

## ***How do Allied Health Professionals evaluate new models of care?***

### ***What are we measuring and why?***

#### **Abstract**

The aim of this study was to identify what outcome measures or quality indicators are being used to evaluate advanced and new roles in nine allied health professions and whether the measures are evaluating outcomes of interest to the patient, the clinician or the health care provider.

#### **Methodology**

A systematic search strategy was used. Medical and allied health databases were searched and relevant articles extracted. Relevant studies with at least one outcome measures were evaluated.

#### **Results**

A total of 106 articles were identified that described advanced roles however only 23 of these described an outcome measure in sufficient detail to be included for review. The majority of the reported measures fit into the economic and process categories. The most reported outcome related to patients was satisfaction surveys. Measures of patient health outcomes were infrequently reported.

#### **Conclusions**

It is unclear from the studies evaluated whether new models of allied health care can be shown to be as safe and effective as traditional care for a given procedure. Outcome measures chosen to evaluate these services often reflect organisational need and not patient outcomes.

Organisations need to ensure that high-quality performance measures are chosen to evaluate the success of new health service innovations. There needs to be a move away from in-house type surveys which add little or no valid evidence as to the effect of a new innovation. More importance needs to be placed on patient outcomes as a measure of the quality of allied health interventions.

Key words

Allied Health

Quality indicators

Outcome measures

Models of care

## ***Purpose***

### BACKGROUND

The development of new technologies and the blurring of professional boundaries are changing the way that health professionals do business. In the developed world, shortages of health care workers and the impetus to reduce costs in health care has led to the training of other health care professionals to take on new and expanded roles. The success or failure of changing skill-mix in health care has been previously reviewed (Sibbald et al., 2004). This review examining the areas of enhancement, substitution, delegation and innovation in health care roles found that there was a general lack of research evidence available particularly for professions outside medicine and nursing meaning that few conclusions could be drawn about the effectiveness and efficiency of most types of skill-mix change.

For medicine, the U.S.A. has had physician assistants in place since the 1960s. These assistants undergo appropriate training to work alongside medical practitioners and can diagnose and treat common conditions independently (Aiken, 2003). Nurse practitioners have been utilised in various health care settings particularly in rural and remote areas (Murphy, 2007). Allied Health professionals are now increasing their influence in health care with many of the professions trialling innovative and new models of care. Extended roles include podiatric surgery, limited injecting and prescribing rights for physiotherapists and laryngeal scoping in speech pathology (Kersten et al., 2007; Kilmartin, 2002; Rattenbury et al., 2004). The Australian government has recognised the growing importance of allied health care particularly for chronic conditions by funding medicare items (Australian Government, 2010) covering up to five allied health consultations per year for nine specific and three generic (aboriginal health care worker, diabetes educator and mental health worker) allied health professions.

Allied health has often been grouped as anything other than nursing and medicine with no consistent definition of allied health available. For the purposes and focus of this paper the definition of allied health used by (Turnbull et al., 2009), p28 has been employed:

“[Professions] which are involved in health care, other than the disciplines of medicine, nursing and health administration; for which tertiary qualifications exist and which are essential for professional registration or admission to a relevant professional body and whose professional activities focus on client diagnosis, treatment and/or primary health care.”

This review focuses on professions fitting this definition of allied health and identified by an expert working group convened for this project as likely to be involved in new and expanded scope of practice within health services. The nine professions chosen are broadly similar to the Australian government Medicare funded allied health professions (Australian Government, 2010) and includes Audiology, Dietetics and Nutrition, Exercise Physiology, Occupational Therapy, Podiatry, Physiotherapy, Psychology, Social Work and Speech Pathology

The selection of appropriate outcome measures is an essential element in establishing the effectiveness of new and expanded roles in allied health care. Good clinical practice demands that outcome measures are chosen which are valid, reliable and are responsive to the intervention offered (Galea, 2005). That is, they will actually measure the effectiveness of the new intervention. To fully evaluate the influence of a new or extended role for allied health professionals, measures should be chosen which evaluate the service from all stakeholders' perspectives. This includes the patient's perspective (am I improving?), the clinician's perspective (is this the most effective way to get an improvement?) and the health care providers perspective (is this the best use of health care resources?).

AIMS

The aim of this study was to identify what outcome measures or quality indicators are being used to evaluate advanced and new roles in nine allied health professions and whether the measures are evaluating outcomes of interest to the patient, the clinician or the health care provider.

### ***Data sources***

This study used a systematic search strategy. The following sources were used: Medline, Cinahl, ABI/Inform, Apais Health Business Source, Embase, JBI, Meditext, OT seeker, Psychinfo, Pedro. In addition relevant Australian and international government reports were accessed from the internet. Grey literature was sourced through email contact with relevant Australian professional organisations for the nine identified professions, searching the professional web-site for each named profession and, additionally, through personal contact with key practitioners in the field identified by the project group. The focus on Australian professional organisations does limit generalizability to other professions outside Australia. However it does enable comparisons to the health professions in Australia who have the same regulatory framework.

### **DATA MANAGEMENT**

References identified by the database searches were imported into bibliographic software (Endnote version XI). Microsoft Word proformas were created to facilitate and manage the information extracted from the relevant articles.

### **SEARCH STRATEGY**

Given the expected heterogeneity of studies and the variable language and terms used in these areas, the search strategy was developed in consultation with a specialist medical librarian. Key terms were identified initially by the researchers using both MeSH and generic terms and added to after examining the terms lists of relevant studies. The Key terms used were: “extended scope” or “advanced practitioner” or “innovative model” combined with each of the nine professional groups or “allied health”.

### ***Study selection***

The study had to be published between 2000 and 2008 inclusive and directly or indirectly relevant to the question “what are the new and advanced roles for allied health personnel?” The study must also have one or more outcome measure or quality indicator described in sufficient detail to be included. Studies were excluded if they were located outside a developed world setting according to a commonly accepted definition of North America, Europe, Japan or Australia and New Zealand (United Nations Statistics Division, 2010); in a setting other than health care; published in a language other than English or were a study on professions outside the nine identified allied health professions for this review. All papers identified were pre-screened for relevance. Abstracts were jointly scanned into Endnote by LC and TC and were identified as relevant or not with help of an abstract check-list. The full text of potentially relevant material identified from the previous step and those studies without abstracts were then obtained. A series of screening questions (covering the inclusion and exclusion criteria) identified whether the study was considered relevant to the review.

### ***Data extraction***

A thematic analysis of the literature identified that measures fitted into one of: a patient related outcome, a system or a process outcome or other outcomes such as satisfaction surveys.

To evaluate the patient related outcome measures used by the studies, a taxonomy was required in order to classify the measures into meaningful clusters. It was decided to base the criteria for classifying measures relating to the individual patient on the International Classification of Functioning, Disability and Health (ICF) (Australian Institute of Health and Welfare, 2003) as this provides a universally accepted framework to classify and describe health status and its effects in individuals. This process has been used in allied health previously for assessing stroke outcome measures (Salter et al., 2005) and in identifying appropriate outcome measures for community rehabilitation teams. (Hillier et al., 2010) The ICF framework presents a comprehensive and integrated view of health covering the components of Body Structures and Functions, Activities and Participation as well as Personal Factors and Environmental Factors.

#### **Patient outcomes**

- Measures of Body Structure and function (e.g. lipid profile, blood pressure, cognition)
- Measures of Activity (e.g. mobility)
- Measures of Participation (e.g. activities of daily living scales)
- Measures of Environment
- Measures of Personal factors (e.g. lifestyle, smoking)
- Quality of life (Global measure)

Evaluation of the types of system performance indicators and outcomes used, was undertaken using a similar taxonomy to that established by (Elkhuizen et al., 2006) in their systematic review of business process parameters. In this review of 86 studies they found that evaluating success in redesign of health care systems was measured by either (or both) a process-related parameter or an outcome measure.

The process-related parameters identified were:

- Length of stay or visit time
- Waiting times
- Time to treatment
- Access time
- Number of patients that leave without being seen
- Time to diagnosis
- Number of visits

A number of additional outcomes are reported in studies which are neither a process nor a patient outcome. These cover economic outcomes such as cost and health resource use and patient and staff satisfaction surveys. These were categorised simply as economic or satisfaction surveys for the purposes of this analysis.

### ***Results of data synthesis***

Figure 1 illustrates the process for selection of studies. A total of 106 studies were identified as meeting the criteria for the review. These were evaluated and 23 articles contained a suitable relevant outcome measure or performance indicator to extract. Three of these were reviews which summarised a number of outcome measures used in various studies. No additional studies were sourced from grey literature.

Generally the level of evidence of the studies was low. Most of the studies evaluated the service pre and post introduction of the extended / advanced role. Only four out of the twenty studies used a randomised controlled trial (RCT) design. The studies with the highest level of evidence found, (Level 1 b), were systematic or narrative review. These reviews also rely on the principal



quality of the studies reviewed and contained few RCTs. For example, one review of physiotherapy in emergency departments included only one RCT. (Anaf & Sheppard, 2007)

Table 1 summarises and categorises the types of outcome measures used. The majority of studies (n=14) reported a process measure with waiting times being the most common outcome measure recorded. Satisfaction surveys were also commonly used, with five studies using staff surveys and 13 using patient surveys. Despite the increasing value placed on health economic evaluation of new technology and services, less than half of the studies reported an economic outcome. For the patient outcomes the most commonly used measures were measures of body structure and function, with some measures of activity used and very few studies reporting a participation measure.

It is apparent that advanced roles for allied health practitioners have been successful in reducing waiting times for patients whilst maintaining satisfaction with the service received – with nine studies reporting decreased waiting times and positive satisfaction surveys. However it is unclear from the current studies whether these services provide equally effective clinical outcomes as those provided by traditional service delivery models as patient outcomes were rarely reported.

No preference or trend for evaluation by the professional groups was seen, rather it was scattered, as shown in Table 2 where each measure is grouped by profession. Attempts to determine outcome or impact was approached in a variety of ways, and no accepted practice emerged. Higher levels of evidence (level 2, RCT) were applied in comparison with usual care to some new initiatives. (Brusco et al., 2007; Fleming et al., 2004; Flood et al., 2005; Rattenbury, et al., 2004) However, the ability to construct an RCT can be limited in clinical practice, both in terms of developing a homogenous group and having established measures for the usual care.

Therefore the practicalities in applying a research design with a higher level of evidence to changing work practices limits their use and hence the reliability of evidence available.

## ***Discussion***

The evaluation of new roles for allied health professionals has generally not been methodologically sound and few quality clinical trials have been undertaken (McPherson et al., 2006). The jury is still out on whether these advanced allied health roles have been a success.

Overall the most reported measures fit into the economic and process categories. The most reported outcome related to patients were satisfaction surveys with 13 studies using this tool. These surveys are designed to ascertain the level of satisfaction with the care received. They do not evaluate any patient health outcomes or improvement as a result of treatment.

The outcome measures chosen by these authors no doubt reflect the primary purpose and organisational requirement for setting up the extended or advanced role. For example in emergency departments waiting time is the most recorded measure while for outpatient clinics the most recorded measure is time to assessment. Length of stay is an outcome that has been measured routinely when expanding existing 5 day allied health services to 6 or 7 day services. In addition, the drive to reduce costs in health care settings is evident with 11 studies recording an economic outcome measure. Staff satisfaction is clearly important when changing roles in an organisation and many of the studies recorded measuring this.

These measures are important and valid measures to use particularly when evaluating from a health services perspective. However it would be expected that the primary outcome from the patient's perspective would be improvement in health as a result of the health care treatment. Such improvement could focus on measuring the patient's ability to perform usual activities and

participate fully in their normal life. Nonetheless, these measures are used infrequently in the studies identified and many of the studies found during the search process reported no outcome or performance measures to evaluate the success or otherwise of new or advanced roles.

Current initiatives such as increasing the role of primary health care and devolving care to community settings means measures of effectiveness are important, so that a loss of quality of clinical care does not occur. However there is a perception that many of these team based practices are difficult to evaluate and so simpler measures to collect such as time to assessment or satisfaction may be adopted while measures of ICF defined patient outcomes are not.

Overall, there is a strong commitment to evaluate and consider the quality of care provided by allied health professionals as evidenced by the increased focus of professional associations, registration boards and academic programs in promoting evidence based practice and continuing professional development as strategies for improving the quality of patient care. New models of care require careful consideration in their evaluation and the determination of the key factors in success. These by necessity are multifactorial.

### ***Limitations***

There are a number of limitations to our approach. Terms such as allied health, skill mix, role substitution, outcome measures and quality indicators along with many other terms in the literature have no consistent definition and are often used interchangeably. Hence a literature search strategy is difficult to define and may fail to find all the relevant information in this area.

The professional groups which identify as being allied health appear to be expanding over time. Within the time and budget constraints of this study, the authors focussed on nine allied health groupings in Australia. Any extrapolation beyond these professions and beyond Australia may

not be possible; however, the study provides a methodology which could assist other researchers and managers seeking to learn more about the evidence base for expanded roles.

### ***Implications for Practice***

The modern health care environment demands both effective and efficient services. Given this, there is a clear need for organisations contemplating change to ensure that high-quality performance measures are chosen to evaluate the success or failure of the innovation. These performance measures should ideally be published evidence based measures, have sound psychometric properties such as reliability and validity and be applicable to the local health care setting. There needs to be a move away from in-house type surveys which provide little or no valid evidence of the effect of a new innovation.

For a new model to be considered a success it should be successful from the point of view of the patient, the clinicians and the health care provider. This requires that both patient outcomes and process related parameters are used to evaluate allied health outcome measures. In particular, the results of this review indicate that in the future more importance needs to be placed on patient outcomes as a measure of the effectiveness of new allied health care interventions. Rather than as a comparison to other professions or industries, the development of outcome measures for allied health per se is needed.

Research design is also paramount when assessing a new intervention or service. Often a randomised controlled trial is not a viable option for measuring the impact of a service delivery change. Designs such as pre-post, case-control and time-series are alternative options that can be appropriately used for these types of studies. The validity of these designs can be strengthened if methodological issues are foreseen and addressed in the research proposal.

### ***Funding***

This project was commissioned by the Allied Health Workforce Advisory and Co-ordination Unit, Queensland Health. All researchers involved in this study were independent of the funders and were not influenced in any way by the funding organisation. The views expressed are those of the authors and do not necessarily reflect those of the funder.

### ***Acknowledgements***

We thank Samantha Streiner for her assistance with the electronic and paper literature searches. For their direction on this project; Dr Kirsten McKenzie, Dr Lloyd Reed and Dr Fiona Barnett, members of the expert working group. The authors also express their appreciation for comments made by two independent reviewers on an earlier version of this manuscript.

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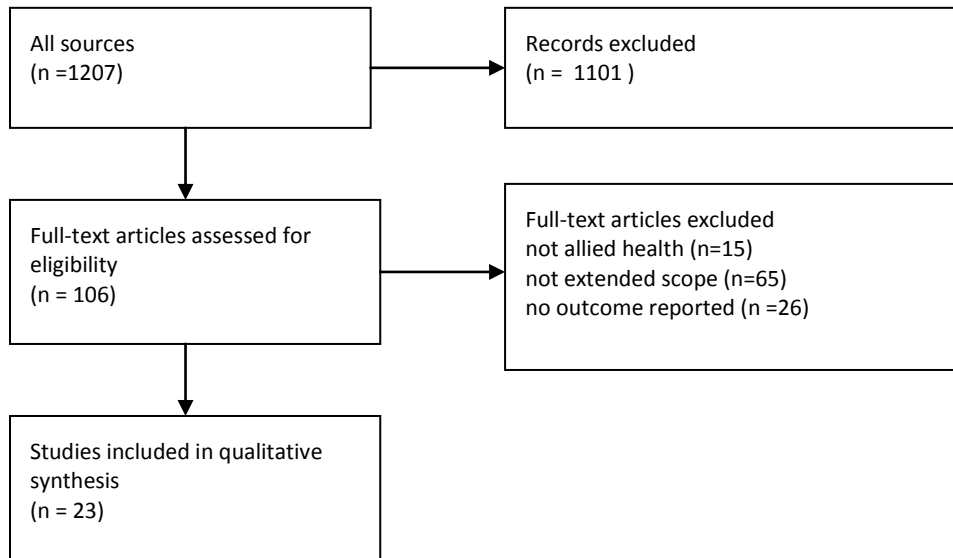
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**Figure One: Flow diagram of systematic search strategy**



**Table 1. Summary of type of outcome measures / performance indicators identified.**

Type of measure	Examples of Indicator / outcome measure
Process parameters	
Length of stay or visit time	Length of stay (3 studies)
Waiting times	Time to assessment (9 studies)
Time to treatment	
Access time	Referrals to the service (4 studies)
Number of patients that leave without being seen	Completion of treatment Patients leaving without assessment (2 studies)
Time to diagnosis	
Number of visits.	Number of consultations
Patient outcomes	
Measures of Body Structure and function (e.g. haematology, blood pressure, cognition)	Changes in bladder function Biofeedback measurements Visual analogue scale (3 studies) Joint range of movement Metabolic equivalents (METS) Complication rates Podiatry expert examination Voice outcome SPL (db) BMI – body mass index Glucose tolerance
Measures of Activity (e.g. mobility)	Community Dependency Index Mobility (Timed up and go (3 studies), 10 m walk test, 6 minute walk test, motor assessment scale) Functional reach Pre discharge assessment tool (PAT) Speech (GRBAS voice outcome measures scale; Perceptual ratings of speech questionnaire)
Measures of Participation (e.g. activities of daily living scales)	Barthel ADL Nottingham Extended ADL score FIM
Measures of Environment	Nil
Measures of Personal factors	Dietary habits Self-care behaviours Self-esteem
Quality of life (Global measure)	General Health Questionnaire EQ-5D (2 studies) SF-36 Health status questionnaire 2.0 VPQ – voice related quality of life
Economic outcomes (cost and health resource use)	Health and Social Service resource use (6 studies) Institutionalisation rates (3 studies) Admission rates Work absence
Staff satisfaction	Survey (5 studies)
Patient satisfaction	Survey (13 studies)

**Table 2 – Specific reported measures from each identified study**

Study	Design	Level of evidence	Outcome / Performance measure	Category
<b>Multidisciplinary</b>				
(Fleming, et al., 2004)	RCT comparing usual care to an in home rehabilitation service	2	Barthel ADL Index Nottingham extended ADL score General health questionnaire Institutionalisation rates; Health and social service resource use	ICF Activities ICF Activities/Participation Quality of Life (QOL) Economic
(Flood, et al., 2005)	Cost-effectiveness analysis alongside a RCT. Compare costs and outcome of occupational therapy assessment with social worker assessment of older people.	2	Community Dependency Index (CDI) EQ-5D Health and social care resource use	ICF Activities QOL Economic
(Lyon et al., 2006)	A prospective, comparative, observational study of the introduction of a social worker into a GP practice.	3a	Time to social work assessment; Length of stay Admission rates; Consultations with GPs (health resource use)	Process Economic
(Le Mesurier & Cumella, 2001)	Comparative evaluation of direct referral to a social worker in primary care (GP practice) compared with an area team		Time to social work assessment Residential and respite placements (Health resource use)	Process Economic
(Rymaszewski et al., 2005)	Pre-post study design. An outpatient musculo-skeletal service changed from a traditional model, to a team approach, extending the roles of nurses, physiotherapists and podiatrists.	3a	Wait time for outpatient appointment Number of patients referred Staff and patient satisfaction surveys	Process Process Satisfaction Survey (SS)
(Milne & Moore, 2003)	Survey design. Communication and questionnaire with Canadian and international health care professionals with expertise in urinary incontinence.	3b	Changes in bladder function Biofeedback measurements Patient satisfaction	ICF Body Structure / Function ICF Body Structure / Function SS
<b>Dietetics / Nutrition</b>				
(Jack, 2003)	Literature search and narrative review of diabetes self-management education (DSME) in community settings.	1b	Cholesterol; body mass index; blood pressure; fasting glucose.; triglycerides; impaired glucose tolerance Exercise; self-care behaviours; dietary habits; self-esteem; social support; diabetes knowledge, and health beliefs Clinical service usage	ICF Body Structure / Function ICF Personal Factors Economic
<b>Exercise physiology</b>				
(Smith et al., 2001)	Retrospective review of the introduction of an extended exercise testing service from five days a week to seven.	3a	Complication rates Cost savings – bed days saved	Process Economic
<b>Occupational Therapy</b>				
(Ellis & Kersten, 2002)	Postal survey of surgical consultants regarding the nature and role of extended scope occupational therapists in hand clinics.	3b	Staff satisfaction survey Waiting times	SS Process

Study	Design	Level of evidence	Outcome / Performance measure	Category
(Veillette et al., 2007)	Postal survey of occupational therapists working in emergency departments.	3b	Predischarge Assessment Tool (PAT)	ICF Participation
<b>Podiatry</b>				
(Farndon et al., 2006)	Review of foot surveys – expert opinion.	3b	Expert examination (17 studies) Patient survey (8 studies)	ICF Body Structure / Function SS
<b>Speech Pathology</b>				
(Rattenbury, et al., 2004)	RCT comparing Transnasal flexible laryngoscopy (TFL) assisted treatment to conventional voice therapy. The TFL assisted treatment group showed a significant improvement in treatment time over the traditional treatment group.	2	Electroglottographic measurement Voice outcome measures GRBAS scale Voice related quality of life (VPQ)	ICF Body Structure / Function ICF Activities QOL
(Theodoros et al., 2006)	Pre-post study of ten participants in an Internet-based telerehabilitation application (eREHAB) for Lee Silverman Voice Treatment (LSVT) to persons with PD and disordered speech.	3a	Voice outcome SPL instrumental measures (db) Perceptual ratings of speech questionnaire	ICF Body Structure / Function ICF Activities
(Davies et al., 2001)	Pre and post study of the introduction of implementation of a co-ordinated inter-disciplinary dysphagia management policy including training of nurse specialists.	3a	Referral rates, Time to assessment	Process
<b>Physiotherapy</b>				
(Holdsworth & Webster, 2004)	Pre and post study of 12 months duration of the introduction of direct access to physiotherapy services.	3a	Visual analogue scale Referrals to the service GP or self; Number of consultations; Completion of treatment Work absence (resource cost), GP workload (health resource cost)	ICF Body Structure / Function Process Economic
(Byrne, 2003)	Pre-post evaluation of the introduction of extended physiotherapy service for obstetric and gynaecological patients, in Ipswich, Australia.	3a	Time to assessment, proportion of patients leaving without assessment Staff and patient satisfaction surveys	Process SS
(Robarts et al., 2008)	Descriptive analysis of a new model of advanced practice physiotherapist (APP) role for patients requiring hip and knee replacement surgery.	3b	Number of referrals, Clinic volumes Consultations with surgeons (health resource) Patient satisfaction survey	Process Economic SS
(Anaf & Sheppard, 2007)	Systematic search and narrative literature review of the role and responsibilities of an emergency department physiotherapist.	1b	Pain (VAS) (2 studies) Timed up and go / gait assessment (2 studies) Waiting time (2 studies), Rates of referral, Re-attendance, Re-admission, Number of patients to home not requiring other referral, Patients leaving without attendance by any staff member, Accuracy	ICF Body Structure / Function ICF Activities Process

Study	Design	Level of evidence	Outcome / Performance measure	Category
			of referral for MRI Quality of life, SF-36 Cost Patient satisfaction (4 studies)	QOL Economic SS
(Bethel, 2005)	A review and critical appraisal of the role of the physiotherapist practitioner in emergency departments	1b	Number of patients managed, Waiting time Patient satisfaction (3 studies)	Process SS
(David et al., 2003)	Pre-post study design of the introduction of extended physiotherapy to a rheumatology ward.	3a	Admissions/throughput; Length of stay	Process
(Brusco, et al., 2007)	Randomised controlled trial of extended rehabilitation physiotherapy service in a hospital in Australia. Reduction in stay for the experimental group.	2	Joint range of movement 10m walk test, timed up and go, functional reach, Motor assessment scale (MAS) Functional Independence Measure (FIM) EuroQol Length of stay Discharge destination (health resource use)	ICF Body Structure / Function ICF Activities  ICF Participation QOL Process Economic
(Kersten, et al., 2007)	A systematic review of extended roles in physiotherapy up to 2005. 152 resources identified, seven included.	1a	Waiting times Patient and staff satisfaction surveys	Process SS
(Dawson & Ghazi, 2004)	Qualitative, case study of four extended scope physiotherapists working in orthopaedic case management in Scotland.	4	Staff satisfaction	SS

Level of Evidence: 1. Meta-analysis of experimental studies; 1a. Systematic review of experimental studies; 1b. Systematic review of combination of study designs; 2. Randomised controlled trial; 2a. Other experimental trials (non-controlled, non-randomised, non-blinded or combinations of...); 3a. Observational studies (testing a hypothesis); 3b. Observational studies (descriptive); 4. Case studies;

Source: (Centre for Allied Health Evidence, 2009)