



University of
South Australia

International Centre for
Allied Health Evidence
ICAHE

A member of the Sansom Institute

The Role of Advanced Allied Health Assistants

A Systematic Review

Prepared by:

The Review Team

International Centre for Allied Health Evidence

University of South Australia

Adelaide

SA 5000

Prepared for:

Claire Pearce

Project Officer

Office of the Allied Health Adviser

ACT Health Directorate

RESEARCH CENTRE RESPONSIBLE FOR THE PROJECT

International Centre for Allied Health Evidence

School of Health Sciences
City East Campus
University of South Australia
Adelaide
South Australia 5000
Website: www.unisa.edu.au/cahe

Centre Director

Professor Karen Grimmer
Phone: (08) 8302 2769
Fax: (08) 8302 2766
Email: karen.grimmer@unisa.edu.au

Project researcher

Ms Jess Stanhope
Email: Jessica.stanhope@unisa.edu.au

Project administered by

Ms Madeleine Mallee
Business Services Officer
Business Development Unit
Division of Health Sciences
University of South Australia
Phone: (08) 8302 2121
Fax: (08) 8302 1472
Email: madeleine.mallee@unisa.edu.au

Citation details:

The International Centre for Allied Health Evidence (2013): The Role of Advanced Allied Health Assistants: A Systematic Review. A technical report prepared for the ACT Health Directorate

Table of contents

Table of contents.....	3
List of tables	5
List of figures	5
Abbreviations	5
Executive summary	6
1. Introduction.....	9
2. Methods	10
2.1 Peer-reviewed literature	10
2.1.1 Systematic search.....	10
2.1.2 Study identification	10
2.1.3 Assigning levels of evidence	11
2.1.4 Critical appraisal	11
2.1.5 Data extraction	11
2.1.6 Analysis.....	12
2.2 Australian grey literature	12
2.2.1 Search	12
2.2.2 Literature selection	12
2.2.3 Data extraction	12
2.3 Literature obtained from the ACT Health Directorate	13
3 Results	13
3.1 Overview of the literature identified	13
3.2 Findings.....	14
3.2.1 Question 1: What is the scope of practice of advanced allied health assistants?	15
Allied health disciplines	15
Competencies.....	16
Tasks performed and level of autonomy.....	20
3.2.2 Question 2: What client groups do advanced allied health assistants work with?	24
3.2.3 Question 3: What settings do advanced allied health assistants work in?	24
3.2.4 Question 4: What training is available for advanced allied health assistants?	27
3.2.5 Question 5: How effective are advanced allied health assistant roles in terms of health, cost, and process outcomes?	28

3.2.6 Question 6: What are the workforce issues for advanced allied health assistants?	29
Discussion	Error! Bookmark not defined.
Conclusion	31
References	32
Appendices	37
Appendix 1: Search terms used	37
Search terms for all databases except Scopus	37
Advanced allied health assistant terms	37
Senior allied health assistant terms	37
Extended scope or advanced practice allied health assistant terms	38
Search terms in Scopus and Google Scholar	39
Advanced allied health assistant terms	39
Senior allied health assistant terms	41
Extended scope/ advanced practice allied health assistant terms	43
Appendix 2: Details of the search strategy	46
Appendix 3: National Health and Medical Research Council hierarchy of evidence[14]	47
Appendix 4: Centre for Evidence Based Medicine Systematic Review Critical Appraisal Sheet [15]	48
Appendix 5: PEDro Scale[16]	51

List of tables

Table 1: Data extraction	12
Table 2: Advanced allied health assistant terms used, and the countries in which advanced allied health assistants work	14
Table 3: The allied health disciplines in which advanced allied health assistants work	17
Table 4: Skills/ attributes required for employment at this level of Australian Grade 3 allied health assistants (with advanced skills), adapted from <i>Supervision and delegation framework for allied health assistants</i> [18]	19
Table 5: Competencies for advanced community rehabilitation assistants. Source: <i>Evaluation of the trial of new Advanced Community Rehabilitation Assistant (ACRA) roles in Queensland</i> [20]	20
Table 6: Tasks performed by advanced allied health assistants	20
Table 7: The clients groups that advanced allied health assistants work with	24
Table 8: Work settings of advanced allied health assistants	26
Table 9: Competency assessment of pharmacy advanced allied health assistants	27
Table 10: Key findings regarding the effectiveness of advanced allied health assistant roles	30

List of figures

Figure 1: Flow chart for the database search.....	13
---	----

Abbreviations

A/AHA: Advanced allied health assistant

AH: Allied health

AHA: Allied health assistant

AHP: Allied health professional

CI: Confidence interval

CINAHL: Cumulative Index to Nursing and Allied Health Literature

NHMRC: National Health and Medical Research Council

UK: United Kingdom

USA: United States of America

Executive summary

Background

This review sought to answer the following questions:

1. What is the scope of practice of advanced allied health assistants (A/AHA)?
2. What client groups do A/AHA work with?
3. What settings do A/AHA work in?
4. What training is available for A/AHA?
5. How effective are A/AHA roles in terms of health, cost and process outcomes?
6. What are the workforce issues for A/AHA?

Methods

A systematic search of seven databases, and Google Scholar was conducted using a comprehensive list of A/AHA terms to identify peer-reviewed literature. This was supplemented by Australian grey literature identified through searching Government websites and Trove. Studies pertaining to the research question were obtained, and relevant data extracted. Study designs were determined and assigned to the National Health and Medical Research Council (NHMRC) hierarchy of evidence. Any studies assigned levels I to III_1 were critically appraised. Data were reported descriptively.

Results

Fifty-four studies were identified, and their findings were supplemented with data from six Australian grey literature reports. Evidence was identified to inform each of the review questions, with the key findings summarised below.

Question 1: What is the scope of practice of advanced allied health assistants?

Advanced allied health assistants work within pharmacy, social work, psychology, occupational therapy, physiotherapy, speech therapy, podiatry and dietetics/nutrition disciplines, and in some cases work across a number of disciplines. [32 peer-reviewed studies, NHRMC level: not assigned (only background information); 5 grey literature reports]

The competencies reported for A/AHA varied widely with common skill areas centring around problem solving, interpersonal skills, communication skills, initiative, and training (previous and ongoing). [1 peer-reviewed study, NHRMC level : not assigned (qualitative study); 2 grey literature reports]

Tasks performed by the A/AHA varied widely, which is likely to reflect the diverse roles, clients and settings in which they work. In many cases the A/AHA were given greater autonomy than AHA, in some cases took on a supervisory role. A/AHAs were involved in assessing, managing, discharging and reporting on patient management and progress. [21 peer-reviewed studies, NHRMC level: not assigned (1 observational survey, 20 background information); 4 grey literature reports]

Question 2: What client groups do advanced allied health assistants work with?

Advanced allied health assistants work with both adults and children, with a range of conditions including intellectual/ learning disabilities, emotional, behavioural and/or social difficulties, neurological conditions, dementia, cancer, post-surgery (including total hip replacement), mental health problems, mobility problems and those at risk of falls. [27 peer-reviewed studies, NHMRC level: not assigned (background information only)]

Question 3: What settings do advanced allied health assistants work in?

Advanced allied health assistants work in a range of settings including hospitals, client homes (including group homes), community services such as mental health services, services for those with intellectual/ learning disabilities, day-care, therapy centres, training centres and outpatient pharmacy departments. [32 peer-reviewed studies, NHMRC level: not assigned (background information only); 2 grey literature reports]

Question 4: What training is available for advanced allied health assistants?

Within Australia, Certificate IV in Allied Health Assistance appears to be a requirement for A/AHA in most cases, although having this qualification does not automatically allow an individual to take on this advanced role. These certificate programs allow a student to specialise in up to three AH disciplines. In many cases, this training was supplemented by on the job training, as well as informal, external training programs. Similar training is provided overseas. [5 peer-reviewed studies, NHMRC level: not assigned (1 observational survey, 4 background information only); 4 grey literature reports]

Question 5: How effective are advanced allied health assistant roles in terms of health, cost and process outcomes?

There were only outcomes reported in terms of health and process outcomes. The implementation of A/AHA roles freed up the time of the allied health professionals (AHP), decreased waiting lists, increased therapy and improvements in patient and staff satisfaction. [4 peer-reviewed studies, NHRMC levels: III_3 for 1 study, 3 not assigned (2 qualitative studies, 1 self-reflection; 1 grey-literature report (same project as one of the qualitative studies))]

Question 6: What are the workforce issues for advanced allied health assistants?

The key issues with implementing A/AHA centred on AHP understanding the A/AHA, and therefore being able to best utilise these assistants, and supervise them appropriately. Concerns were also expressed regarding responsibility and accountability. One project found that a restructure of the department was required to accommodate the new A/AHA role they implemented. [2 peer-reviewed studies, NHMRC level not assigned (qualitative); 2 grey literature reports (1 same project as one of the qualitative studies)]

Discussion

There is a paucity of high-level evidence regarding A/AHAs. With the exception of one study which informed Question 5 (level III_3), all were qualitative studies, observational surveys, narrative reviews, or data was considered background information only (e.g. could not be assigned to the NHMRC hierarchy of evidence).

A/AHA roles are diverse, and have the potential to improve patient outcomes, and satisfaction, and to streamline service delivery, however this has not been well established through research. In implementing these roles professionals working with A/AHA need to be educated about the roles, and their level of training. In doing so supervisory issues should be minimised, and the A/AHAs better utilised. Prior to implementation, the responsibility and accountability of A/AHAs and their supervising AHPs should be established. The potential impact of implementing A/AHA roles on the structure of departments should also be considered, particularly in terms of filling existing AHA positions, as well as the impact it will have upon the AHPs.

1. Introduction

The shortage of health professionals in Australia has lead governments to consider workforce redesign to best utilise their human resources to meet the health needs of the population. One aspect of redesign in the health workforce is advanced practice or extended scope roles. Advanced scope of practice refers to “a role that is within the currently recognised scope of practice for that profession, but that through custom and practice has been performed by other professions. The advanced role would require additional training, competency development, as well as significant clinical experience and formal peer recognition. This role describes the depth or practice” [1], whilst extended scope of practice is defined as “a role that is outsider the currently recognised scope of practice and requires legislative change. Extended scope of practice requires some method of credentialing following additional training, competency development, and significant clinical experience... This role describes the breadth of practice”. [1]

Although advanced/ extended practice is most commonly associated with nurse practitioner roles, and extended scope physiotherapists, there is also a shift towards expanding the roles of allied health assistants (AHA). The current scope of practice of AHA includes assisting allied health professionals (AHP), providing physical and social support to patients, administering clinical services and modalities, transferring patients, communicating patient progress, communicating with other staff, assisting with mobility and gait, providing equipment, patient education, provision of healthcare to patients, supervising/ conducting exercise classes, preparing patients for treatment, conducting individual or group therapy, coordinating and assisting in the operation of services, assisting and coordinating health service, administration, stock ordering/requisition, preparing/ maintaining the environment, maintaining equipment, health promotion, monitoring and updating health care databases, recording/ statistics/ database, housekeeping, and cleaning.[2]

The working definition of advanced allied health assistants (A/AHA) used for the purpose of this review are any assistant role supporting AH professionals; working beyond the skill base or level of responsibility normally expected for an AHA. It is acknowledged that there are likely to be a range of terms used to describe these roles, e.g. advanced, senior or extended scope, as well as terms which reflect the allied health (AH) disciplines they support (e.g. physiotherapy, occupational therapy), or more generic healthcare terms (e.g. healthcare assistant, support worker).

These roles have been recommended within rehabilitation services in South Australia [3, 4] and Queensland [5], as well as to address the shortage of pharmacists in Queensland [6]. The potential role for A/AHA has also been reported in the peer-reviewed literature [7-12]. Despite this, little is currently known about these roles, both within Australia and internationally. This systematic review aimed to better understand the role of A/AHA, the training they receive, and their effectiveness, as well as any workforce issues regarding the implementation of these roles.

This review sought to answer the following questions:

1. What is the scope of practice of advanced allied health assistants (A/AHA)?
2. What client groups do A/AHA work with?
3. What settings do A/AHA work in?
4. What training is available for A/AHA?
5. How effective are A/AHA roles in terms of health, cost and process outcomes?
6. What are the workforce issues for A/AHA?

2. Methods

2.1 Peer-reviewed literature

2.1.1 Systematic search

A systematic search of key library databases (Embase (OvidSP), Medline (OvidSP), Scopus, Web of Science, Nursing and Allied Health Source (ProQuest), Health and Medical Complete (ProQuest), and Cumulative Index to Nursing and Allied Health Literature (CINAHL) (EbscoHost)) was conducted in February 2013, using a comprehensive list of search terms (see Appendix 1). These terms were developed through iterative discussion between staff from the International Centre for Allied Health Evidence and the ACT Health Directorate, and systematic reviews of AHA roles were also consulted[2, 13]. These terms were searched in all fields, and searches were limited to peer-reviewed studies, published in English, from 2003 to 2013 where permitted by the databases (see Appendix 2 for details). Additionally, a similar search was conducted in Google Scholar using the same terms (Appendix 1). This search was limited to 2003-2013.

To widen the search, the reference lists of all included peer-review studies, and any systematic reviews identified were manually screened to identify any study titles which made reference to A/AHA, or where the reference related to A/AHA in text. If further studies were included, this process was repeated until saturation was reached.

2.1.2 Study identification

All studies obtained were exported into EndNote X6 where duplicate studies were excluded. The title and abstract of all remaining studies was screened, before the full texts were obtained and screened.

Studies were excluded if they:

- did not involve A/AHA (e.g. the assistant was not identified as advanced, senior or extended scope, or did not perform tasks identified as extended scope, or advanced practice, or they clearly stated that their role was to support non-AHA stuff, e.g. nurses)
- only reported potential A/AHA roles, rather than those which had been implemented
- were not published from 2003-2013 (or where no date could be determined),
- were not published in English,
- were not available in full text (e.g. conference abstracts),
- were not published in peer-reviewed journals, or
- they did not include any information pertaining to the six review questions.

Due to the broad nature of questions for this review, studies of any design were included. Furthermore, any paper reporting any relevant data was included even if this was not investigated in the study (e.g. relevant information for this review was reported in the background). Where this relevant information was citing another reference, the original study was identified to ensure it (the original study) met the inclusion criteria. Where all relevant information was cited from other references, the study was excluded.

2.1.3 Assigning levels of evidence

Where the findings of a study informed the review questions (i.e. not solely background information) the study design was identified, and assigned to the National Health and Medical Research Council (NHMRC) [14] hierarchy of evidence (see Appendix 3).

2.1.4 Critical appraisal

Critical appraisal was only conducted for studies identified as level III_1 or higher. Systematic reviews were appraised using the Centre for Evidence Based Medicine Systematic Review Critical Appraisal Sheet[15], and PEDro scale[16] (see Appendices 4 and 5) was used for level II and III_1 studies. Lower level studies were not appraised due to the biases inherent in their designs.

2.1.5 Data extraction

Relevant data was extracted from all included studies, according to the headings reported in Table 1. Where relevant data was reported with a reference, this data was not extracted, however the reference was obtained, and included in the review if it met the inclusion criteria.

Table 1: Data extraction

General	<ul style="list-style-type: none"> Country* Study design Title of the A/AHA
Question 1: What is the scope of practice of A/AHA?	<ul style="list-style-type: none"> The AH discipline they support The competencies of the A/AHA role Tasks performed which directly or indirectly involve patient care (e.g. not audits for research purposes) Level of autonomy
Question 2: What client groups do A/AHA work with?	<ul style="list-style-type: none"> Age groups Conditions
Question 3: What settings do A/AHAs work in?	<ul style="list-style-type: none"> Any setting they work in
Question 4: What training is available for A/AHA?	<ul style="list-style-type: none"> Any type of training (formal or informal) either enabling them to work as A/AHAs or to extend their skills in this role (i.e. professional development)
Question 5: How effective are A/AHA roles in terms of health, cost and process outcomes?	<ul style="list-style-type: none"> A/AHA role implemented Outcome measures used Key findings
Question 6: What are the workforce issues for A/AHA?	<ul style="list-style-type: none"> Any issues identified, including but not limited to changing roles of others (e.g. AHA or AHP), and funding

*unless otherwise stated this was assumed to be the same as the authors affiliations, A/AHA: advanced allied health assistant, AHA: allied health assistant, AHP: allied health professional

2.1.6 Analysis

Due to the nature of the questions posed, all data is reported descriptively.

2.2 Australian grey literature

2.2.1 Search

Relevant Australian grey literature was identified through searching Trove database, in addition to screening government health website's lists of reports/ publications (www.health.gov.au/, www.sahealth.sa.gov.au/wps/wcm/connect/Public+Content/SA+Health+Internet/, www.health.wa.gov.au/home/, www.health.nt.gov.au/, www.health.qld.gov.au/, www.health.nsw.gov.au/Pages/default.aspx, www.health.act.gov.au/c/health, www.health.vic.gov.au/, www.dhhs.tas.gov.au/) .

2.2.2 Literature selection

Grey literature was subject to the same criteria as outlined in Section 2.1.2, but did not have to be peer-reviewed. Additionally, the literature had to be structured and include referencing to be included.

2.2.3 Data extraction

The data extraction for the grey literature was performed using the same headings as outlined in Table 1. Where projects which inform Question 5 are reported as abstracts/ summaries this data was not extracted, as the projects are not available in full text.

2.3 Literature obtained from the ACT Health Directorate

A collection of literature was provided to us by the ACT Health Directorate. This was divided into peer-reviewed, and grey literature, and was subject to the same selection and extraction procedures as outlined in Sections 2.1.2, 2.1.3, 2.2.2 and 2.2.3.

3 Results

3.1 Overview of the literature identified

Of the 1987 studies identified through the database/ Google Scholar searching, 54 peer-review studies were included, with one additional study provided by the ACT Health Directorate[21] (see Figure 1 for the flow diagram). Additionally, six grey-literature reports were included [5] [13, 17-20].

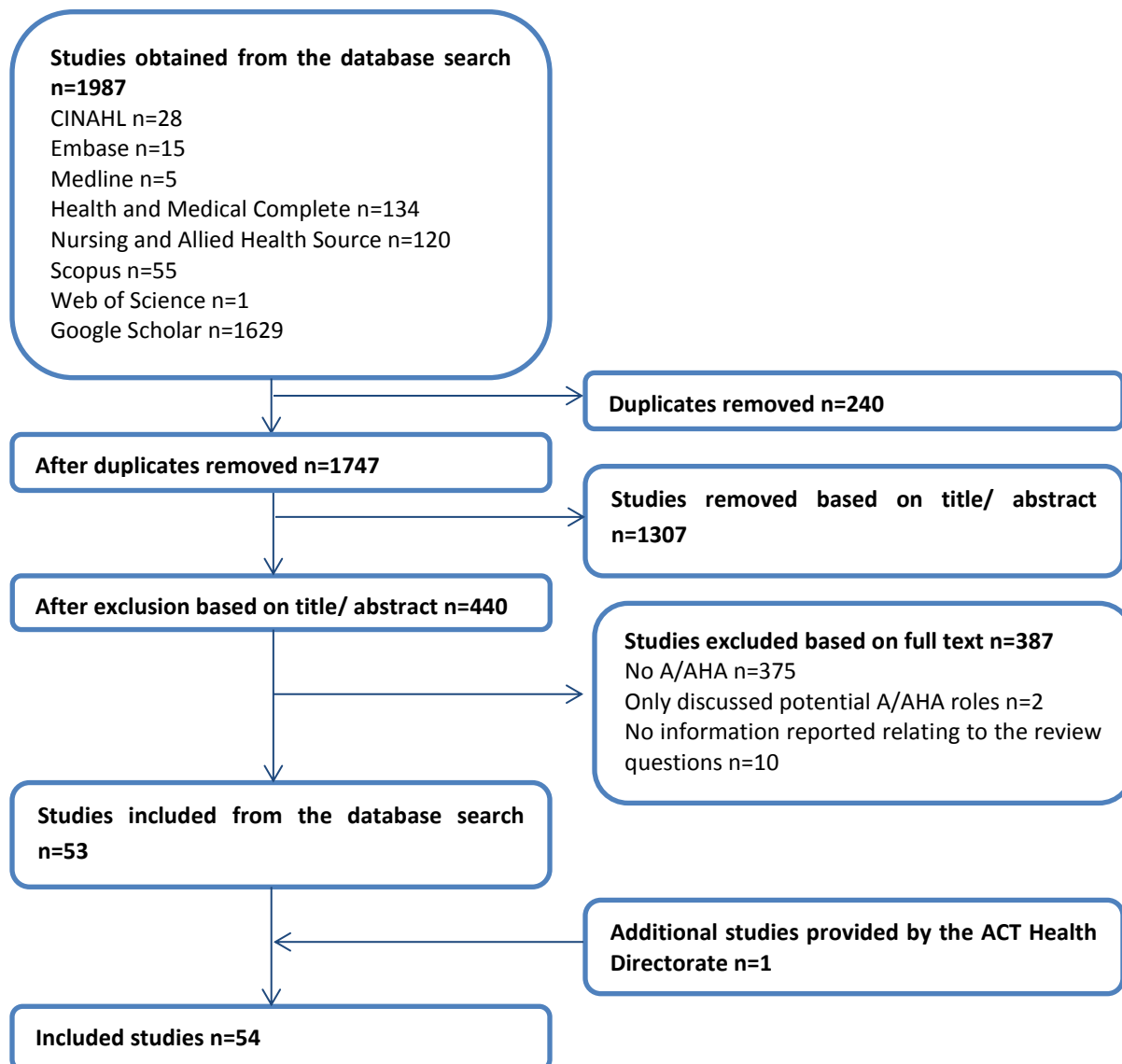


Figure 1: Flow chart for the database search

3.2 Findings

Table 2 reported the A/AHA roles reported in the literature, as well as the countries in which they have been implemented.

Table 2: Advanced allied health assistant terms used, and the countries in which advanced allied health assistants work

Advanced allied health assistant	Countries
Senior support worker	UK[19, 22-39] Australia[40-42] USA[43, 44]
Senior health care assistants/ senior support workers	UK[38, 45]
Senior healthcare support worker	UK[46]
Senior healthcare assistant	UK[47, 48]
Senior healthcare assistant/ Assistant practitioner	UK[49]
Advanced practice healthcare aides	Canada[50]
Advanced allied health assistants	Australia [5, 13, 17]
Allied health assistants with advanced skills (Grade 3)	Australia [18]
Allied health assistant with advanced tasks	Australia [17]
Allied health assistant with advanced level of independence	Australia [17]
Senior rehabilitation technician	USA[51]
Advanced community rehabilitation assistant ¹	Australia[20, 52]
Senior occupational therapy assistant	UK[53]
Extended role occupational therapy support worker/ occupational therapy assistant practitioner	UK[21]
Senior social worker assistants	Hong Kong[54, 55]
Senior social work assistant	UK[56]
Physical therapy assistants taking on advanced-level opportunities	USA[57]
Pharmacy technicians/ assistants with advanced practice roles	Australia[58]
Pharmacy technician with extended roles	Australia[59]
Advanced practice pharmacy technicians	USA[60]
Senior pharmacy technician	Netherlands[61] Canada [62, 63] Australia[64, 65] UK[66-73]
Senior pharmacy assistant	Malaysia[74]
Extended scope pharmacy assistants	Australia [19]
Extended scope pharmacy technicians	Australia [19]

Grey references indicate grey literature; UK: United Kingdom; USA: United States of America

¹ [20, 52] report on the same project

3.2.1 Question 1: What is the scope of practice of advanced allied health assistants?

Allied health disciplines

Advanced allied health assistants work in a range of disciplines, including pharmacy, social work, psychology, occupational therapy, physiotherapy, podiatry and dietetics (see

Competencies

The competencies required of A/AHA were reported in three studies/ reports [18, 20, 21]. Two of these [18, 20] were grey literature reports, with the third [21] being a qualitative study (NHMRC level: not assigned). The competencies reported vary, which may reflect the different AH disciplines, work settings and health systems they work within.

The competencies required of an extended role occupational therapy support worker were:

- ability to make sound judgements,
- interpersonal skills (eye contact, 'nice disposition', friendly),
- interest in the job,
- communication skills,
- confidence,
- need to be able to assert their own role boundaries/ competence/ confidence,
- drive,
- have developed the role themselves,
- assertiveness,
- initiative,
- ability to 'think outside the box',
- need for self-direction,
- trustworthy (more than just a police check),
- ability to think/ reflect on role,
- type of people who will continually improve (e.g. undertake training),
- experience,
- training to underpin competence, formal qualifications,
- willing to accept responsibility,
- willing to learn, and
- clinical competence

Table 3). Some studies [5, 19, 22-28, 31-36, 38, 39, 41, 42, 45-47, 50, 51] did not report which AH discipline they worked within; however they did not clearly state that they were supporting other medical/health roles, and were therefore included in the review. This section was informed by 32 peer-reviewed studies, and five grey-literature reports; however no study specifically researched the disciplines; hence this data cannot be allocated to the hierarchy of evidence.

Competencies

The competencies required of A/AHA were reported in three studies/ reports [18, 20, 21]. Two of these [18, 20] were grey literature reports, with the third [21] being a qualitative study (NHMRC level: not assigned). The competencies reported vary, which may reflect the different AH disciplines, work settings and health systems they work within.

The competencies required of an extended role occupational therapy support worker were:

- ability to make sound judgements,
- interpersonal skills (eye contact, 'nice disposition', friendly),
- interest in the job,
- communication skills,
- confidence,
- need to be able to assert their own role boundaries/ competence/ confidence,
- drive,
- have developed the role themselves,
- assertiveness,
- initiative,
- ability to 'think outside the box',
- need for self-direction,
- trustworthy (more than just a police check),
- ability to think/ reflect on role,
- type of people who will continually improve (e.g. undertake training),
- experience,
- training to underpin competence, formal qualifications,
- willing to accept responsibility,
- willing to learn, and
- clinical competence

Table 3: The allied health disciplines in which advanced allied health assistants work

Advanced allied health assistant title	Pharmacy	Social work	Psychologist	Occupational therapy	Physiotherapy	Speech therapy	Podiatry	Dietetics/ nutrition
Senior support worker		[37]	[29, 30, 40, 43, 44]					
Senior health care assistants/ senior support workers								
Extended scope support workers								
Senior healthcare support worker								
Senior healthcare assistant		[48]						
Senior healthcare assistant/ assistant practitioner					[49]			
Advanced practice healthcare aides								
Advanced allied health assistants				[13, 17]	[17]			
Allied health assistants with advanced skills (Grade 3)				[18]	[18]	[18]	[18]	[18]
Senior rehabilitation technician								
Advanced community rehabilitation assistant ²				[20, 52]	[20, 52]	[20, 52]	[20, 52]	[20, 52]
Senior occupational therapy assistant				[53]				
Extended role occupational therapy support worker/ occupational therapy assistant practitioner				[21]				
Senior social worker assistants		[54, 55]						
Senior social work assistant		[56]						
Physical therapy assistants taking on advanced-level opportunities					[57]			
Pharmacy technicians/ assistants with advanced practice roles	[58]							
Pharmacy technician with extended roles	[59]							
Advanced practice pharmacy technicians	[60]							
Senior pharmacy technician	[61-73]							
Senior pharmacy assistant	[74]							
Extended scope pharmacy assistant	[19]							
Extended scope pharmacy technician	[19]							
Allied health assistant with advanced tasks					[17]			

² [20, 52] report on the same project

Grey references indicate grey literature

The reports, *Supervision and delegation framework for allied health assistants* [18] and *Evaluation of the trial of new Advanced Community Rehabilitation Assistant (ACRA) roles in Queensland* [20] reported the competencies for Grade 3 AHAs (with advanced skills) and advanced community rehabilitation assistants, respectively, as reported in Table 4 and Table 5.

Table 4: Skills/ attributes required for employment at this level of Australian Grade 3 allied health assistants (with advanced skills), adapted from *Supervision and delegation framework for allied health assistants*[18]

Communication	<ul style="list-style-type: none"> • Has very well developed communication skills, enabling them to be highly effective team members. • Works effectively, not only within their team, but has the ability to communicate with other areas of the organisation under the supervision of an AHP.
Teamwork	<ul style="list-style-type: none"> • Has very well developed teamwork skills that enable them to work as highly effective team members. They will work effectively, not only within their team, but will have the ability to work in teams with other areas of the organisation under the supervision of an AHP. • Will have the capacity to undertake roles that involve giving feedback, coaching or mentoring.
Problem solving	<ul style="list-style-type: none"> • Will show a high level of independence and initiative in identifying workplace problems and in the development of practical solutions. • Able to solve relatively complex problems individually or in teams. • Able to listen to and resolve concerns in relation to workplace issues, where the issues are quite complex, and determine when problem resolution requires the assistance of intervention at a higher level.
Initiative and enterprise	<ul style="list-style-type: none"> • Able to adapt to a wide range of new situations. • Able to creatively respond to workplace challenges/ • Able to translate ideas into action and develop innovative solutions.
Planning and organising	<ul style="list-style-type: none"> • Able to collect, analyse and organise information using complex systems for planning and organising. • Able to be resourceful and take initiative and decision-making responsibility. • Able to participate in continuous improvement and planning processes, which may include activities involving other parts of the organisation as delegated by the supervising AHP. • Able to manage own work time and priorities and those of others.
Self-management	<ul style="list-style-type: none"> • Will be highly self-motivated in relation to the requirements of their own role. • Able to articulate and balance their own ideas and values with workplace values and requirements. • Able to monitor and evaluate their own performance and take responsibility at the appropriate level
Learning	<ul style="list-style-type: none"> • Will actively participate in learning new ideas, skills and techniques in a range of settings, including skills that will contribute to strengthening organisational performance. • Will take responsibility for their own learning and actively contribute to the learning of others through coaching and mentoring other AHAs, under the direction of an AHP. • Will participate in developing their own learning plans.
Technology	<ul style="list-style-type: none"> • Able to use more complex technology and related workplace equipment. • Has advanced skills to use basic terminology to organise ideas

	<ul style="list-style-type: none"> • Able to adapt to new technology skill requirements with training if required • Able to apply OHS knowledge when using technology
--	---

AHP: allied health professional; AHA: allied health assistant, OHS: occupational health & safety

Table 5: Competencies for advanced community rehabilitation assistants. Source: *Evaluation of the trial of new Advanced Community Rehabilitation Assistant (ACRA) roles in Queensland* [20]

Competency	Description
Advocacy	Advocate for clients by lobbying for recognition, resources and respect to improve services
Problem solving	Ability to think creatively in the use of available resources and have a flexible approach to solving problems
Health and safety	Applying good workplace health and safety principles to enable a safe and healthy working environment
Community engagement	Engaging with, and investing in, the local community to become a trusted partner
Cultural diversity	Understanding and considering people with different cultural backgrounds and perspectives
Partnerships	Working as part of a team by building partnerships with other individuals and agencies to ensure the best outcomes for the client
Transition	Identifying risks and coordinating support for clients through a number of transition points which extend from the time of discharge from hospital to the clients return to home and community living
Social and emotional health	Recognising that clients' needs go beyond the immediate physical health issues and include social and emotional health issues
International Classification of Functioning, Disability and Health framework	Understanding and applying the International Classification of Functioning, Disability and Health framework

Tasks performed and level of autonomy

The task performed by A/AHAs, including their level of autonomy, is reported in Table 6. This section drew upon 21 peer-review studies, and four grey literature reports, however only one study[58] investigated the advanced tasks being performed by A/AHAs, however this was an observational survey and therefore could not be allocated to the NHMRC hierarchy.

Table 6: Tasks performed by advanced allied health assistants

Advanced allied health assistant	Tasks and level of autonomy
Senior support worker	<ul style="list-style-type: none"> • Supervise support workers [30, 44] • Assist psychologists in training and supervising support workers, and running a parent's group, along with the psychologist[31] • Discuss assessments of children with the support worker who carried out these assessments[43]
Advanced practice healthcare aides	<ul style="list-style-type: none"> • Involved in falls prevention program[50]

Advanced allied health assistant	Tasks and level of autonomy
Advanced community rehabilitation assistant	<ul style="list-style-type: none"> • Conduct interventions including self-care, domestic tasks, physical programs, community access and integration, domestic tasks, leisure, advocacy for clients at medical appointments, speech and communication, monitoring medication compliance and basic wound care, in individual and group settings, phone and face to face[20, 52]³ • Work under the supervision of an AHP or nurse[52] • Work with more autonomy than an AHA[52]
Senior occupational therapy assistant	<ul style="list-style-type: none"> • Advised patients regarding hip precautions[53]
Extended scope occupational therapy support worker	<ul style="list-style-type: none"> • Works autonomously on an occupational therapy caseload[21] • Can assess the need for and deliver occupational therapy management strategies, within their professional boundaries[21] • Are supervised by an occupational therapist, but has responsibility of the progress of their clients[21] • Is managed by a team leader and an occupational therapist[21] • Can perform occupational therapy and generic tasks in a range of social and health care settings[21]
Advanced practice role for pharmacy technicians/ assistants	<ul style="list-style-type: none"> • Extemporaneous compounding (e.g. aseptic admixtures, aseptic cytotoxic admixtures) [58] • Provide research support [58] • Processing claims, new admissions[58] • Assist the pharmacist with clinical review tasks[58] • Assist the pharmacist with therapeutic drug monitoring activities[58] • Provide medicine information to other health professionals and to patients[58] • Provide information for ongoing care, monitoring adverse drug reaction[58] • Conduct quality control activities[58]
Advanced practice tasks for pharmacy technicians	<ul style="list-style-type: none"> • Answering phones[59] • Posting mail[59] • Photocopying[59] • Entering patent data[59] • Deal with patent billing queries[59] • Notify the Billings Department of any high cost drugs supplied via the imprest system[59]
Advanced practice pharmacy technicians	<ul style="list-style-type: none"> • Validate the work of other technicians where non-judgemental pharmacy functions are performed (tech-check-tech) a task usually performed by a pharmacist[60]

³ [20, 52] report on the same project

Advanced allied health assistant	Tasks and level of autonomy
Senior pharmacy technician	<ul style="list-style-type: none"> • Prepare compound cytotoxic drugs[65] • Have a supervisory role[62]/ team leader[63] • Analyse the prescription of drugs[73] • Take medication histories [72] • Have an involvement in the transition from hospital to intermediate care[72] • Liaise between the patient, medical/nursing staff, community pharmacist and/ or general practitioner [72] • Ensure legibility and accuracy of discharge prescriptions and/or medicines administration records[72] • Assess the patient's understanding of medications and the potential issues with self-administration[72] • Educate the patients and their families about their medications[72] • Provide support and guidance to students in a foundation degree in medicines management course, and as a work-based facilitator[67] • Lead a drug administration round (oral medicines only), and a nurse would take the lead for complex patients if the senior pharmacy technician did not feel comfortable[69] • Educate students and return to practice nurses who follow on in the drug administration rounds[69] • Coordinate the medical gases service, which included policy implementation, receiving the new cylinders, coordination of the collection of old cylinders, charging the cylinders to the users (wards, departments, special schools), arranging the store room and completing the associated paper work[70]
Senior pharmacy assistant	<ul style="list-style-type: none"> • Front line for screening for prescriptions reviewed by the outpatient pharmacy department, which were then referred to a trainee pharmacist or pharmacist[74]
Advanced allied health assistant	<ul style="list-style-type: none"> • Practice autonomously[13] • Have primary contact status[13] • Provide plan care programs[13] • Make decisions regarding interventions[13] • Discharge patients[13]
Senior healthcare assistant/ assistant practitioner	<ul style="list-style-type: none"> • Screen for falls risk[49] • Assist the patient with walking and exercising following instructions provided by a physiotherapist[49]
Allied health assistant with advanced skills (Grade 3)	<ul style="list-style-type: none"> • Perform general work under the supervision of an AHP[18] • Perform the duties of a Grade 1 and 2 AHA[18] • Have an understanding of the work conducted by the AHP they are supported (i.e. the theoretical background) [18] • Manage (including documentation) clients, with minimal supervision (in areas where they have been trained and assessed) [18] • Provide suggestions of additional management from the AHP[18] • Prioritise and arrange their workload[18] • Assist in the supervision of Grade 1 and 2 AHAs as well as those training[18] • Monitoring progress of patients[18] • Develop treatment plans in conjunction with the AHP[18] <p><i>The reader is also referred to the original document [18] for guidance as to the tasks these AHA should not perform</i></p>

Advanced allied health assistant	Tasks and level of autonomy
Allied health assistant with advanced task	<ul style="list-style-type: none"> • Coordinate and run a functional maintenance program (group or one-on-one) [17] • Interpret referrals for the functional maintenance program following the physiotherapist's initial assessment[17] • Implement the appropriate program for the patients[17] • Report (within an agreed framework) the patients progress to the ward team[17] • Ensuring the oxygen requirements of the patients[17] • Assess patient mobility[17]
Advanced allied health assistant	<ul style="list-style-type: none"> • Devise a treatment session from a joint occupational therapy/ physiotherapy problem list[17] • Perform an intervention prescribed by the physiotherapist or occupational therapist[17] • Progress as appropriate the intervention within and between sessions[17] • Review performance of functional tasks[17] • Attend unit meetings and report patient performance[17] • Provide and educate patient prescribed occupational therapy equipment[17] • Progress gait aid where appropriate using specified equipment[17] • Organise patient hiring or purchase of equipment[17] • Arrange couriering of equipment[17] • Assist in education of occupational therapy prescribed equipment[17] • Communicate variation in functional task performance between ward and home to staff and/ or family[17] • Reinforce strategies/ interventions practiced on ward to home setting[17] • Identify variation in functional task performance between ward and home[17] • Assist in ensuring patient safety on home visit[17] • Validation information provided and observations from home visit[17]
Allied health assistant with advanced level of independence	<ul style="list-style-type: none"> • Make direct contact with parents, child and siblings[17] • Set up for the sessions[17] • Coordinate the set up of the group therapy and preparation of resources[17] • Monitor the performance of the child[17] • Report to the therapist[17] • Maintain the intake list[17] • Monitor the resources for paediatric services in the community[17] • Typing, printing and mailing out prescribed programs[17] • Make contact with the families to set up appointments[17] • Reschedule appointments where necessary and follow up reasons for failure to attend[17] • Introduce tools used in client's therapy to the family[17] • Administer tools[17] • Record the client's scores[17] • Set-up and administer the toy library[17] • Seek funding for the library[17] • Order or make toys as appropriate[17]

	<ul style="list-style-type: none"> Track and maintain the toys[17]
--	---

Grey references indicate grey literature; AHP: allied health professional; AHA: allied health assistant

3.2.2 Question 2: What client groups do advanced allied health assistants work with?

Twenty-seven peer-reviewed studies reported the client groups in which A/AHAs work with, however none of these studies investigated this, therefore no study was allocated to the NHMRC hierarchy of evidence. A/AHAs work with both adults and children, with a range of conditions including intellectual/ learning disabilities, emotional, behavioural and/or social difficulties, neurological conditions, dementia, cancer, post-surgery (including total hip replacement), mental health problems, mobility problems and those at risk of falls (see Table 7).

Table 7: The clients groups that advanced allied health assistants work with

Advanced allied health assistant	Client group
Senior support worker	People with intellectual/learning disabilities[24, 33, 39]
	Adults with intellectual/learning disabilities[23, 25, 29, 32, 34, 36, 41]
	Adults with intellectual/ learning disabilities and challenging behaviour[35]
	People with disabilities[40]
	Trafficking victims[28]
	Adults with Prader-Willi syndrome[27]
	Children with emotional, behavioural and/or social difficulties[31, 43]
	Children with (or at risk of developing) conduct disorders[30, 44]
	People with progressive long term neurological conditions[38]
Senior healthcare assistant	People with dementia and cancer[47]
	Cancer patients at the end of life[48]
Senior occupational therapy assistant	Patients post primary total hip replacement[53]
Senior social worker assistant	People with mental health problems[54, 55]
Senior social work assistant	People with mental health problems and substance abuse[56]
Senior pharmacy assistant	Patients on surgical wards[69]
Senior healthcare assistant/ assistant practitioner	People with mobility problems[49]
	People at risk of falls[49]

3.2.3 Question 3: What settings do advanced allied health assistants work in?

Advanced allied health assistants work various settings from client homes, to community services, and hospital settings (see

Table 8). All data reported for this question was regarded as background information (i.e. not from the research findings) of 32 peer-reviewed studies and two grey literature reports, and was therefore not allocated to the hierarchy of evidence.

Table 8: Work settings of advanced allied health assistants

Allied health assistant role	Hospital	Residential services/ group homes	Care homes	Acute services & outreach teams	Adult mental health & learning disability services	Community based services/ programs	Training centre	Day care	Therapy centres	Community settings	Client homes	Outpatient pharmacy department	NHS trust	Intermediate care facility
Senior support worker/ senior health care assistants/ senior healthcare support worker	[45, 46]	[25, 27, 29, 35, 39]	[45]	[28]	[26]	[24, 31, 42]	[36]							
Senior healthcare assistant/ assistant practitioner	[48, 49]					[48]		[48]						
Advanced practice healthcare aids	[50]													
Advanced allied health assistants	[17]													
Senior rehabilitation technician	[51]													
Advanced community rehabilitation assistant ⁴	[20, 52]								[20, 52]	[20, 52]	[20, 52]			
Senior occupational therapy assistant	[53]													
Senior social work assistant						[56]								
Pharmacy technicians/ assistants with advanced practice/extended roles/ advanced practice pharmacy technicians	[58-60]													
Senior pharmacy technician	[61, 63, 65, 68, 70-72]												[73]	[72]
Senior pharmacy assistant												[74]		
Allied health assistant with advanced task	[17]													

Grey references indicate grey literature; NHS: National Health Service

⁴ [20, 52] report on the same project

3.2.4 Question 4: What training is available for advanced allied health assistants?

In Australia, Certificate IV in Allied Health Assistance was commonly reported as a formal qualification for A/AHAs (four grey literature reports[5, 17, 18, 20] and 1 peer-reviewed study [52] (background information, NHMRC level: not assigned), however this qualification does not automatically enable one to work in this role, and it is unclear whether these qualifications are required for these roles [5, 17]. Despite this, one report[18] reported that this qualification was required for both Grade 2 and 3 AHA (Grade 3 has advanced tasks). This certificate program allows the student to specialise in up to three areas (dietetics, occupational therapy, physiotherapy, podiatry or speech therapy) [18]. The competencies of these are reported in detail in the report, *Supervision and delegation framework for allied health assistants* [18].

A Certificate IV level qualification (in Hospital/ Health Services Pharmacy Support) was held by some of the pharmacy technicians/ assistants in O’Leary’s [58] study (observational survey, NHRMC level: not assigned), but not all of them, again highlighting the inconsistencies in the level of education required to undertake these advanced roles. In the case of one project where there was a paediatrics focus[17] an additional qualification, Certificate III in Children’s Services, was also recommended.

Informal training for A/AHA was also reported in some cases (two grey literature reports[17, 20] and two peer-reviewed studies[60, 69] (background information, NHMRC level: not assigned). One report[17] stated that informal A/AHA training (one on one sessions with the physiotherapists and occupational therapists) focused on ‘gaps’ in the formal training, which were gait training, knowledge of occupational therapy and physiotherapy aids and equipment, balance exercises (including exercise progression), and knowledge of functional activities of daily living and training. In this training, competency based assessments were conducted. Advanced community rehabilitation assistants had additional training including using workbooks, shadowing others and attending videoconferences for advanced community rehabilitation workers[20]. For advanced practice pharmacy technicians, a self-learning package was used and was developed in-house[60]. This training also involved competency assessments (see Table 9), as did the training program for senior pharmacy technicians[69]. In both of these studies, no formal training was undertaken.

Table 9: Competency assessment of pharmacy advanced allied health assistants

Study	Competency assessment
[60]	100% accuracy was required in an audit involving a minimum 500 line items in the cart fill validation, as well as a 100 line item in the automation refill. This had to be repeated annually.
[69]	Competency assessment was carried out over five medicine rounds, in which they were to dispense 200 items following the policy

In the United Kingdom, expanded role occupational therapy support workers/ APs had completed National Vocational Qualification training[21]. There was a perception, however, reported in this qualitative study (NHMRC level: not assigned) that a number of the skills/ attributes that the A/AHA requires could only be gained through experience, rather than the ‘paper’ qualification[21].

3.2.5 Question 5: How effective are advanced allied health assistant roles in terms of health, cost, and process outcomes?

Process outcomes and stakeholder perspectives (relating to health and processes) were reported, however no study reported cost or health outcomes. The main findings were that the A/AHA roles appears to be well accepted by clients, provide clients with more therapy time, and freeing up time for AHPs perform other duties. The details of the effectiveness of A/AHA roles are reported in 3.2.6 Question 6: What are the workforce issues for advanced allied health assistants?

Four studies (two qualitative peer-reviewed studies [[21, 52], and two grey literature reports[17, 20]) reported the issues associated with implementing A/AHA roles. A key issue was the uncertainty of the scope of practice of A/AHA[17, 20, 21, 52], how they should be best utilised[17, 20, 52], as well as issues around responsibility and accountability [20, 21, 52]. In some cases, the AHPs had to spend more time supervising and training the A/AHA in the initial stages[20, 52]. One study [21] reported both under- and over-supervision of the A/AHA which may have been due to the lack of understanding of the A/AHA role, and the training provided to these assistants. Specific to the advanced community rehabilitation assistants time management was an issue as the A/AHA had to report and communicate with a range of supervisors [20, 52]. Some AHPs felt that the A/AHA were a cheap alternative to their own role [21]. In one project an A/AHA felt that their remuneration was insufficient given the additional responsibility of the role[20, 52]. A study [17] which advanced the role of an AHA working in the physiotherapy department. In doing so their original role had to be covered for the time they were working in the advanced role. This lead to a restructure of the department to accommodate the new role. The key issue appears to be the integration of A/AHA roles into traditional health care systems; a move which requires structural, organisational and philosophical changes.

Table 10. It should be noted that none of these studies were high level design; hence there are inherent biases in the study designs, which reduces the believability of these findings.

3.2.6 Question 6: What are the workforce issues for advanced allied health assistants?

Four studies (two qualitative peer-reviewed studies [[21, 52], and two grey literature reports[17, 20]⁵) reported the issues associated with implementing A/AHA roles. A key issue was the uncertainty of the scope of practice of A/AHA[17, 20, 21, 52], how they should be best utilised[17, 20, 52], as well as issues around responsibility and accountability [20, 21, 52]. In some cases, the AHPs had to spend more time supervising and training the A/AHA in the initial stages[20, 52]. One study [21] reported both under- and over-supervision of the A/AHA which may have been due to the lack of understanding of the A/AHA role, and the training provided to these assistants. Specific to the advanced community rehabilitation assistants time management was an issue as the A/AHA had to report and communicate with a range of supervisors [20, 52]. Some AHPs felt that the A/AHA were a cheap alternative to their own role [21]. In one project an A/AHA felt that their remuneration was insufficient given the additional responsibility of the role[20, 52]. A study [17] which advanced the role of an AHA working in the physiotherapy department. In doing so their original role had to be covered for the time they were working in the advanced role. This lead to a restructure of the department to accommodate the new role. The key issue appears to be the integration of A/AHA roles into traditional health care systems; a move which requires structural, organisational and philosophical changes.

⁵ [20, 52] report on the same project

Table 10: Key findings regarding the effectiveness of advanced allied health assistant roles

Study	Study design (NHMRC level)	Advanced allied health assistant role implemented	Key findings
[20, 52] ⁶	Qualitative (not assigned)	Advance community rehabilitation assistant	<p>Clients were satisfied with the A/AHA services, in particular the home visits were viewed as being valuable, as were the motivation, feedback, assistance and monitoring within their therapy programs.</p> <p>Some clients felt they were getting more therapy with the A/AHA than they were prior to the implementation of these roles.</p> <p>AHPs reported improvements in client outcomes, which they felt were due to more frequent and longer therapy sessions.</p> <p>The AHPs reported decreased waiting lists, increased throughput, service extension and expansion, enhanced multidisciplinary practice, resource development and improved ability to provide services under the most appropriate delivery model.</p>
[21]	Qualitative (not assigned)	Expanded role occupational therapy support worker	<p>This A/AHA role freed up time for the occupational therapist to perform other duties.</p> <p>The A/AHA was reported to spend more time in the clients home than the occupational therapist, which allowed them to get to know the patient better, and therefore better able to manage them appropriately.</p> <p>Some support workers as well as managers stated that the support workers were better able to relate to the patients as they used less complicated language and had a similar background to their patients.</p> <p>The patients valued having the additional time with a staff member, could not differential between the A/AHA and occupational therapist, and they were not concerned about the lack of formalised training, provided they were trained appropriately.</p>
[60]	Non-randomised blocks, without concurrent controls (III_3)	Advanced practice pharmacy technicians	<p><i>Outcome measures used: time saving for the clinical pharmacist and the variances</i></p> <p>The implementation of this role saved the clinical pharmacist over 50 hours/ month, which freed up their time to provide more patient focused services.</p> <p>The variances for the pharmacist in the 12 months immediately prior to implementation of the A/AHA role was 1.42/month (95% CI, 0.95-1.88), whereas the variance rate for the advanced practice pharmacy technician was 0.31/month (95% CI, 0.00-0.77), indicating greater accuracy of the new role.</p>
[69]	Self reflection (not assigned)	Senior pharmacy technician	<p>The senior pharmacy technician reported that there were improvements in terms of drug security, medicines being delivered in a more timely manner, and the senior pharmacy technician was able to explain what the medicines were for and how to take them.</p>

Grey references indicate grey literature; NHMRC: National Health and Medical Research Council; A/AHA: advanced allied health assistant; AHP: allied health professional; CI: confidence interval

⁶ [20, 52] report on the same project

4 Key messages

- Advanced allied health assistant roles are diverse in terms of the disciplines they work with, their work settings, the tasks they perform, and the titles they are given
- Low level (NHMRC level III_3, or not assigned) research has been conducted into the effectiveness of A/AHA roles in terms of process measures, indicating that the implementation of these roles may lead to decreased waiting times, increased throughput and more therapy time for patients
- Stakeholder perspectives regarding A/AHA roles have been positive, however these too reflect low level evidence
- There is no published research (peer-reviewed or grey literature) reporting the health or cost outcomes of implementing A/AHA roles, indicating a clear evidence gap
- In Australia, the Certificate IV in Allied Health Assistance forms part of the formal training for A/AHA, however this qualification is also held by AHA, and additional training is often provided to ensure they can carry out their advanced roles.
- Issues in terms of fitting the new A/AHA roles into traditional healthcare models were identified; hence prior to implementation the potential impact on other staff (e.g. AHPs and AHAs) should be considered; strategies should be put in place to ensure that the A/AHAs are appropriately trained, supervised and utilised within the healthcare system they are working in; and the A/AHAs and the supervising AHPs level of responsibility and accountability needs to be established.

Conclusion

This is the first systematic review, to our knowledge, which has specifically investigated the roles of A/AHA. Whilst the conclusions drawn are limited, due to the quality (low level designs used, qualitative studies) and quantity of research evidence. Despite this, A/AHA roles are being established in Australia, and internationally. These roles are diverse, and there is some suggestion that they are effective in terms of process and health outcomes. Further research in the area should aim to better understand the roles, as well as conducting higher level studies to determine their effectiveness.

References

1. Australian Physiotherapy Association, *Position statement: scope of practice*. Australian Physiotherapy Association, 2009. 2009, Accessed online November 21, 2011 <http://physiotherapy.asn.au/images/Document_Library/Position_Statements/2014%20scope%20of%20practice.pdf>.
2. Lizarondo, L., et al., *Allied health assistants and what they do: A systematic review of the literature*. Journal of multidisciplinary healthcare, 2010. 3: p. 143.
3. Statewide Service Strategy Division, *Statewide Rehabilitation Service Plan 2009-2017*. Statewide Service Strategy Division, Department of Health, Government of South Australia, accessed online March 4, 2013 <<http://www.health.sa.gov.au/Portals/0/statewiderehabilitationplan-sahealth-ss-091215.pdf>>, 2009.
4. Statewide Orthopaedic Clinical Network and Rehabilitation Clinical Network, *Models of Care for Orthopaedic Rehabilitation - Fragility Fractures, General Orthopaedic Trauma and Arthroplasty*. SA Health, Government of South Australia, accessed online March 4, 2013 <<http://sahealth.sa.gov.au/wps/wcm/connect/443d0f8046e616d78953fb2e504170d4/Models+of+Care-SSS-Clinical+Network-20110509.pdf?MOD=AJPERES&CACHEID=443d0f8046e616d78953fb2e504170d4>>, 2011.
5. Queensland Health, *Queensland Statewide Rehabilitation Medicine Services Plan 2008-2012*. Queensland Health, Queensland Government, accessed online March 4, 2013 <http://s3.amazonaws.com/zanran_storage/www.health.qld.gov.au/ContentPages/2524665.pdf>, 2008.
6. Queensland Health, *Issue paper for Bundaberg Hospital Commission of Inquiry: Enhanced Clinical Roles*. Queensland Health, accessed online March 4, 2013 <<http://www.health.qld.gov.au/inquiry/docs/enhancedroles.pdf>>, 2005.
7. Brooks, A.D., *Considering academic pharmacy as a career: opportunities and resources for students, residents, and fellows*. Currents in Pharmacy Teaching and Learning, 2009. 1(1): p. 2-9.
8. Jessup, R.L., *Interdisciplinary versus multidisciplinary care teams: do we understand the difference?* Australian Health Review, 2007. 31(3): p. 330-1.
9. Campbell, K.L. and E.M. Murray, *ALLIED HEALTH SERVICES TO NEPHROLOGY: AN AUDIT OF CURRENT WORKFORCE AND MEETING FUTURE CHALLENGES*. Journal of renal care, 2012: p. 1-10.
10. Ford, P., *The role of support workers in the department of diagnostic imaging—service managers perspectives*. Radiography, 2004. 10(4): p. 259-267.
11. Green, S.M., et al., *A systematic review of the use of volunteers to improve mealtime care of adult patients or residents in institutional settings*. Journal of Clinical Nursing, 2011. 20(13-14): p. 1810-1823.
12. Kibicho, J. and J. Owczarzak, *Pharmacists' strategies for promoting medication adherence among patients with HIV*. Journal of the American Pharmacists Association, 2011. 51(6): p. 746-755.
13. Lowe, J., et al., *Allied health scope of practice role development in the wider allied health service delivery context: the allied health assistant (AHA)*. Prepared for the SA Health and Community Services Skills Board, Government of South Australia, 2008.
14. National Health and Medical Research Council, *NHMRC additional levels of evidence and grades for recommendations for developers of guidelines: Stage 2 Consultation*. National Health and Medical Research Council, Australian Government, accessed online January 18, 2013 <http://www.nhmrc.gov.au/files/nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf>, 2009.

15. University of Oxford, *Centre for Evidence Based Medicine Systematic Review Critical Appraisal Sheet*. Centre for Evidence Based Medicine, University of Oxford, accessed online February 25, 2013, <<http://www.cebm.net/index.aspx?o=1157>>, 2005.
16. The George Institute for Global Health, *PEDro Scale*. PEDro Physiotherapy Evidence Database, accessed only February 25, 2013 <<http://www.pedro.org.au/english/downloads/pedro-scale/>>, 1999.
17. Services, D.o.H., *Better skills, best care - Stage 1: Final report*. Department of Human Services, Victorian Government accessed online <www.health.vic.gov.au/workforce/skills>, 2007.
18. Department of Health, *Supervision and delegation framework for allied health assistants*. Department of Health, The Government of Victoria, 2012.
19. Lowe, K., et al., *The evaluation of periodic service review (PSR) as a practice leadership tool in services for people with intellectual disabilities and challenging behaviour*. Tizard Learning Disability Review, 2010. **15**(3): p. 17-28.
20. Community Rehabilitation Workforce Project, *Evaluation of the trial of new Advanced Community Rehabilitation Assistant (ACRA) roles in Queensland*. Community Rehabilitation Workforce Project, 2008.
21. Nancarrow, S. and H. Mackey, *The introduction and evaluation of an occupational therapy assistant practitioner*. Australian Occupational Therapy Journal, 2005. **52**: p. 293-301.
22. Kroese, B.S., et al., *Mental Health Services for Adults with Intellectual Disabilities—What Do Service Users and Staff Think of Them?* Journal of Applied Research in Intellectual Disabilities, 2013. **26**(1): p. 3-13.
23. Bradshaw, J. and J. Goldbart, *Staff Views on the Importance of Relationships with Knowledge Development*. Journal of Applied Research in Intellectual Disabilities, 2013.
24. Stimpson, A., et al., *The Experiences of Staff Taking on the Role of Lay Therapist in a Group-Based Cognitive Behavioural Therapy Anger Management Intervention for People with Intellectual Disabilities*. Journal of Applied Research in Intellectual Disabilities, 2013. **26**(1): p. 63-70.
25. Ravoux, P., P. Baker, and H. Brown, *Thinking on Your Feet: Understanding the Immediate Responses of Staff to Adults Who Challenge Intellectual Disability Services*. Journal of Applied Research in Intellectual Disabilities, 2012.
26. Robertson, J.P. and C. Collinson, *Positive risk taking: Whose risk is it? An exploration in community outreach teams in adult mental health and learning disability services*. Health, Risk & Society, 2011. **13**(2): p. 147-164.
27. Hawkins, R., M. Redley, and A. Holland, *Duty of care and autonomy: how support workers managed the tension between protecting service users from risk and promoting their independence in a specialist group home*. Journal of Intellectual Disability Research, 2011. **55**(9): p. 873-884.
28. Bosworth, M., C. Hoyle, and M.M. Dempsey, *Researching Trafficked Women On Institutional Resistance and the Limits to Feminist Reflexivity*. Qualitative Inquiry, 2011. **17**(9): p. 769-779.
29. Phillips, N. and J. Rose, *Predicting placement breakdown: individual and environmental factors associated with the success or failure of community residential placements for adults with intellectual disabilities*. Journal of Applied Research in Intellectual Disabilities, 2010. **23**(3): p. 201-213.
30. Frampton, I., et al., *Beyond parent training: Predictors of clinical status and service use two to three years after Scallywags*. Clinical child psychology and psychiatry, 2008. **13**(4): p. 593-608.
31. Lovering, K., et al., *Community-based early intervention for children with behavioural, emotional and social problems: evaluation of the Scallywags Scheme*. Emotional and behavioural difficulties, 2006. **11**(2): p. 83-104.

32. Parsons, S., et al., *Resources, staff beliefs and organizational culture: Factors in the use of information and communication technology for adults with intellectual disabilities*. Journal of Applied Research in Intellectual Disabilities, 2008. **21**(1): p. 19-33.
33. Campbell, M., *Cognitive representation of challenging behaviour among staff working with adults with learning disabilities*. Psychology, health & medicine, 2007. **12**(4): p. 407-420.
34. Hegarty, J.R. and A. Aspinall, *The Use of Personal Computers with Adults Who Have Developmental Disability: Outcomes of an Organisation-Wide Initiative*. The British Journal of Development Disabilities, 2006. **52**(103): p. 137-154.
35. Hawkins, S., D. Allen, and R. Jenkins, *The use of physical interventions with people with intellectual disabilities and challenging behaviour—the experiences of service users and staff members*. Journal of Applied Research in Intellectual Disabilities, 2005. **18**(1): p. 19-34.
36. Hetherington, R., A. Crerar, and P. Turner, *A question of realism*. User-Centered Interaction Paradigms for Universal Access in the Information Society, 2004: p. 68-76.
37. Turbett, C., *Rural social work in Scotland and eastern Canada A comparison between the experience of practitioners in remote communities*. International Social Work, 2006. **49**(5): p. 583-594.
38. Wilson, E., J. Seymour, and A. Aubeeluck, *Perspectives of staff providing care at the end of life for people with progressive long-term neurological conditions*. Palliative and Supportive Care, 2011. **9**(04): p. 377-385.
39. Beacroft, M. and K. Dodd, *Pain in people with learning disabilities in residential settings - the need for change*. British Journal of Learning Disabilities, 2010. ???(???).
40. Plath, D., *Organisational processes supporting evidence-based practice*. Administration in Social Work, 2012(just-accepted).
41. Kleinberg, I. and K. Scior, *The impact of staff and service user gender on staff responses towards adults with intellectual disabilities who display aggressive behaviour*. Journal of Intellectual Disability Research, 2012.
42. Sawyer, A.-M., *Mental health workers negotiating risk on the frontline*. Australian Social Work, 2009. **62**(4): p. 441-459.
43. Broadhead, M., R. Chilton, and V. Stephens, *Utilising the Boxall Profile within the Scallywags service for children with emotional and behavioural difficulties*. British Journal of Special Education, 2011. **38**(1): p. 19-27.
44. Broadhead, M., et al., *Scallywags—an evaluation of a service targeting conduct disorders at school and at home*. Educational Psychology in Practice, 2009. **25**(2): p. 167-179.
45. Lawrence, V. and S. Banerjee, *Improving care in care homes: A qualitative evaluation of the Croydon care home support team*. Aging & Mental Health, 2010. **14**(4): p. 416-424.
46. Roberts, D. and K. Hurst, *Evaluating palliative care ward staffing using bed occupancy, patient dependency, staff activity, service quality and cost data*. Palliative Medicine, 2012.
47. Bartlett, A. and B. Clarke, *An exploration of healthcare professionals' beliefs about caring for older people dying from cancer with a coincidental dementia*. Dementia, 2012. **11**(4): p. 559-565.
48. Dryden, H. and R. Addicott, *Evaluation of a pilot study day for healthcare assistants and social care officers*. International Journal of Palliative Nursing, 2009. **15**(1): p. 6-11.
49. Nazarko, L., *Falls part 4: Prevention, assessment and intervention*. British Journal of Healthcare Assistants, 2008. **2**(11): p. 535-539.
50. Ireland, S., et al., *Designing a Falls Prevention Strategy That Works*. Journal of nursing care quality, 2010. **25**(3): p. 198-207.
51. Ford, M.T. and L.E. Tetrick, *Relations among occupational hazards, attitudes, and safety performance*. Journal of Occupational Health Psychology, 2011. **16**(1): p. 48.

52. Wood, A.J.M.B., S.B.B. Schuurs, and D.I.B.M. Amsters, *Evaluating new roles for the support workforce in community rehabilitation settings in Queensland*. Australian Health Review, 2011. **35**(1): p. 86-91.
53. Drummond, A., et al., *Hip precautions following primary total hip replacement: a national survey of current occupational therapy practice*. The British Journal of Occupational Therapy, 2012. **75**(4): p. 164-170.
54. Yip, K.-s., *Medicalization of social workers in mental health services in Hong Kong*. British Journal of Social Work, 2004. **34**(3): p. 413-435.
55. Yip, K.-s., *Controversies in Psychiatric Services in Hong Kong: Social Workers' Superiority and Inferiority Complexes*. International Social Work, 2004. **47**(2): p. 240-258.
56. Graham, H., *Implementing integrated treatment for co-existing substance use and severe mental health problems in assertive outreach teams: training issues*. Drug and Alcohol Review, 2004. **23**(4): p. 463-470.
57. Massey, B.F., Jr., *"For the Sake of Our Patients, It Is the Right Thing to Do"*. Physical Therapy, 2005. **85**(11): p. 1238-1242.
58. O'Leary, K.M., *Two national surveys of hospital pharmacy technician activities to support the review of national qualifications*. Journal of Pharmacy Practice and Research, 2012. **42**(1): p. 43-47.
59. Maslanka, E. and H.J. Leach, *Expanding the role of a pharmacy technician in a private hospital*. Journal of Pharmacy Practice and Research, 2004. **34**(2): p. 131-132.
60. McKee, J. and M. Zimmerman, *Tech-check-tech pilot in a regional public psychiatric inpatient facility*. Hospital Pharmacy, 2011. **46**(7): p. 501-511.
61. Niazkhani, Z., et al., *Evaluating the medication process in the context of CPOE use: the significance of working around the system*. International Journal of Medical Informatics, 2011. **80**(7): p. 490-506.
62. Hall, K.W., et al., *Organizational Restructuring of Regional Pharmacy Services to Enable a New Pharmacy Practice Model*. The Canadian Journal of Hospital Pharmacy, 2011. **64**(6): p. 451.
63. Hon, C.-Y., et al., *Occupational Exposure to Antineoplastic Drugs: Identification of Job Categories Potentially Exposed throughout the Hospital Medication System*. Safety and Health at Work, 2011. **2**(3): p. 273-281.
64. Lee, S.G., et al., *Paclitaxel exposure and its effective decontamination*. Journal of Pharmacy Practice and Research, 2009. **39**(3): p. 181.
65. Tkaczuk, M., et al., *Surface contamination of cytotoxic drug 5-fluorouracil (5-FU) and decontamination*. Journal of Health, Safety and Environment, 2010. **26**(2): p. 171.
66. Duggan, C., et al., *Becoming a good leader-developing the skills required*. HOSPITAL PHARMACIST-LONDON-, 2007. **14**(6): p. 193.
67. Herrera, H., *Foundation degrees-building on the foundation of experience*. HOSPITAL PHARMACIST-LONDON-, 2007. **14**(9): p. 311.
68. Conroy, S., et al., *Medication errors in a children's hospital*. Paediatric and Perinatal Drug Therapy, 2007. **8**(1): p. 18-25.
69. Holding, D., *Starting a pharmacy technician-led drug round*. Hosp Pharm, 2004. **11**: p. 477-8.
70. Orchiston, M., *Coordinating a medical gases service*. HOSPITAL PHARMACIST-LONDON-, 2003. **10**(8): p. 324-327.
71. Tempest, A., *Auditing the recording of allergy status in community hospitals*. HOSPITAL PHARMACIST-LONDON-, 2006. **13**(7): p. 259.
72. Sedgwick, T., *Improving medicines management for older patients on the move*. HOSPITAL PHARMACIST-LONDON-, 2006. **13**(6): p. 226.

73. Moulder, B., *Why not ask a technician to promote better prescribing?* HOSPITAL PHARMACIST-LONDON-, 2004. **11**(9): p. 397-398.
74. Siang, C.S., K.M. Ni, and M.N. bin Ramli, *Outpatient prescription intervention activities by pharmacists in a teaching hospital.* Malaysian Journal of Pharmacy, 2003. **1**(3): p. 86.

Appendices

Appendix 1: Search terms used

Search terms for all databases except Scopus

Advanced allied health assistant terms

"advanced allied health assistant*"
 "advanced allied health aid*"
 "advanced allied health technician*"
 "advanced physiotherap*assistant*"
 "advanced physiotherap* aid*"
 "advanced physiotherap* technician*"
 "advanced physical therap* assistant*"
 "advanced physical therap* aid*"
 "advanced physical therap* technician*"
 "advanced occupational therap* assistant*"
 "advanced occupational therap* aid*"
 "advanced occupational therap* technician*"
 "advanced speech therap* assistant*"
 "advanced speech therap* aid*"
 "advanced speech therap* technician*"
 "advanced technical officer*"
 "advanced health care assistant*"
 "advanced health care aid*"
 "advanced health care technician*"
 "advanced healthcare assistant*"
 "advanced healthcare aid*"
 "advanced healthcare technician*"
 "advanced community rehabilitation worker*"
 "advanced rehabilitation assistant*"
 "advanced rehabilitation aid*"
 "advanced rehabilitation technician*"
 "advanced assistant practitioner*"
 "advanced nutrition* assistant*"
 "advanced nutrition* aid*"
 "advanced nutrition* technician*"
 "advanced diet* assistant*"

"advanced diet* aid*"
 "advanced diet* technician*"
 "advanced podiat* assistant*"
 "advanced podiat* aid*"
 "advanced podiat* technician*"
 "advanced speech assistant*"
 "advanced speech aid*"
 "advanced speech technician*"
 "advanced speech path* assistant*"
 "advanced speech path* aid*"
 "advance speech path* technician*"
 "advanced paramedical assistant*"
 "advanced paramedical aid*"
 "advanced paramedical technician*"
 "advanced social work* assistant*"
 "advanced social work* aid*"
 "advanced social work* technician*"
 "advanced imaging assistant*"
 "advanced imaging aid*"
 "advanced imaging technician*"
 "advanced audiolog* assistant*"
 "advanced audiolog* aid*"
 "advanced audiolog* technician*"
 "advanced prosthet* assistant*"
 "advanced prosthet* aid*"
 "advanced prosthet* technician*"
 "advanced orthot* assistant*"
 "advanced orthot* aid*"
 "advanced orthot* technician*"
 "advanced pharmac* assistant*"
 "advanced pharmac* aid*"
 "advanced pharmac* technician*"
 "advanced psycholog* assistant*"
 "advanced psycholog* aid*"
 "advanced psycholog* technician*"

"advanced orthopt* assistant*"
 "advanced orthopt* aid*"
 "advanced orthopt* technician*"
 "advanced support work*"

Senior allied health assistant terms

"senior allied health assistant*"
 "senior allied health aid*"
 "senior allied health technician*"
 "senior physiotherap*assistant*"
 "senior physiotherap* aid*"
 "senior physiotherap* technician*"
 "senior physical therap* assistant*"
 "senior physical therap* aid*"
 "senior physical therap* technician*"
 "senior occupational therap* assistant*"
 "senior occupational therap* aid*"
 "senior occupational therap* technician*"
 "senior speech therap* assistant*"
 "senior speech therap* aid*"
 "senior speech therap* technician*"
 "senior technical officer*"
 "senior health care assistant*"
 "senior health care aid*"
 "senior health care technician*"
 "senior healthcare assistant*"
 "senior healthcare aid*"
 "senior healthcare technician*"
 "senior community rehabilitation worker*"
 "senior rehabilitation assistant*"
 "senior rehabilitation aid*"
 "senior rehabilitation technician*"
 "senior assistant practitioner*"
 "senior nutrition* assistant*"
 "senior nutrition* aid*"

"senior nutrition* technician*"
 "senior diet* assistant*"
 "senior diet* aid*"
 "senior diet* technician*"
 "senior podiat* assistant*"
 "senior podiat* aid*"
 "senior podiat* technician*"
 "senior speech assistant*"
 "senior speech aid*"
 "senior speech technician*"
 "senior speech path* assistant*"
 "senior speech path* aid*"
 "advance speech path* technician*"
 "senior paramedical assistant*"
 "senior paramedical aid*"
 "senior paramedical technician*"
 "senior social work* assistant*"
 "senior social work* aid*"
 "senior social work* technician*"
 "senior imaging assistant*"
 "senior imaging aid*"
 "senior imaging technician*"
 "senior audiolog* assistant*"
 "senior audiolog* aid*"
 "senior audiolog* technician*"
 "senior prosthet* assistant*"
 "senior prosthet* aid*"
 "senior prosthet* technician*"
 "senior orthot* assistant*"
 "senior orthot* aid*"
 "senior orthot* technician*"
 "senior pharmac* assistant*"
 "senior pharmac* aid*"
 "senior pharmac* technician*"
 "senior psycholog* assistant*"
 "senior psycholog* aid*"
 "senior psycholog* technician*"

"senior orthopt* assistant*"
 "senior orthopt* aid*"
 "senior orthopt* technician*"
 "senior support work*"

Extended scope or advanced practice allied health assistant terms

*[all were searched with AND ("extended scope
OR "advanced practice")]*

"allied health assistant*"
 "allied health aide*"
 "allied health technician*"
 "physiotherap* assistant*"
 "physiotherap* aid*"
 "physiotherap* technician*"
 "physical therap*assistant*"
 "physical therap* aid*"
 "physical therap* technician*"
 "occupational therap* assistant*"
 "occupational therap* aid*"
 "occupational therap* technician*"
 "speech therap* assistant*"
 "speech therap* aid*"
 "speech therap* technician*"
 "technical officer*"
 "health care assistant*"
 "health care aid*"
 "health care technician*"
 "healthcare assistant*"
 "healthcare aid*"
 "healthcare technician*"
 "community rehabilitation worker*"
 "rehabilitation assistant*"
 "rehabilitation aid*"
 "rehabilitation technician*"
 "assistant practitioner*"

"nutrition* assistant*"
 "nutrition* aid*"
 "nutrition technician*"
 "diet* assistant*"
 "diet* aid*"
 "diet* technician*"
 "podiat* assistant*"
 "podiat* aid*"
 "podiat* technician*"
 "speech assistant*"
 "speech aid*"
 "speech technician*"
 "speech path* assistant*"
 "speech path* aid*"
 "speech path* technician*"
 "paramedical assistant*"
 "paramedical aid*"
 "paramedical technician*"
 "social work* assistant*"
 "social work* aid*"
 "social work* technician*"
 "imaging assistant*"
 "imaging aid*"
 "imaging technician*"
 "audiolog* assistant*"
 "audiolog* aid*"
 "audiolog* technician*"
 "prosthet* assistant*"
 "prosthet* aid*"
 "prosthet* technician*"
 "orthot* assistant*"
 "orthot* aid*"
 "orthot* technician*"
 "pharmac* assistant*"
 "pharmac* aid*"
 "pharmac* technician*"
 "psycholog* assistant*"

"psycholog* aid*"
 "psycholog* technician*"
 "orthopt* assistant*"
 "orthopt* aid*"
 "orthopt* technician*"
 "'support work*"

Search terms in Scopus and Google Scholar

Advanced allied health assistant terms

"advanced allied health assistant"
 "advanced allied health assistants"
 "advanced allied health aide"
 "advanced allied health aides"
 "advanced allied health technician"
 "advanced allied health technicians"
 "advanced physiotherapy assistant"
 "advanced physiotherapy assistants"
 "advanced physiotherapist assistant"
 "advanced physiotherapist assistants"
 "advanced physiotherapy aide"
 "advanced physiotherapy aides"
 "advanced physiotherapist aide"
 "advanced physiotherapist aides"
 "advanced physiotherapy technician"
 "advanced physiotherapy technicians"
 "advanced physiotherapist technician"
 "advanced physiotherapist technicians"
 "advanced physical therapy assistant"
 "advanced physical therapy assistants"
 "advanced physical therapist assistant"
 "advanced physical therapist assistants"
 "advanced physical therapy aide"
 "advanced physical therapy aides"
 "advanced physical therapist aide"
 "advanced physical therapist aides"

"advanced physical therapy technician"
 "advanced physical therapy technicians"
 "advanced physical therapist technician"
 "advanced physical therapist technicians"
 "advanced occupational therapy assistant"
 "advanced occupational therapy assistants"
 "advanced occupational therapist assistant"
 "advanced occupational therapist assistants"
 "advanced occupational therapy aide"
 "advanced occupational therapy aides"
 "advanced occupational therapist aide"
 "advanced occupational therapist aides"
 "advanced occupational therapy technician"
 "advanced occupational therapy technicians"
 "advanced occupational therapist technician"
 "advanced occupational therapist technicians"
 "advanced speech therapy assistant"
 "advanced speech therapy assistants"
 "advanced speech therapist assistant"
 "advanced speech therapist assistants"
 "advanced speech therapy aide"
 "advanced speech therapy aides"
 "advanced speech therapist aide"
 "advanced speech therapist aides"
 "advanced speech therapy technician"
 "advanced speech therapy technicians"
 "advanced speech therapist technician"
 "advanced speech therapist technicians"
 "advanced technical officer"
 "advanced technical officers"
 "advanced health care assistant"
 "advanced health care assistants"
 "advanced health care aide"
 "advanced health care aides"
 "advanced health care technician"
 "advanced health care technicians"
 "advanced healthcare assistant"

"advanced healthcare assistants"
 "advanced healthcare aide"
 "advanced healthcare aides"
 "advanced healthcare technician"
 "advanced healthcare technicians"
 "advanced community rehabilitation worker"
 "advanced community rehabilitation workers"
 "advanced rehabilitation assistant"
 "advanced rehabilitation assistants"
 "advanced rehabilitation aide"
 "advanced rehabilitation aides"
 "advanced rehabilitation technician"
 "advanced rehabilitation technicians"
 "advanced assistant practitioner"
 "advanced assistant practitioners"
 "advanced nutrition assistant"
 "advanced nutrition assistants"
 "advanced nutritionist assistant"
 "advanced nutritionist assistants"
 "advanced nutrition aide"
 "advanced nutrition aides"
 "advanced nutritionist aide"
 "advanced nutritionist aides"
 "advanced nutrition technician"
 "advanced nutrition technicians"
 "advanced nutritionist technician"
 "advanced nutritionist technicians"
 "advanced dietetics assistant"
 "advanced dietetics assistants"
 "advanced dietetic assistant"
 "advanced dietetic assistants"
 "advanced dietician assistant"
 "advanced dietician assistants"
 "advanced dietitian assistant"
 "advanced dietitian assistants"
 "advanced dietetics aide"
 "advanced dietetics aides"

“advanced dietetic aide”
“advanced dietetic aides”
“advanced dietician aide”
“advanced dietician aides”
“advanced dietitian aide”
“advanced dietitian aides”
“advanced dietetics technician”
“advanced dietetics technicians”
“advanced dietetic technician”
“advanced dietetic technicians”
“advanced dietician technician”
“advanced dietician technicians”
“advanced dietitian technician”
“advanced dietitian technicians”
“advanced podiatry assistant”
“advanced podiatry assistants”
“advanced podiatrist assistant”
“advanced podiatrist assistants”
“advanced podiatry aide”
“advanced podiatry aides”
“advanced podiatrist aide”
“advanced podiatrist aides”
“advanced podiatry technician”
“advanced podiatry technicians”
“advanced podiatrist technician”
“advanced podiatrist technicians”
“advanced speech assistant”
“advanced speech assistants”
“advanced speech aide”
“advanced speech aides”
“advanced speech technician”
“advanced speech technicians”
“advanced speech pathology assistant”
“advanced speech pathology assistants”
“advanced speech pathologist assistant”
“advanced speech pathologist assistants”
“advanced speech pathology aide”

“advanced speech pathology aides”
“advanced speech pathologist aide”
“advanced speech pathologist aides”
“advanced speech pathology technician”
“advanced speech pathology technicians”
“advanced speech pathologist technician”
“advanced speech pathologist technicians”
“advanced paramedical assistant”
“advanced paramedical assistants”
“advanced paramedical aide”
“advanced paramedical aides”
“advanced paramedical technician”
“advanced paramedical technicians”
“advanced social work assistant”
“advanced social work assistants”
“advanced social worker assistant”
“advanced social worker assistants”
“advanced social work aide”
“advanced social work aides”
“advanced social worker aide”
“advanced social worker aides”
“advanced social work technician”
“advanced social work technicians”
“advanced social worker technician”
“advanced social worker technicians”
“advanced imaging assistant”
“advanced imaging assistants”
“advanced imaging aide”
“advanced imaging aides”
“advanced imaging technician”
“advanced imaging technicians”
“advanced audiology assistant”
“advanced audiology assistants”
“advanced audiologist assistant”
“advanced audiologist assistants”
“advanced audiology aide”
“advanced audiology aides”

“advanced audiologist aide”
“advanced audiologist aides”
“advanced audiology technician”
“advanced audiology technicians”
“advanced audiologist technician”
“advanced audiologist technicians”
“advanced prosthetic assistant”
“advanced prosthetic assistants”
“advanced prosthetist assistant”
“advanced prosthetist assistants”
“advanced prosthetic aide”
“advanced prosthetic aides”
“advanced prosthetist aide”
“advanced prosthetist aides”
“advanced prosthetic technician”
“advanced prosthetic technicians”
“advanced prosthetist technician”
“advanced prosthetist technicians”
“advanced orthotic assistant”
“advanced orthotic assistants”
“advanced orthotist assistant”
“advanced orthotist assistants”
“advanced orthotic aide”
“advanced orthotic aides”
“advanced orthotist aide”
“advanced orthotist aides”
“advanced orthotic technician”
“advanced orthotic technicians”
“advanced orthotist technician”
“advanced orthotist technicians”
“advanced pharmacy assistant”
“advanced pharmacy assistants”
“advanced pharmacist assistant”
“advanced pharmacist assistants”
“advanced pharmaceutical assistant”
“advanced pharmaceutical assistants”
“advanced pharmacy aide”

"advanced pharmacy aides"
 "advanced pharmacist aide"
 "advanced pharmacist aides"
 "advanced pharmaceutical aide"
 "advanced pharmaceutical aides"
 "advanced pharmacy technician"
 "advanced pharmacy technicians"
 "advanced pharmacist technician"
 "advanced pharmacist technicians"
 "advanced pharmaceutical technician"
 "advanced pharmaceutical technicians"
 "advanced psychology assistant"
 "advanced psychology assistants"
 "advanced psychologist assistant"
 "advanced psychologist assistants"
 "advanced psychology aide"
 "advanced psychology aides"
 "advanced psychologist aide"
 "advanced psychologist aides"
 "advanced psychology technician"
 "advanced psychology technicians"
 "advanced psychologist technician"
 "advanced psychologist technicians"
 "advanced orthoptic assistant"
 "advanced orthoptic assistants"
 "advanced orthoptist assistant"
 "advanced orthoptist assistants"
 "advanced orthoptic aide"
 "advanced orthoptic aides"
 "advanced orthoptist aide"
 "advanced orthoptist aides"
 "advanced orthoptic technician"
 "advanced orthoptic technicians"
 "advanced orthoptist technician"
 "advanced orthoptist technicians"
 "advanced support worker"
 "advanced support workers"

Senior allied health assistant terms

"senior allied health assistant"
 "senior allied health assistants"
 "senior allied health aide"
 "senior allied health aides"
 "senior allied health technician"
 "senior allied health technicians"
 "senior physiotherapy assistant"
 "senior physiotherapy assistants"
 "senior physiotherapist assistant"
 "senior physiotherapist assistants"
 "senior physiotherapy aide"
 "senior physiotherapy aides"
 "senior physiotherapist aide"
 "senior physiotherapist aides"
 "senior physiotherapy technician"
 "senior physiotherapy technicians"
 "senior physiotherapist technician"
 "senior physiotherapist technicians"
 "senior physical therapy assistant"
 "senior physical therapy assistants"
 "senior physical therapist assistant"
 "senior physical therapist assistants"
 "senior physical therapy aide"
 "senior physical therapy aides"
 "senior physical therapist aide"
 "senior physical therapist aides"
 "senior physical therapy technician"
 "senior physical therapy technicians"
 "senior physical therapist technician"
 "senior physical therapist technicians"
 "senior occupational therapy assistant"
 "senior occupational therapy assistants"
 "senior occupational therapist assistant"
 "senior occupational therapist assistants"
 "senior occupational therapy aide"
 "senior occupational therapy aides"

"senior occupational therapist aide"
 "senior occupational therapist aides"
 "senior occupational therapy technician"
 "senior occupational therapy technicians"
 "senior occupational therapist technician"
 "senior occupational therapist technicians"
 "senior speech therapy assistant"
 "senior speech therapy assistants"
 "senior speech therapist assistant"
 "senior speech therapist assistants"
 "senior speech therapy aide"
 "senior speech therapy aides"
 "senior speech therapist aide"
 "senior speech therapist aides"
 "senior speech therapy technician"
 "senior speech therapy technicians"
 "senior speech therapist technician"
 "senior speech therapist technicians"
 "senior technical officer" [AND "allied health" in Google Scholar]
 "senior technical officers" [AND "allied health" in Google Scholar]
 "senior health care assistant"
 "senior health care assistants"
 "senior health care aide"
 "senior health care aides"
 "senior health care technician"
 "senior health care technicians"
 "senior healthcare assistant"
 "senior healthcare assistants"
 "senior healthcare aide"
 "senior healthcare aides"
 "senior healthcare technician"
 "senior healthcare technicians"
 "senior community rehabilitation worker"
 "senior community rehabilitation workers"
 "senior rehabilitation assistant"

“senior rehabilitation assistants”
“senior rehabilitation aide”
“senior rehabilitation aides”
“senior rehabilitation technician”
“senior rehabilitation technicians”
“senior assistant practitioner”
“senior assistant practitioners”
“senior nutrition assistant”
“senior nutrition assistants”
“senior nutritionist assistant”
“senior nutritionist assistants”
“senior nutrition aide”
“senior nutrition aides”
“senior nutritionist aide”
“senior nutritionist aides”
“senior nutrition technician”
“senior nutrition technicians”
“senior nutritionist technician”
“senior nutritionist technicians”
“senior dietetics assistant”
“senior dietetics assistants”
“senior dietetic assistant”
“senior dietetic assistants”
“senior dietician assistant”
“senior dietician assistants”
“senior dietitian assistant”
“senior dietitian assistants”
“senior dietetics aide”
“senior dietetics aides”
“senior dietetic aide”
“senior dietetic aides”
“senior dietician aide”
“senior dietician aides”
“senior dietitian aide”
“senior dietitian aides”
“senior dietetics technician”
“senior dietetics technicians”

“senior dietetic technician”
“senior dietetic technicians”
“senior dietician technician”
“senior dietician technicians”
“senior dietitian technician”
“senior dietitian technicians”
“senior podiatry assistant”
“senior podiatry assistants”
“senior podiatrist assistant”
“senior podiatrist assistants”
“senior podiatry aide”
“senior podiatry aides”
“senior podiatrist aide”
“senior podiatrist aides”
“senior podiatry technician”
“senior podiatry technicians”
“senior podiatrist technician”
“senior podiatrist technicians”
“senior speech assistant”
“senior speech assistants”
“senior speech aide”
“senior speech aides”
“senior speech technician”
“senior speech technicians”
“senior speech pathology assistant”
“senior speech pathology assistants”
“senior speech pathologist assistant”
“senior speech pathologist assistants”
“senior speech pathology aide”
“senior speech pathology aides”
“senior speech pathologist aide”
“senior speech pathologist aides”
“senior speech pathology technician”
“senior speech pathology technicians”
“senior speech pathologist technician”
“senior speech pathologist technicians”
“senior paramedical assistant”

“senior paramedical assistants”
“senior paramedical aide”
“senior paramedical aides”
“senior paramedical technician”
“senior paramedical technicians”
“senior social work assistant”
“senior social work assistants”
“senior social worker assistant”
“senior social worker assistants”
“senior social work aide”
“senior social work aides”
“senior social worker aide”
“senior social worker aides”
“senior social work technician”
“senior social work technicians”
“senior social worker technician”
“senior social worker technicians”
“senior imaging assistant”
“senior imaging assistants”
“senior imaging aide”
“senior imaging aides”
“senior imaging technician”
“senior imaging technicians”
“senior audiology assistant”
“senior audiology assistants”
“senior audiologist assistant”
“senior audiologist assistants”
“senior audiology aide”
“senior audiology aides”
“senior audiologist aide”
“senior audiologist aides”
“senior audiology technician”
“senior audiology technicians”
“senior audiologist technician”
“senior audiologist technicians”
“senior prosthetic assistant”
“senior prosthetic assistants”

"senior prosthetist assistant"
 "senior prosthetist assistants"
 "senior prosthetic aide"
 "senior prosthetic aides"
 "senior prosthetist aide"
 "senior prosthetist aides"
 "senior prosthetic technician"
 "senior prosthetic technicians"
 "senior prosthetist technician"
 "senior prosthetist technicians"
 "senior orthotic assistant"
 "senior orthotic assistants"
 "senior orthotist assistant"
 "senior orthotist assistants"
 "senior orthotic aide"
 "senior orthotic aides"
 "senior orthotist aide"
 "senior orthotist aides"
 "senior orthotic technician"
 "senior orthotic technicians"
 "senior orthotist technician"
 "senior orthotist technicians"
 "senior pharmacy assistant"
 "senior pharmacy assistants"
 "senior pharmacist assistant"
 "senior pharmacist assistants"
 "senior pharmaceutical assistant"
 "senior pharmaceutical assistants"
 "senior pharmacy aide"
 "senior pharmacy aides"
 "senior pharmacist aide"
 "senior pharmacist aides"
 "senior pharmaceutical aide"
 "senior pharmaceutical aides"
 "senior pharmacy technician"
 "senior pharmacy technicians"
 "senior pharmacist technician"

"senior pharmacist technicians"
 "senior pharmaceutical technician"
 "senior pharmaceutical technicians"
 "senior psychology assistant"
 "senior psychology assistants"
 "senior psychologist assistant"
 "senior psychologist assistants"
 "senior psychology aide"
 "senior psychologist aide"
 "senior psychologist aides"
 "senior psychologist technician"
 "senior psychology technicians"
 "senior psychologist technician"
 "senior psychologist technicians"
 "senior orthoptic assistant"
 "senior orthoptic assistants"
 "senior orthoptist assistant"
 "senior orthoptist assistants"
 "senior orthoptic aide"
 "senior orthoptic aides"
 "senior orthoptist aide"
 "senior orthoptist aides"
 "senior orthoptic technician"
 "senior orthoptic technicians"
 "senior orthoptist technician"
 "senior orthoptist technicians"
 "senior support worker"
 "senior support workers"

*Extended scope/ advanced practice
allied health assistant terms*

*[all were searched with AND ("extended scope
OR "advanced practice")]*

"allied health assistant"
 "allied health assistants"

"allied health aide"
 "allied health aides"
 "allied health technician"
 "allied health technicians"
 "physiotherapy assistant"
 "physiotherapy assistants"
 "physiotherapist assistant"
 "physiotherapist assistants"
 "physiotherapy aide"
 "physiotherapy aides"
 "physiotherapist aide"
 "physiotherapist aides"
 "physiotherapy technician"
 "physiotherapy technicians"
 "physiotherapist technician"
 "physiotherapist technicians"
 "physical therapy assistant"
 "physical therapy assistants"
 "physical therapist assistant"
 "physical therapist assistants"
 "physical therapy aide"
 "physical therapy aides"
 "physical therapist aide"
 "physical therapist aides"
 "physical therapy technician"
 "physical therapy technicians"
 "physical therapist technician"
 "physical therapist technicians"
 "occupational therapy assistant"
 "occupational therapy assistants"
 "occupational therapist assistant"
 "occupational therapist assistants"
 "occupational therapy aide"
 "occupational therapy aides"
 "occupational therapist aide"
 "occupational therapist aides"
 "occupational therapy technician"

"occupational therapy technicians"	"assistant practitioner"	"dietitian technicians"
"occupational therapist technician"	"assistant practitioners"	"podiatry assistant"
"occupational therapist technicians"	"nutrition assistant"	"podiatry assistants"
"speech therapy assistant"	"nutrition assistants"	"podiatrist assistant"
"speech therapy assistants"	"nutritionist assistant"	"podiatrist assistants"
"speech therapist assistant"	"nutritionist assistants"	"podiatry aide"
"speech therapist assistants"	"nutrition aide"	"podiatry aides"
"speech therapy aide"	"nutrition aides"	"podiatrist aide"
"speech therapy aides"	"nutritionist aide"	"podiatrist aides"
"speech therapist aide"	"nutritionist aides"	"podiatry technician"
"speech therapist aides"	"nutrition technician"	"podiatry technicians"
"speech therapy technician"	"nutrition technicians"	"podiatrist technician"
"speech therapy technicians"	"nutritionist technician"	"podiatrist technicians"
"speech therapist technician"	"nutritionist technicians"	"speech assistant"
"speech therapist technicians"	"dietetics assistant"	"speech assistants"
"technical officer"	"dietetics assistants"	"speech aide"
"technical officers"	"dietetic assistant"	"speech aides"
"health care assistant"	"dietetic assistants"	"speech technician"
"health care assistants"	"dietician assistant"	"speech technicians"
"health care aide"	"dietician assistants"	"speech pathology assistant"
"health care aides"	"dietitian assistant"	"speech pathology assistants"
"health care technician"	"dietitian assistants"	"speech pathologist assistant"
"health care technicians"	"dietetics aide"	"speech pathologist assistants"
"healthcare assistant"	"dietetics aides"	"speech pathology aide"
"healthcare assistants"	"dietetic aide"	"speech pathology aides"
"healthcare aide"	"dietetic aides"	"speech pathologist aide"
"healthcare aides"	"dietician aide"	"speech pathologist aides"
"healthcare technician"	"dietician aides"	"speech pathology technician"
"healthcare technicians"	"dietitian aide"	"speech pathology technicians"
"community rehabilitation worker"	"dietitian aides"	"speech pathologist technician"
"community rehabilitation workers"	"dietetics technician"	"speech pathologist technicians"
"rehabilitation assistant"	"dietetics technicians"	"paramedical assistant"
"rehabilitation assistants"	"dietetic technician"	"paramedical assistants"
"rehabilitation aide"	"dietetic technicians"	"paramedical aide"
"rehabilitation aides"	"dietician technician"	"paramedical aides"
"rehabilitation technician"	"dietician technicians"	"paramedical technician"
"rehabilitation technicians"	"dietitian technician"	"paramedical technicians"

“social work assistant”
“social work assistants”
“social worker assistant”
“social worker assistants”
“social work aide”
“social work aides”
“social worker aide”
“social worker aides”
“social work technician”
“social work technicians”
“social worker technician”
“social worker technicians”
“imaging assistant”
“imaging assistants”
“imaging aide”
“imaging aides”
“imaging technician”
“imaging technicians”
“audiology assistant”
“audiology assistants”
“audiologist assistant”
“audiologist assistants”
“audiology aide”
“audiology aides”
“audiologist aide”
“audiologist aides”
“audiology technician”
“audiology technicians”
“audiologist technician”
“audiologist technicians”
“prosthetic assistant”
“prosthetic assistants”
“prosthetist assistant”
“prosthetist assistants”
“prosthetic aide”
“prosthetic aides”
“prosthetist aide”

“prosthetist aides”
“prosthetic technician”
“prosthetic technicians”
“prosthetist technician”
“prosthetist technicians”
“orthotic assistant”
“orthotic assistants”
“orthotist assistant”
“orthotist assistants”
“orthotic aide”
“orthotic aides”
“orthotist aide”
“orthotist aides”
“orthotic technician”
“orthotic technicians”
“orthotist technician”
“orthotist technicians”
“pharmacy assistant”
“pharmacy assistants”
“pharmacist assistant”
“pharmacist assistants”
“pharmaceutical assistant”
“pharmaceutical assistants”
“pharmacy aide”
“pharmacy aides”
“pharmacist aide”
“pharmacist aides”
“pharmaceutical aide”
“pharmaceutical aides”
“pharmacy technician”
“pharmacy technicians”
“pharmacist technician”
“pharmacist technicians”
“pharmaceutical technician”
“pharmaceutical technicians”
“psychology assistant”
“psychology assistants”

“psychologist assistant”
“psychologist assistants”
“psychology aide”
“psychology aides”
“psychologist aide”
“psychologist aides”
“psychology technician”
“psychology technicians”
“psychologist technician”
“psychologist technicians”
“orthoptic assistant”
“orthoptic assistants”
“orthoptist assistant”
“orthoptist assistants”
“orthoptic aide”
“orthoptic aides”
“orthoptist aide”
“orthoptist aides”
“orthoptic technician”
“orthoptic technicians”
“orthoptist technician”
“orthoptist technicians”
“support worker”
“support workers”

Appendix 2: Details of the search strategy

Database	Fields searched	Date	English language	Peer-reviewed	Related words
Embase (OvidSP)	All fields	2003 - current	✓		
Medline (OvidSP)	All fields	2003 - current	✓		
CINAHL (EbscoHost)	All text	2003-2013	✓	✓	✓
Scopus	All fields	2003-2013	✓		
Web of Science	Topic	2003-2013	✓		✓
Health and Medical Complete (ProQuest)	All fields + text	2003-2013	✓	✓ and scholarly journals	
Nursing and Allied Health Source (ProQuest)	All fields + text	2003-2013	✓	✓ and scholarly journals	

CINAHL: Cumulative Index to Nursing and Allied Health Literature

Appendix 3: National Health and Medical Research Council hierarchy of evidence[14]

Level	Intervention ¹	Diagnostic accuracy ²	Prognosis	Aetiology ³	Screening Intervention
I ⁴	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies	A systematic review of level II studies
II	A randomised controlled trial	A study of test accuracy with: an independent, blinded comparison with a valid reference standard, ⁵ among consecutive persons with a defined clinical presentation ⁶	A prospective cohort study ⁷	A prospective cohort study	A randomised controlled trial
III-1	A pseudorandomised controlled trial (i.e. alternate allocation or some other method)	A study of test accuracy with: an independent, blinded comparison with a valid reference standard, ⁵ among non-consecutive persons with a defined clinical presentation ⁶	All or none ⁸	All or none ⁸	A pseudorandomised controlled trial (i.e. alternate allocation or some other method)
III-2	A comparative study with concurrent controls: <ul style="list-style-type: none"> ▪ Non-randomised, experimental trial ⁹ ▪ Cohort study ▪ Case-control study ▪ Interrupted time series with a control group 	A comparison with reference standard that does not meet the criteria required for Level II and III-1 evidence	Analysis of prognostic factors amongst persons in a single arm of a randomised controlled trial	A retrospective cohort study	A comparative study with concurrent controls: <ul style="list-style-type: none"> ▪ Non-randomised, experimental trial ▪ Cohort study ▪ Case-control study
III-3	A comparative study without concurrent controls: <ul style="list-style-type: none"> ▪ Historical control study ▪ Two or more single arm study ¹⁰ ▪ Interrupted time series without a parallel control group 	Diagnostic case-control study ⁶	A retrospective cohort study	A case-control study	A comparative study without concurrent controls: <ul style="list-style-type: none"> ▪ Historical control study ▪ Two or more single arm study
IV	Case series with either post-test or pre-test/post-test outcomes	Study of diagnostic yield (no reference standard) ¹¹	Case series, or cohort study of persons at different stages of disease	A cross-sectional study or case series	Case series

Appendix 4: Centre for Evidence Based Medicine Systematic Review Critical Appraisal Sheet [15]

SYSTEMATIC REVIEW: Are the results of the review valid?

What question (PICO) did the systematic review address?	
What is best?	Where do I find the information?
The main question being addressed should be clearly stated. The exposure, such as a therapy or diagnostic test, and the outcome(s) of interest will often be expressed in terms of a simple relationship.	The Title , Abstract or <i>final paragraph of the Introduction</i> should clearly state the question. If you still cannot ascertain what the focused question is after reading these sections, search for another paper!
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
F - Is it unlikely that important, relevant studies were missed?	
What is best?	Where do I find the information?
The starting point for comprehensive search for all relevant studies is the major bibliographic databases (e.g., Medline, Cochrane, EMBASE, etc) but should also include a search of reference lists from relevant studies, and contact with experts, particularly to inquire about unpublished studies. The search should not be limited to English language only. The search strategy should include both MESH terms and text words.	The Methods section should describe the search strategy, including the terms used, in some detail. The Results section will outline the number of titles and abstracts reviewed, the number of full-text studies retrieved, and the number of studies excluded together with the reasons for exclusion. This information may be presented in a figure or flow chart.
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
A - Were the criteria used to select articles for inclusion appropriate?	
What is best?	Where do I find the information?
The inclusion or exclusion of studies in a systematic review should be clearly defined a priori. The eligibility criteria used should specify the patients, interventions or exposures and outcomes of interest. In many cases the type of study design will also be a key component of the eligibility criteria.	The Methods section should describe in detail the inclusion and exclusion criteria. Normally, this will include the study design.

This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
<i>A - Were the included studies sufficiently valid for the type of question asked?</i>	
What is best?	Where do I find the information?
The article should describe how the quality of each study was assessed using predetermined quality criteria appropriate to the type of clinical question (e.g., randomization, blinding and completeness of follow-up)	The Methods section should describe the assessment of quality and the criteria used. The Results section should provide information on the quality of the individual studies.
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	
<i>T - Were the results similar from study to study?</i>	
What is best?	Where do I find the information?
Ideally, the results of the different studies should be similar or homogeneous. If heterogeneity exists the authors may estimate whether the differences are significant (chi-square test). Possible reasons for the heterogeneity should be explored.	The Results section should state whether the results are heterogeneous and discuss possible reasons. The forest plot should show the results of the chi-square test for heterogeneity and if discuss reasons for heterogeneity, if present.
This paper: Yes <input type="checkbox"/> No <input type="checkbox"/> Unclear <input type="checkbox"/> Comment:	

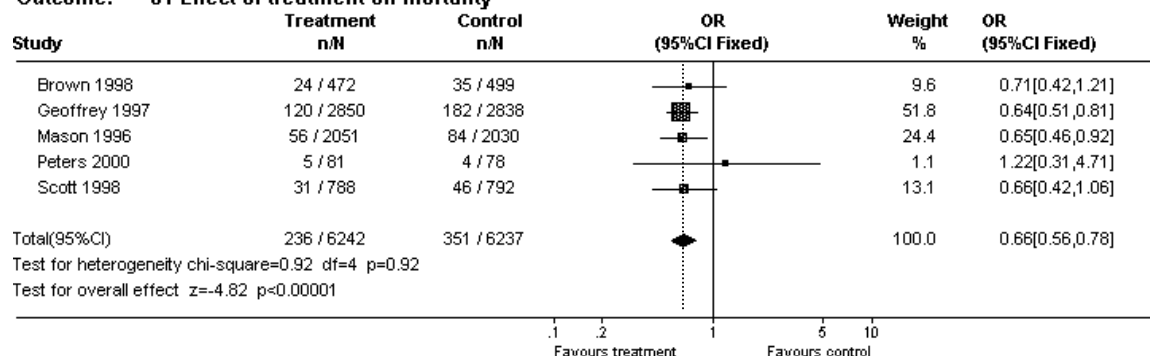
What were the results?

How are the results presented?

A systematic review provides a summary of the data from the results of a number of individual studies. If the results of the individual studies are similar, a statistical method (called meta-analysis) is used to combine the results from the individual studies and an overall summary estimate is calculated. The meta-analysis gives weighted values to each of the individual studies according to their size. The individual results of the studies need to be expressed in a standard way, such as relative risk, odds ratio or mean difference between the groups. Results are traditionally displayed in a figure, like the one below, called a **forest plot**.

Comparison: 03 Treatment versus Placebo

Outcome: 01 Effect of treatment on mortality



The forest plot depicted above represents a meta-analysis of 5 trials that assessed the effects of a hypothetical treatment on mortality. Individual studies are represented by a black square and a horizontal line, which corresponds to the point estimate and 95% confidence interval of the odds ratio. The size of the black square reflects the weight of the study in the meta-analysis. The solid vertical line corresponds to 'no effect' of treatment - an odds ratio of 1.0. When the confidence interval includes 1 it indicates that the result is not significant at conventional levels ($P>0.05$).

The diamond at the bottom represents the combined or pooled odds ratio of all 5 trials with its 95% confidence interval. In this case, it shows that the treatment reduces mortality by 34% (OR 0.66 95% CI 0.56 to 0.78). Notice that the diamond does not overlap the 'no effect' line (the confidence interval doesn't include 1) so we can be assured that the pooled OR is statistically significant. The test for overall effect also indicates statistical significance ($p<0.0001$).

Exploring heterogeneity

Heterogeneity can be assessed using the "eyeball" test or more formally with statistical tests, such as the Cochran Q test. With the "eyeball" test one looks for overlap of the confidence intervals of the trials with the summary estimate. In the example above note that the dotted line running vertically through the combined odds ratio crosses the horizontal lines of all the individual studies indicating that the studies are homogenous. Heterogeneity can also be assessed using the Cochran chi-square (Cochran Q). If Cochran Q is statistically significant there is definite heterogeneity. If Cochran Q is not statistically significant but the ratio of Cochran Q and the degrees of freedom (Q/df) is > 1 there is possible heterogeneity. If Cochran Q is not statistically significant and Q/df is < 1 then heterogeneity is very unlikely. In the example above Q/df is < 1 ($0.92/4 = 0.23$) and the p -value is not significant (0.92) indicating no heterogeneity.

Note: The level of significance for Cochran Q is often set at 0.1 due to the low power of the test to detect heterogeneity.

Appendix 5: PEDro Scale[16]

PEDro scale

1. eligibility criteria were specified	no <input type="checkbox"/> yes <input type="checkbox"/> where:
2. subjects were randomly allocated to groups (in a crossover study, subjects were randomly allocated an order in which treatments were received)	no <input type="checkbox"/> yes <input type="checkbox"/> where:
3. allocation was concealed	no <input type="checkbox"/> yes <input type="checkbox"/> where:
4. the groups were similar at baseline regarding the most important prognostic indicators	no <input type="checkbox"/> yes <input type="checkbox"/> where:
5. there was blinding of all subjects	no <input type="checkbox"/> yes <input type="checkbox"/> where:
6. there was blinding of all therapists who administered the therapy	no <input type="checkbox"/> yes <input type="checkbox"/> where:
7. there was blinding of all assessors who measured at least one key outcome	no <input type="checkbox"/> yes <input type="checkbox"/> where:
8. measures of at least one key outcome were obtained from more than 85% of the subjects initially allocated to groups	no <input type="checkbox"/> yes <input type="checkbox"/> where:
9. all subjects for whom outcome measures were available received the treatment or control condition as allocated or, where this was not the case, data for at least one key outcome was analysed by "intention to treat"	no <input type="checkbox"/> yes <input type="checkbox"/> where:
10. the results of between-group statistical comparisons are reported for at least one key outcome	no <input type="checkbox"/> yes <input type="checkbox"/> where:
11. the study provides both point measures and measures of variability for at least one key outcome	no <input type="checkbox"/> yes <input type="checkbox"/> where:

The PEDro scale is based on the Delphi list developed by Verhagen and colleagues at the Department of Epidemiology, University of Maastricht (Verhagen AP *et al* (1998). *The Delphi list: a criteria list for quality assessment of randomised clinical trials for conducting systematic reviews developed by Delphi consensus. Journal of Clinical Epidemiology*, 51(12):1235-41). The list is based on "expert consensus" not, for the most part, on empirical data. Two additional items not on the Delphi list (PEDro scale items 8 and 10) have been included in the PEDro scale. As more empirical data comes to hand it may become possible to "weight" scale items so that the PEDro score reflects the importance of individual scale items.

The purpose of the PEDro scale is to help the users of the PEDro database rapidly identify which of the known or suspected randomised clinical trials (ie RCTs or CCTs) archived on the PEDro database are likely to be internally valid (criteria 2-9), and could have sufficient statistical information to make their results interpretable (criteria 10-11). An additional criterion (criterion 1) that relates to the external validity (or "generalisability" or "applicability" of the trial) has been retained so that the Delphi list is complete, but this criterion will not be used to calculate the PEDro score reported on the PEDro web site.

The PEDro scale should not be used as a measure of the "validity" of a study's conclusions. In particular, we caution users of the PEDro scale that studies which show significant treatment effects and which score highly on the PEDro scale do not necessarily provide evidence that the treatment is clinically useful. Additional considerations include whether the treatment effect was big enough to be clinically worthwhile, whether the positive effects of the treatment outweigh its negative effects, and the cost-effectiveness of the treatment. The scale should not be used to compare the "quality" of trials performed in different areas of therapy, primarily because it is not possible to satisfy all scale items in some areas of physiotherapy practice.

Last amended June 21st, 1999