speech therapy. Documents specific to each of the services were developed, using information from Nanavut Government data, healthcare providers and links made through the internet. Topics included the scope and limitations of telehealth services, staff responsibilities, training and reporting, professional standards and cultural considerations. The authors concluded that the policies and procedures for the AHPs would enhance and expand the successes already achieved through telehealth in this region.

A rehabilitation programme in rural Australia was evaluated by Dow *et al.* (2010), whereby five separate health authorities (hospitals) worked together in order to deliver a shared

rehabilitation service. This included sharing the resources of a Project Leader, a programme OT, and existing medical records, as well as workforce and training initiatives, such as rehabilitation outcome measures. Clients were able to attend different locations, depending on the input required, and the accessibility to them of the location. The programme relied mainly on existing resources, with staff taking on additional part-time responsibilities and/or roles. The full time project leader worked across all five sites, advising on referral and assessment, and provided a case management role. The additional full time OT worked across all sites, providing assessment and therapy (this post was subsequently changed to 2 part-time positions, in order to reduce travel obligations). The programme underwent a three phase evaluation (formative, process and impact) and showed significant improvements to Barthel Index scores (measures of performance in basic activities of daily living) and reduced Length of Stay, in comparison to the state average. Results of the evaluation showed that staff overall reported improvements in the coordination of care, assessment and referrals. A client satisfaction survey showed that the programme was very well received by the vast majority of clients.

Stevens & Vecchio (2009) investigated labour substitution across nursing and physiotherapy within the home care sector in Australia. Data were collected from 218 clients of a branch of a community-based service agency operating nationally in Brisbane, over a three month period in 2005. Regression analysis revealed that when either AHP or nursing time rose by 10%, with all else held constant, it was predicted that the other would fall by 4%. The subcategories, registered/enrolled nursing and physiotherapy, appeared to drive the inverse relationship between nursing and allied health service time. It was found that registered/enrolled nursing was more sensitive to changes in physiotherapy rather than the other way round. The higher labour turnover among allied health staff compared with nursing staff implied a substitution of labour between the two professions to ensure that the clients' needs were met. The authors concluded that health policy makers and health care professional educators need to acknowledge that workforce shortages will inevitably reshape professional boundaries.

The effects of workplace policy on continued professional development (CPD) for OTs in Nova Scotia in Canada were examined by Townsend *et al.* (2006). The study used a multi-methods design, comprising a critical appraisal of the literature, interviews and focus groups with 28 OTs and four health service administrators, and a review of workforce policy. The

lack of policy defining who was responsible for ensuring availability of/access to CPD, or policy which limited employee benefits and work flexibility options for those with family responsibilities, particularly in female dominated professions where there may also be gender-based challenges, were highlighted as problematic by respondents. The authors concluded that health services recruitment and retention was likely undermined by the absence of an explicit workplace policy to support continuing CPD, and gave suggestions for improvement, e.g. policy makers could facilitate collective policy discussion with representatives of those professions which do not currently have policy support for CPD, and health professions need to inform workplace policy makers, unions, and regulatory bodies of changes of the potential service, recruitment, and retention benefits of using policy to routinely stimulate participation in CPD.

CHANGE TO/NEW JOB ROLE:

There has been a rapid transformation in the role boundaries of allied health professions in some countries, facilitated through the creation of new roles, some at “assistant” level and the expansion of existing roles into various types of advanced practice.

A strategy of health care ‘modernisation’ has resulted in the redrawing of professional boundaries and identities, linked with demands for greater workforce flexibility. Tasks and roles previously only carried out by medical professionals have been delegated to, or assumed by, allied health professionals (Borthwick *et al.* 2010). Allied health assistants (also variously called support workers, community rehabilitation support workers, and therapy assistants) are now employed as a means of improving and increasing allied health service delivery. Many factors (such as scarcity of allied health professionals in specific areas, the generally ageing population, an increase in the prevalence of chronic diseases, as well as the cost of managing the ramifications of chronic diseases in the tertiary health sector, increasing community demand for allied health services, more thinly spread allied health resources, and limited access to university allied health training programs) have driven the agenda of allied health workforce reform since then, and the numbers of assistants continue to rise, in some countries (Lowe *et al.* 2008).

Mackey & Nancarrow (2005) described and evaluated the introduction of assistant

practitioners (APs) in occupational therapy who were empowered to work independently in a limited number of interventions and services within an NHS trust in England. Key themes emerging from the study were ambiguity about who takes responsibility for the outcomes of care, and uncertainty about challenging the role of the 'professional' staff. There was a lack of clarity about how work is 'delegated' to the assistant practitioners and it was difficult to determine levels of competence in the new workers, because the existing staff did not recognize their qualifications. The authors recommended that these issues needed to be addressed in order to optimize the relationships between staff clarify the roles of team members, and ensure that service users receive the most appropriate care from the most appropriate practitioner.

In remote areas of Western Australia, multidisciplinary therapy assistants are employed to provide allied health services often working across physiotherapy, occupational therapy and speech pathology, resulting in work that is broad in scope and client mix. Goodale *et al.* (2007) evaluated a discrete training programme for therapy assistants (TAs) which relied on the use of telehealth. A key aim of the programme was the development of a training pathway for TAs toward a recognized qualification. The training modules were delivered by rural and remote allied health professionals via videoconference, thereby reducing the need for AHPs to travel to distant sites, and enabling therapy assistants to use on-the-job training to achieve a recognized qualification. Post-session evaluation reported a high general level of satisfaction with the training, and found that the stand-alone training packages, which were also adapted for distance learning, improved the sustainability and accessibility to training.

Duncan *et al.* (2006) reported on a new role of dietetic assistant (DA) within an acute trauma ward in a teaching hospital in England. The DA role helped to increase energy intake by ensuring nutritional supplements were offered regularly to patients following hip fracture, and helping and encouraging them to drink them, and to feed themselves. The study used an open prospective randomised control trial with 302 patients, 157 of whom received conventional care, and 145 of whom received additional DA support. Evaluation showed significant improvements in dietary energy intake and a pattern of improved nutritional and anthropological indices. Additionally, it was shown that the employment of DAs significantly reduced patients' risk of dying in the acute trauma unit, and also freed up nurses to carry out other duties.

A recent systematic review by Lizarondo *et al.* (2010) explored the roles and responsibilities of allied health assistants (AHAs). From the original 415 papers identified, ten were included in the study. The majority of papers reported roles performed by general health care assistants, or rehabilitation assistants working in multiple settings or not specifically affiliated to a health discipline, but the roles of OT assistant, psychology assistant and physiotherapy assistant were described. The review found that benefits from the introduction of the AHA role in healthcare included improved clinical outcomes, increased patient satisfaction, higher-level services and allowed more “free” time for AHPs to concentrate on patients. The authors identified clear advantages associated with the use of AHAs to support allied health service delivery, but also barriers in the form of blurred role boundaries, raising issues relating to professional status and security.

In their systematic review of the extended scope of practice of physiotherapists, Kersten *et al.* (2007) identified 152 papers. The review found overwhelming support for extended scope of practice, despite most articles being descriptive or discursive in nature (76%), but little in the way of robust evidence to exemplify effectiveness or safety of extended scope of practice in physiotherapy. However three studies, outlined below, found positive evidence for different extended practice physiotherapy roles.

A “gatekeeper” role for physiotherapists, whereby they screened patients referred by General Practitioners (GPs), prior to a first consultation with an orthopaedic surgeon was assessed in a Australian hospital (Oldmeadow *et al.* 2007). Two physiotherapists were employed in the new screening role, both with postgraduate qualifications in musculoskeletal physiotherapy. The study found that experienced well qualified physiotherapists competently and safely undertook screening of patients referred to hospital orthopaedic out-patient clinics with non-urgent musculoskeletal pain, and both patients and doctors reported high levels of satisfaction with the physiotherapy-led service. Half of the sample could have been managed by the physiotherapists alone. The next step would be to introduce and evaluate this type of clinic on a large scale, and over a longer period of time.

Another Australian study investigated the advanced practice role for physiotherapists in outpatient departments, this time relating to a physiotherapy-led triage clinic (PLTC) for lower back pain (Blackburn *et al.* 2009). A retrospective cohort study was undertaken. Outcomes assessed included waiting times to first appointment, patient attendance and surgery conversion rates, which were compared with the hospital benchmark data. General

practitioner (GP) satisfaction was evaluated. One-hundred and five new patients attended the PLTC clinic during the evaluation period. Patients waited 9 weeks for a PLTC appointment compared with 26 weeks for the general orthopaedic clinic and 23 weeks for the spinal orthopaedic clinic. Sixty-seven percent of the patients triaged in the PLTC were discharged from the orthopaedic outpatient department without requiring an orthopaedic surgeon consultation. Referring GPs were at least as satisfied with the management of their patients through the PLTC as with usual management in the general orthopaedic clinic. The study concluded that a PLTC can significantly reduce waiting times for orthopaedic outpatient appointments in a public hospital. Many patients can be managed by these experienced physiotherapists and their GPs, without the need for face-to-face contact with an orthopaedic surgeon.

Aiken *et al.* (2008) evaluated the role of the extended practice physiotherapist in Canada. A physiotherapist and orthopaedic surgeons assessed patients (n=38) referred for surgery and found (with 100% agreement on surgical versus non surgical decision making between the two healthcare professionals) that 34% did not require surgery, and that all patients required appropriate conservative management. All patients who were surgical candidates were appropriately identified by the physiotherapist and were therefore referred to a surgeon for confirmation and surgical treatment. These findings led to the development and implementation of model of care that not only met orthopaedic demands, but also improved treatment options for orthopaedic patients, and met with high levels of satisfaction, demonstrated through completion of a clinical measure, and a patient satisfaction survey.

Price & Le Masurier (2007) examined the extended role of radiographer within the UK. The delivery of radiographic services is by a four-tier structure of assistant practitioners, practitioners, advanced practitioners and consultant practitioners. The authors examined the nature of extended role tasks and staff in 177 NHS trusts (68.6% response rate). In 166 trusts, radiographers administered intravenous injections, performed barium enemas in 147 trusts and barium meals in 19 trusts, and abnormality detection (e.g. a red dot system) was operational in 143 trusts. Each category showed an increase since 2000. Radiographers reported on ultrasound at 146 trusts, appendicular skeleton at 81 trusts, and axial skeletal reporting at 70 trusts, barium enemas in 78 trusts, as well as increased reporting on barium meals, mammography, nuclear medicine, paediatric and chest radiography. 59% of trusts reported that they employed assistant practitioners, 47% advanced practitioners and 3%

consultants. A number of trusts had plans to introduce assistants, advanced practitioners and/or consultants over the following two-year period. The findings highlighted the extent to which NHS acute trusts were utilising the skills of radiographers and indicated the growing use of extended scope of radiographic practice.

A socio-historical analysis by Borthwick *et al.* (2010) examined the development of podiatric prescribing, access, supply and administration of medicines in Australasia and the UK. The authors highlighted the influence of health policy drivers at work in determining change, and the speed and scope of the changes within the last decade. They concluded that the advent of neo-liberal healthcare policies, along with demands for workforce flexibility and role transfer has enabled AHPs to undertake an expanding number of tasks, involving the sale, supply, administration and prescription of medicines. Whilst these changes have not gone unchallenged by the medical profession, the broader policy agenda continues to ensure workforce redesign whereby podiatry has assumed wider roles and responsibilities in prescribing, in order to promote a fit-for-purpose health service for the 21st century.

Another Australian study (Rodger *et al.* 2009) evaluated the pilot trial of two innovative placement models in the area of OT mental health, namely role emerging and collaborative supervision. Role emerging placements involve establishing an OT role where one does not currently exist while another health professional provides direct supervision. Additional supervision is provided by a local OT working in a different service or university employed therapist. Collaborative supervision involves two or more students attending placements together with one shared OT supervisor. The project was set up in response to workforce shortages in mental health. Six OT students and eight practice educators were surveyed pre- and post-placement, regarding implementation of the models. Students participating in these placements reported they were highly likely to work in mental health upon graduation, and practice educators were positive about undertaking innovative placements in future. Whilst the study relates to a small sample size, the results indicated the potential of innovative placement models to provide valuable student learning experiences in mental health.

McPherson *et al.* (2006) conducted a systematic review of evidence regarding extended roles for AHPs – paramedics, physiotherapists, occupational therapists, radiographers and speech and language therapists. An expanded Cochrane Collaboration was method used, and of 355 papers identified, 21 studies were progressed to full review and data extraction. With regard to radiographers, studies suggested that they appear able to be trained in diagnostic and

therapeutic skills to a level of performance similar to that of medical colleagues and the performance was acceptable to patients after postgraduate training. The majority of literature evaluating extended scope practice (ESP) roles in paramedics had focused on specific skill acquisition, such as carrying out pre-hospital thrombolysis, and telephone assessment to identify patients who are less likely to require A&E care or hospital admission. Several studies relating to physiotherapists indicated that therapists had expanded their roles to increase their professional autonomy and skills, with similar findings for the two occupational therapy studies included. There was little published work evaluating ESP in speech and language therapy at the time of the review, but one unpublished study suggested that the time taken to complete voice therapy (using fibreoptic videolaryngeal endoscopy, which is ESP for speech therapists) was significantly shorter in the ESP group of therapists, leading to revised policy for training and competency for therapists involved in this practice. The authors concluded that a range of extended practice roles for AHPs have been promoted, and are being undertaken, but their health outcomes have rarely been evaluated, and as such, there is little evidence about how to best introduce such roles, or how to best educate, support and mentor these practitioners.

Nancarrow *et al.* (2005) set out to explore the range of support worker roles developing in intermediate care services in the UK. They surveyed 33 intermediate care services which employed 794 support workers and 368 professionally qualified staff. The roles constituted working in multidisciplinary settings, meeting rehabilitation needs, providing personal care and enablement, as well as administrative support in some cases. The most commonly reported sources of support worker training were National Vocational Qualifications and in-house training. In 80% of the services, at least half of the support workers had a qualification. Three models of supervision emerged across the services: the allocation of a mentor; team supervision; and formal and informal line management. These findings illustrated the diversity of employment of support workers in intermediate care. The variations in training, supervision and skill mix have implications for clinical governance and support worker regulation.

Another study investigating new generic support worker roles within rehabilitation and intermediate care services in the UK was carried out by Stanmore & Waterman (2007). The authors examined a joint project in one region in northwest England, and described the process of introducing new roles within rehabilitation and evaluated the acceptability and integration within different settings. Thirty support worker staff from an Acute Trust, a

Primary Care Trust, and Social Services were trained over an 18 month period to become generic rehabilitation assistants (RAs). Fifty five semi-structured interviews of patients, associated professionals and RAs were conducted to examine the acceptability and integration of the new role. Interviews were recorded, transcribed, inductively analysed and categorized into themes. Several factors appeared to influence the acceptance and integration of the new role: prior experience and degree of role change, familiarity and inter-staff relationships, role distinction and contribution, and resources and management. Despite many challenges, great appreciation of the new role was reported by all respondents. The evaluation demonstrated how an innovative, inter-organisational approach could deliver new solutions to address workforce issues.

WORKFORCE PLANNING, RECRUITMENT AND RETENTION

Developing a more effective policy and practice in relation to the recruitment and retention of AHPs has been a common theme of the literature; this includes a specific focus on AHP services in rural areas. This section covers two types of publication. Some focus on assessing data and trends to identify shortages or mismatch between supply and demand. These are described first. Other papers focus more on specific solutions or interventions to improve recruitment and retention; these are described later in the section.

A study by Anderson *et al.* (2005) explored labour force data from the New South Wales Physiotherapists' Registration Board over almost three decades. The results indicated that the demographics and working patterns of physiotherapists in New South Wales have remained remarkably stable over time. Although the workforce continues to grow, the growth rate has decreased markedly with only a 2.3% increase from 2001 to 2002. The proportion of men within the profession is steadily increasing; in 1975 men accounted for 5.2% of physiotherapists, in 2000 23.5% of physiotherapists were male. While the male workforce increases, the female workforce is ageing. The modal age for female physiotherapists has steadily increased from 25-29 years in 1975 to 40-44 years in 2001. Importantly, in relation to attrition, the degree of workforce participation has not undergone significant change since 1987. Although labour force analysis has demonstrated that the workforce is in shortage, attrition does not appear to be the major contributor to this situation. The proportion of the profession who are inactive has remained relatively stable since 1987. More pertinent to the

current shortage is the slowing of the growth rate of the profession while demand for physiotherapy services continues to rise

Several of the above findings were supported by McMeeken *et al.* (2008) who conducted a demographic study of 2003 graduates, 2004 student intake and estimated 2007 student intake, across 11 schools of physiotherapy in Australia. They too found that the Australian physiotherapy student intake had been increasing and that attrition was lower than university average, and that more males were entering Masters programmes. The percentage of Masters and international students was also increasing, and the physiotherapy attrition rate was 5% vs. 25% across universities. It was suggested that a substantial increase in new physiotherapists might serve to ease workforce demands in the short term, however, the study highlighted evidence of significant pressure on physiotherapist academics and clinical educators.

Powell *et al.* (2008) conducted a survey of the US occupational therapy workforce. A 31 question survey was sent to rehabilitation administrators and managers to a proportional random sample of 556 facilities, who employed OTs in 29 states, during 2005/2006, and received a response rate of 55%. They found a vacancy rate of 8.9% for OTs, and 7.7 for OT assistants. Forty five percent of respondents predicted an increase in OT positions, and 33% an increase in OT assistant positions in next 2 years...Difficulties in hiring OTs were reported by 67%, and in hiring OT assistants by 62%. The study identified a serious shortage of OT practitioners at a time when predictions of workforce demands continue to grow.

Also in the US, Zimbelman *et al.* (2010) recently examined current and future physical therapy (PT) job surplus/shortage trends nationwide. Forecast models and grading methodology previously utilised for nursing were used to evaluate individual state PT job shortages from 2008 to 2030. The forecast model used to project PT job supply and demand accounted for changes in age and population size on the basis of estimates from the U.S. Census Bureau for each of the 50 states. PT shortages were assigned letter grades on the basis of shortage ratios (difference between demand and supply per 10,000 people) to evaluate PT shortages and describe the changing PT workforce in each state. On the basis of current trends, demand for PT services will outpace the supply of PTs within the United States. Shortages are expected to increase for all 50 states through 2030. By 2030, the number of states receiving below-average grades for their PT shortages will increase from 12 to 48. States in the Northeast are projected to have the smallest shortages, whereas states in the south and west are projected to have the largest shortages. These data serve to provide health

professionals, policy makers, and stakeholders with a means of assessing current and future PT needs. Discussion of the issues surrounding PT shortages and ongoing assessment of supply and demand must ensue to mitigate projected shortages. Although our model has several limitations and may be oversimplified, it is the first attempt to use available, creditable data to examine both supply and demand for the entire country. Follow-up studies that use more complex modelling are needed to adequately forecast future trends beyond that accomplished in the current article. Monitoring trends over time is critical to maintain an appropriate balance between PT supply and demand that meets the population needs.

Dodd *et al.* (2009) undertook a comparison of Gen X (30-39 years), Gen Y (20-29 years) and Baby Boomer (40-60+ years) physiotherapists, speech pathologists, and OTs in Australia. The survey covered sociodemographic profile and employment history, and asked AHPs open-ended questions on recruitment, retention and mobility. The survey found that reasons that Gen Y AHPs left their employer were to travel, to work with a different client group, or because of a lack of professional development. Reasons given by Gen X AHPs were to have children, and because of the impact of work on family and travel. The survey found that AHPs are more likely to consider staying with an organisation when they are able to attain higher levels of competency and professional development, there is good peer support, and workplace encourages 'continuous learning culture'. The study also highlighted the importance of interprofessional collaboration, so that AHPs can develop skills in different areas, such as research and management.

A recent Canadian modified Delphi study (Tran *et al.* 2008) was carried out to identify recruitment and retention strategies for rehabilitation professionals. A total of 34 strategies were identified as being important and feasible for the development of a health human resource plan for recruitment and retention. Seven were categorised under Quality of Worklife and Work Environment theme, another seven in Financial Incentives and Marketing, two in Workload and Skill Mix, thirteen in Professional Development, and five in Education and Training. Three main areas identified for focus for recruitment and retention strategies:

Quality of worklife and work environment – personal safety; work safety; communication between employer/employee; training/growth opportunities; real resources; workplace audit and congruence between employer and staff values.

Financial incentives and marketing – rural and remote orientation packages; increase public awareness of rehab careers; increase awareness of rehab careers; employer/workplace awards; family relocation programs; competitive wage packages

Professional development – preceptorship training; rural and remote mentors; career paths; minimize rural and remote isolation; access to research information; flexible delivery in CPD; continuing education; rural practice scholarships; percentage payroll to professional development; competency-based education training; rural and remote teaching and training activities; clearinghouse resource centre; community-based professional development.

Probst & Griffiths (2009) identified and explored the current and developing roles and responsibilities of therapist radiographers in the UK, and the impact of these factors on job satisfaction. This involved an interpretive study utilising unstructured interviews with therapists (N=18), across a range of grades and experience, from three radiotherapy centres. From the interviews, factors which influenced job satisfaction fell under three main headings: job design, leadership and organisational governance, and stress or burnout. The study provided preliminary data to design retention strategies, which should initially focus on job redesign, development of appropriate leadership qualities in those within supervisory roles, and minimising opportunities for stress and burnout.

A study to examine graduate radiographers' expectations for role development, and the potential impact of misalignment of expectation and valence on staff retention and service provision was conducted by Williamson & Mundy (2010), in Wales. A final year cohort of radiography students (n=37) completed a structured Likert questionnaire with 20 questions, across three themes – expectation, valence, and knowledge (according to Vroom's (1964) Expectancy Theory, cited in Williamson & Mundy, expectancy is an individual's perception of the probability of achieving a desired reward, and valence is the perceived value of that reward to an individual). All participants stated an expectation for role development opportunities, with 97% indicating that these would be realised within 5 years of graduation, and 75% within 2 years of graduation. Significant correlation was found between expectation for role development and job satisfaction, and 81% of participants stated turnover intentions in order to meet their expectations. The study found an expectation for role development opportunities for new graduates with a valence noted of the intrinsic reward of meeting these expectations. Both expectation and valence were seen to be intrinsically linked with job satisfaction. This suggests that a misalignment of these would have a potentially negative

impact on motivation and retention of the future radiography workforce, demonstrating a positive correlation with withdrawal behaviours, including turnover intentions. In this relatively small professional group, group cohesion may be strong, suggesting that withdrawal behaviours may manifest as ‘resignation in post’, which will impact on the quality of care and service provision for patients.

Coombs *et al.* (2010) set out to identify what influences AHPs’ intention to work for the NHS. A postal questionnaire was sent to an equal number of four allied health professions within England (N=4800), occupational therapy, physiotherapy, diagnostic and therapeutic radiography, and speech and language therapy. Within each profession, the study targeted ‘stayers in’, ‘leavers from’, and ‘returners to’ the NHS. There was a response rate of 40% (N=1960). Stayers’ intention to remain in NHS was influenced by CPD opportunities, confidence that they could find NHS work, commitment to their profession, a sense of moral obligation and a belief that people important to them think it is a good idea. Returners’ intention was influenced by similar factors as stayers. Leavers were influenced by similar factors as stayers/returners, but to a lesser extent. The authors concluded that perceptions of various NHS work characteristics, which led to reasonably positive attitudes towards the NHS, did not necessarily translate into intention to work for it, and that career decision making is a social process, additionally influenced by external opinions.

The majority of papers in this review relating to remote and rural working have been Australian, but a study which investigated ways to support recruitment and retention of AHPs in hard to fill posts in rural areas in Scotland was carried out by Solowiej *et al.* (2010). The authors set out to evaluate the newly introduced Allied Health Professions (AHP) Support and Development Scheme, (a joint project between NHS Health Scotland and the Scottish Government) and its impact on recruitment, retention, career development and successful outcomes for individuals and teams of AHPs. Additional funding was provided for both the teams with hard to fill posts, and the individuals selected to support the recruitment, retention and career development of AHPs. Questionnaire surveys were distributed to a sample of 44 managers and 32 individuals involved in the scheme (82% response rate), and included AHPs working in physiotherapy, occupational therapy, speech and language therapy, radiography and dietetics. Support funding allocated to teams was used for CPD, teambuilding, workload review, skill-mix development and redesign of patient pathways, in order of frequency. Overall, as a result of the scheme, over 75% of managers had successfully recruited new team members, although the majority of new recruits (68%) reported that it was not the financial

incentive that had persuaded them to take the posts. Many of the new recruits remained in post and their appointment was reported to have had a positive impact on service provision.

O'Toole & Schoo (2010) carried out a survey of private rehabilitation therapists (RTs) to examine the retention policies for AHPs in rural areas of Australia. Whilst AHPs working in the private sector tend to remain in post longer, government efforts to enhance retention have been in the public sector, reducing the incentive for private practitioners to stay in rural areas. The purposive sampling of 72 RTs in rural Victoria (40% response rate) explored views regarding the perceived place occupied by practitioners in rural areas; professional practice; retention policies; and education and training. The overwhelming majority of respondents were in favour of having public/private practice partnerships and of having government programmes to facilitate such partnerships. The study reported a favourable response to the use of government incentives to retain and attract private practitioners to rural and regional areas. Many private RTs in Victoria perceived their greater involvement in delivery of public health care in rural areas positively.

Another study by O'Toole *et al.* (2010) explored the lack of retention of AHPs in rural areas of Australia. They carried out structured telephone interviews (N=32) asking about working experiences and reasons for resignation, looking at both positive and negative aspects of living and working in rural areas. The authors found that work experiences can be summarised into three domains – organisational, professional, and personal/community. Regarding the organisational domain, participants focused on the way in which their work arrangements required them to be more generalist in their day-to-day approach to work, and to take more responsibility for management style functions in the workplace. The professional outlined three major issues; clinical, career and education/training. The personal/community domain focused on issues relating to the AHPs' affinity for their workplace as well as their location in a rural place. The study concluded that government attempts to address some of the leading factors for AHP retention are too narrowly focused on the public sector and could encompass a wider approach.

Recruitment and retention issues for OTs in mental health in Sydney were studied by Scanlan *et al.* (2010). They surveyed 38 OTs (response rate 84%), investigating overall satisfaction, attractive features of positions, positive aspects of positions, constraints of positions, factors associated with leaving, supervision, professional development, career pathways, and interest in and access to management positions. Key 'pull' elements included the nature of the work,

being in a supportive team and the opportunity to use OT skills. Push factors were the desire for new and different types of work, desire to work closer to home, insufficient time or high workloads, feeling 'bored', organisational change or juggling multiple demands, working in unsupportive or dysfunctional teams and family/personal factors. The study identified both job-related (intrinsic) and non-job-related (extrinsic) issues, which can allow organisations to closely examine factors that attract practitioners to positions, and those that support, or damage, staff tenure.

The perspective of returners, potential returners and clinical supervisors returning to physiotherapy practice in Australia was studied by Sheppard *et al.* (2010). Semi-structured interviews were conducted to determine the opinions of participants on returning to physiotherapy. Maternity and child-care were the main reason returners and potential returners took a break from physiotherapy. The main reason for returning to physiotherapy was because the returner "wanted to" rather than external factors such as financial hardship. Overall, the experience of returning to physiotherapy has been rewarding for returners and clinical supervisors. Returners and potential returners were highly motivated, keen to learn, and are willing to undertake a period of training to help them return to practice. However, there was only one programme available for returners to re-register as a physiotherapist and no refresher programmes are available. Flexible methods to enable return to practice were needed, and time away from practice needed to be managed to enable seamless returns, facilitating workforce strategies.

A comparative study which investigated recruitment and retention of SLTs, from the perspective of university students in Australia and the UK was conducted by Whitehouse *et al.* (2007). Poor job retention rates among SLTs are associated with high levels of job dissatisfaction. One factor known to influence job satisfaction is congruence between career motivation and actual career experience. The study looked at why students embark on SLT degree, what factors are important to maintain their long-term employment in speech and language therapy and how long they predicted they would remain in the workforce practising SLT. Students in Australia (N=67) and UK (N= 84) UK completed an online questionnaire, and as the responses were consistent between cohorts, results were combined into one dataset. Three categories of responses were set up: altruism (helping others), intellectual desire (interest in disease and disability), and professional issues (salary, desire for professional career). Students who were motivated to enter speech and language therapy for

professional reasons tended to report that they would remain in the profession for a shorter time than students who chose the career with a primarily humanistic or intellectual motivation.

The US has experienced a growing shortage of AHPs providing special education services. Predominant reasons for poor recruitment and retention of school-based speech pathologists, in particular are poor working conditions, large unmanageable workloads and increasing administrative requirements. One way it has been claimed that these problems can be addressed is through application of a new methodology for establishing caseload configurations, called workload analysis. Woltmann & Camron (2009) conducted an evaluation of the source, application of and empirical evidence relating to workload analysis and concluded that there was insufficient evidence to support the claims, and advocated further research.

A broader focus on recruitment, retention and return, making recommendations to improve use of workforce data, absence management and succession planning was developed in the UK by Harden and Fraher (2010). A similar analytical approach, leading to broad based recommendations on recruitment, retention and deployment of podiatrists was conducted by Vernon and Borthwick (2006).

OUTCOME MEASUREMENT

As noted by McPherson *et al.* (2006) above, there is relatively little research on the links between roles in AHP and health outcomes. This is also the case for other health professions, but it is also likely that the relatively limited availability for research funding for AHP related research is a factor in limiting the evidence base.

The Health Council of Canada (2009) commissioned research to review the factors that helped and hindered the implementation of collaborative primary health care (PHC) teams, focusing on chronic illness care programmes, four in Canada, and one in Finland. Collectively, the five case studies described a recipe for success for the design and implementation of effective, team-based primary health care for people living with chronic illness. The ingredients included:

- effective leadership, both at the clinical and senior management levels;

- clear roles and responsibilities for team members, so that the patient gets the right care, at the right time, from the right provider;
- a common philosophy and shared values underpinning the team-based delivery of care;
- an electronic health/medical record system; and
- patient-centred programs and support services, combined with effective (usually electronic) self-assessment and self-management tools.

Outcome calculators across the areas of basic outcomes, neuromuscular disorders, chronic disease management, musculoskeletal and incontinence have been developed by Grimmer *et al.* (2005), at the International Centre for Allied Health Evidence in South Australia, and are available from the website (www.unisa.edu.au/CAHE).

Woodford (2006) carried out a literature review to investigate the impact of a 4-tier profession within the UK. Variables examined were the: extent of radiographer role development, effect on patient services, attitudes of radiologists and other health care professionals, work quality and accountability and recruitment and retention issues. Many studies revealed improvements to patient services, and good work quality, but there were mixed results regarding recruitment issues. In general, radiologists were supportive of the 4-tier profession, although some studies disagreed on the effects of radiographer role development and junior radiologists' training. The review concluded that although there have been positive developments, more evaluation of the effect of the new career progression framework and radiographer role development and the practice of radiography was required. The lack of interest in consultant posts, the amount of autonomy given to those in a consultant position, the effect on superintendent positions and the possible effect on demand for radiologists are just some of many issues that require investigation.

Improved outcomes have been described from patients and allied health professionals' perspectives. In one small scale study, Conti *et al.* described (2007) the improvements in patient clinical outcomes as a result of the introduction of a physical therapy assistant in a nurse-led critical care team. These included reduction in skin breakdown rates, ventilator days per patients, ventilator pneumonia rate, and overall fewer complications, all of which was achieved using a collaborative team approach.

Another small scale UK study involving five nursing consultants and one physiotherapy consultant examined activity in the context of four key functions of the role – education, expert practice, leadership and research (Richardson *et al.* 2008). The consultants kept an activity diary for a one week period, and detailed analysis of a clinic carried out by one of the consultants was undertaken using a mapping procedure. Results suggest that the activity diary, combined with mapping of activities, illustrated the complexity and variety of the role and facilitated meaningful reflection on what advanced practitioners across disciplines, and that consultants have the capacity to integrate four functions of their role simultaneously.

A study which investigated the use of skill mix change as way to address staff shortages experienced within occupational therapy in Quebec, was carried out by Guay *et al.* (2010). They examined the use of skills mix in homecare OT with patients with bathing difficulties. All provincial Health and Social Centres (N=95, with a high response rate of 91%) were surveyed. Results found that 89% of protocols for determining the need for technical assistance with bathing in home-care services involved skill mix. Generally, OTs collaborated with physical therapists or with home-health aides; substitution occurred by task management. Clinical OTs provided informal training, lasting between 1-40 hours (with a mean of 8 hours), and had developed 63 ‘in-house’ tools to assist those involved in the task. Findings demonstrated both horizontal substitutions with physical therapists, nurses, or social workers, although vertical substitution was also common with homehealth aides, specially trained and named, or with physical-rehabilitation therapists (registered physical-therapist assistants working in Quebec).

Two studies which gave detailed outcomes involved evaluation of extended physiotherapy roles within the acute hospital setting. One study based in Hong Kong explored whether early physiotherapy intervention in an Accident and Emergency (A&E) Department reduced pain and improved satisfaction for patients with acute low back pain (Lau *et al.* 2008). The authors conducted a randomised trial with concealed allocation, assessor blinding and intention-to-treat analysis. Participants were 110 patients who attended the A&E department of a local acute hospital. The experimental group received early physiotherapy intervention which consisted of education, reassurance, pain management, mobility training, interferential therapy, walking training, and walking aids as indicated. The control group received only walking training and walking aids as indicated. All participants received conventional medical intervention and outpatient physiotherapy

intervention. Pain was measured using the Numeric Pain Rating Scale and satisfaction was measured using the Numeric Global Rating of Change Scale at baseline, discharge from the A&E Department, and admission to the Physiotherapy Outpatient Department at 1 month, 3 months, and 6 months. Participants in the experimental group had 1.6 out of 10 points (97.5% CI 0.8 to 2.3) less pain than the control group on discharge from the Accident and Emergency Department and still had 0.9 points (97.5% CI 0.1 to 1.6) less pain on admission to the Physiotherapy Outpatient Department. Participants in the experimental group were 2.1 out of 20 points (97.5% CI 1.2 to 2.9) more satisfied than the control group on discharge from the Accident and Emergency Department. Early physiotherapy intervention was effective in reducing pain and increasing satisfaction for patients with acute low back pain in an Accident and Emergency Department but the effect tailed off.

In the UK, McClellan *et al.* (2006) evaluated the effect of an extended scope physiotherapy service on patient satisfaction. They also measured the functional outcome of patients with soft tissue injuries attending an adult emergency department (ED), comparing management by ESPs, emergency nurse practitioners (ENPs), and all grades of emergency department doctor. The ESP service operated on four days out of every seven in a week in an urban adult ED. A satisfaction questionnaire was sent to all patients with a peripheral soft tissue injury and fractures (not related to the ankle) within one week of attending the ED. Patients with a unilateral soft tissue ankle injury were sent the acute Short Form 36 (SF-36) functional outcome questionnaire, with additional visual analogue scales for pain, at 4 and 16 weeks after their ED attendance. Waiting times and time spent with individual practitioners was also measured. The ESP service achieved patient satisfaction that was superior to either ENPs or doctors. Overall 55% of patients seen by the ESP service strongly agreed that they were satisfied with the treatment they received, compared with 39% for ENPs and 36% for doctors ($p=0.048$). The authors concluded that adding an ESP service to the interdisciplinary team achieved higher levels of patient satisfaction than for either doctors or ENPs.

3. Improving the evidence base on the AP workforce: some next steps

The literature reviewed in the previous section highlights that there have been significant progress in analysis and identification of policy solutions to AHP workforce challenges. There is, as yet, less evidence on impact and outcomes but the evidence base is growing. AHPs, as individuals, as professionals, and as a health workforce are making a major and growing contribution to health improvements. However this contribution remains under-recognised in many countries.

What can be done to improve the policy visibility of the AHP workforce? There are several areas for action to improve the evidence base and shed more light on the role and contribution of AHPs, from a broad based, “non professional” perspective that will enable engagement with policy makers and communities at large. In part this will be about clarity of role, purpose and contribution of AHPs. One such example is a practical guidebook which provides youth programme planners and service providers with practical information about allied health occupations in order to create or expand programmes and services leading to allied health opportunities (US Department of Labor, 2010).

It will also be necessary to develop country specific priority agendas to address varying AHP workforce challenges. Examples of current country level priorities from respondents in a range of countries is summarised in Table 3 below, which highlights both key workforce challenges, and possible policy solutions.

Table 3: Examples of key AHP workforce challenges and solutions identified at country level

Country	Challenges: Key Workforce Priorities	Policy Solutions to Challenges
<p>Australia (Western Australia, South Australia)</p>	<ul style="list-style-type: none"> • Career Pathway from Allied Health Assistants to Graduates AHPs to Extended Scope Allied Health Professionals requires further development, particularly education articulation to bridge the gaps • Clinical workforce design that allows for more efficient and effective use of AHP workforce • Involvement of AHPs in the service delivery planning and ratio of AHPs to clinical areas • Obtaining adequate level of budgetary resource to employ AHP to meet patient demand • Ensuring informed Executive level leadership as health services move towards a more primary prevention focus 	<ul style="list-style-type: none"> • Update of extended scope solutions in career pathways (already in literature) • Clinical workforce redesign that allows for more efficient and effective use of AHP workforce and which also takes some burden off doctors and nurses and ensures good outcomes for patients • Interprofessional and multidisciplinary learning at tertiary level
<p>Canada</p>	<ul style="list-style-type: none"> • Inadequate information (databases) about the full range of health personnel - no national/ comparative data to support HHR planning or decision-making on a national scale. • Changing scopes of practice of professional (repeal of regulations governing specific 	<ul style="list-style-type: none"> • Provincial and territorial governments across Canada have developed, or are in the process of developing, HHR information systems. The initiative began in 2005 through a consultative process involving many key stakeholders. • There must be meaningful stakeholder consultation prior to proposed scope of practice changes. There should be evidence

	<p>professions and introduction of Health Professions Act).</p> <ul style="list-style-type: none"> Improving competency for interprofessional collaborative practice. This requires a change in culture and behaviour, which will only occur when healthcare providers develop the required competencies to work effectively in a collaborative practice environment. 	<p>that the expanded scope of practice of specific providers promotes improved access to quality care. Education and training must be developed to ensure that practitioners are competent to perform the advanced skills under consideration.</p> <ul style="list-style-type: none"> Interprofessional education is needed to better prepare the future workforce to work collaboratively, but attention must also be paid to developing skill for collaborative practice among the current health workforce. Health leaders must commit to supporting applicable and appropriate strategies for developing competence for collaborative practice in the workplace and educators must overcome existing barriers (e.g. funding envelopes) to the development of integrated curricula.
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<p>Hong Kong</p>	<ul style="list-style-type: none"> • Manage growing service demand by increasing service capacity for ageing population and people with chronic illness • Staff morale • Sustain high performing workforce 	<ul style="list-style-type: none"> • Prevent avoidable hospitalization and keep people healthy in community through enhancement of multidisciplinary primary care and optimize chronic disease management • Staff engagement in valuing staff wellbeing and contribution and foster career development in improving opportunities for career progression and incentives to drive performance. Support physical and psychological wellbeing of staff. • Enhance workforce capacity by fostering new way of working and enhancing new roles to support service development and advanced practice.
<p>USA</p>	<ul style="list-style-type: none"> • <i>Economics and the cost of health care:</i> some allied health professions can deliver high quality health care services at a lower cost than the traditional providers and means of care. • Due to the downturn in the US economy, many AHPs that would have retired have not done so, limiting the number of open positions for new graduates. This should change dramatically when the economy improves, and there are large numbers of individuals either retiring or leaving the health workforce, creating a greater workforce demand than a supply of new graduates. 	<ul style="list-style-type: none"> • Health system reform is most likely to occur via incremental change than sweeping modification that reconstitutes the workforce. The changes will be expected to focus on reimbursement issues affecting the health workforce, but as extrapolations of existing practice patterns rather than changing the fundamental nature and relationships of the existing health professions. While growth is expected to be larger at the lower training levels, there is still substantial growth anticipated for allied health professionals, particularly at graduate levels.

	<ul style="list-style-type: none"> • Because of the market economy, there is an inclination to use the least expensive (usually also the lesser trained) individual to deliver care, e.g. in some ambulatory group practice settings, medical assistants (1-2 years training, salary circa \$27k pa) may substitute for registered nurses (2+ years training, salary circa \$50k pa). While this may appear to be beneficial to the AHPs, it can also be counterproductive to many of them. • <i>Education challenges:</i> There appears to be a movement toward bifurcation of the workforce with a number of allied health professions extending the length of their educational process and moving to higher degree levels (e.g. physical therapy, occupational therapy, audiology, pharmacy) while at the same time there is an increasing demand for larger proportions of lower trained individuals (e.g. home health aides, medical assistants etc.). • <i>Population demographics versus allied health workforce demographics</i> With an increasingly aged population, much of health care is shifting from acute disease and care to chronic diseases and care, indicating a need for greater numbers of individuals working in various rehabilitation fields. In an effort to contain the escalating cost of health care, the federal government may place harsh limits on 	
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	the number of therapy sessions or reduce rates of reimbursement such that is disrupts care patterns and has a detrimental effect on health care employment.	
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To complement country level progress, there is scope to collaborate across borders to work collectively to raise the profile of the AHP workforce and ensure that it is sufficiently “visible” on the international health policy agenda. In summary, several universal challenges can be identified, which serve as the focus for international collaborative efforts on this issue:

- Action to address incomplete/fragmented/out of date data on the AHP workforce
- Research to contribute to cost/benefit analysis and demonstration of value of AHP roles
- Policy attention on the changing demographics; on changed supply of AHPs; and on increased demand for health in areas where AHPs can make a vital and cost effective contribution, such as in chronic disease management
- Further work on clarifying role definition and scope, and on determining effective skill mix and task shifting within the AHP area
- More policy attention and support for inter-professional education/ team working

This translates into an agenda for advocacy and action:

- Improving the data: clear definitions; improved data gathering and exchange, will give the analytics for advocacy
- Monitoring AHP workforce trends and flows: to better understand national and international AHP labour market dynamics
- Assessing the scope for national and international benchmarking, looking at staff ratios: but also understanding differences between roles and jobs
- Identifying and examining best practice in inter-professional education, and in interdisciplinary teamworking, in health
- Developing country level comparative case studies of AHP roles and contributions
- Conducting reviews and case studies of impact of AHPs on outcomes

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