

A decorative graphic on the right side of the page. It features three sets of concentric circles in shades of blue. Two sets are in the upper right, and one is in the lower right. Thin blue lines extend from the top left towards the circles, and another line extends from the top right towards the circles.

NSW Speech Pathology Evidence-based Practice Network

Introductory training manual – 2nd Edition

Baker, Kelly, Robinson, Parkin, Taylor, Cantor (2012)

This manual contains a summary of the information covered during the introductory training seminar, in addition to activities and worksheets to complete during the seminar. The manual also contains a series of appendices that you will find helpful as a member of the NSW Speech Pathology EBP Network.



The first edition of this manual was developed and written by Trish Brad, Claire Quinn and Alison Stevens (2002).

They were the inaugural steering committee of the NSW Speech Pathology EBP Network. The Network is grateful for their vision, careful planning, and dedication to the speech pathology profession.

A decade on, the NSW EBP Network has over 200 members and 10 clinical groups.



This manual is designed to be used by speech pathologist during the NSW Speech Pathology EBP Network Introductory Training Seminar. Feedback on the contents of this manual is welcome (contact Elise Baker via email: elise.baker@sydney.edu.au). The NSW Speech Pathology EBP Network Steering Committee maintains full copyright entitlements of this manual. Please do not upload it to a website, modify it or mass distribute it electronically.


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Learning Objectives for the Introductory Seminar

1. Briefly describe the history of the NSW Speech Pathology Evidence-based practice (EBP) Network.
2. Outline the primary and specific objectives of the NSW Speech Pathology EBP Network.
3. Define evidence-based practice (EBP) (based on Sackett et al., (2001), and Dollaghan's (2007) re-conceptualization of the term for communication disorders – "E³BP", and, compare and contrast Sackett et al's original definition of EBP with Dollaghan's (2007) re-conceptualization, E³BP.
4. Explain the need for the NSW Speech Pathology EBP Network.
5. Outline the 7 steps involved in the conduct of EBP (based on Baker & McLeod, 2011b; Gillam & Gillam, 2006)
6. Describe the difference between foreground and PICO-style clinical questions, and provide an example of each.
7. List search engine's relevant to speech pathology practice, and have a general understanding of how to use a search engine.
8. Compare and contrast levels of evidence (LOE) systems, including NHMRC (2009) and ASHA's (2004) system.
9. Discuss the issues to consider when evaluating the scientific rigor (level and quality) of research evidence.
10. Complete a critically-appraised paper (CAP), and understand the difference between CAPs and CATS (critically appraised topics). CAP may be either treatment (CAP-T) or diagnostic (CAP-D).
11. Given a clinical scenario, discuss how to account for client values and preferences in clinical decisions.
12. Reflect on how EBP is currently used in clinical practice (e.g., which steps are / aren't currently used, what barriers prevent you implementing one or more of the steps)

Introduction: What drives your clinical decisions?

 Exercise 1. What do you think?	TRUE?	FALSE?
• <i>Cracking your knuckles will cause arthritis in later life.</i>		
• <i>Staring at an eclipse can blind you.</i>		
• <i>Drinking warm milk puts you to sleep.</i>		
• <i>Chocolate causes acne.</i>		
• <i>During a heart attack, your heart stops beating.</i>		
• <i>Teething causes fever.</i>		
• <i>Stretching before exercise prevents injury.</i>		

Your understanding of these statements, determines what you may or may not do. For example, if you believe that cracking your knuckles will cause arthritis in later life. According to deWeber, Olszewski, & Ortolan (2011, p. 169), a history of habitual KC (knuckle cracking)—including the total duration and total cumulative exposure—does not seem to be a risk factor for hand OA (osteoarthritis). So, the myth is false. As for the others..... tune in during the training seminar to find out (unless you KNOW from a review of peer reviewed published evidence of course).

Most of what we do or think about our health is directed by either KNOWLEDGE, BELIEFS or BOTH. As a health professional, it is up to you to make decisions (or help clients make decisions) guided by KNOWLEDGE.

Plato defined **knowledge** as
“justified true belief”.
 (Chisholm, 1982)

NSW Speech Pathology EBP Network: **Background**



Exercise 2.

What do you think? *"Speech Pathologists should be engaging in Evidence Based Practice to support their clinical management of people with communication and swallowing disorders."*

Our responses to statements like these can be many and varied:

- "It's too much to take on"
- "We're busy enough as it is!"
- "But there's no evidence for what we do anyway"
- "It's just another load of paperwork to do"
- "!!!!"
- "I like the idea of it, but it's just too big a task to take on alone."

Not surprisingly, when SLPs have been surveyed about the 'barriers' that make it difficult to engage in EBP, the number one barrier is time. SLPs repeatedly report there being insufficient time to search, read, and critique published research evidence (McLeod & Baker, 2004; Meline & Paradiso, 2003; O'Conner & Pettigrew, 2009; Zippoli & Kennedy, 2005). But we all agree that our **clinical decisions should, ideally, be based on the *best* available evidence from both published research and clinical practice, in conjunction with consideration of patient values, characteristics and preferences.** But, how do we actually do this? How do we cope with the mammoth task of searching for, critiquing, applying and evaluating the evidence, so that clinical practice is both effective and efficient?

Why was the NSW Speech Pathology EBP Network started?

The **NSW Speech Pathology EBP Network** was established in **2002** by senior NSW Department of Health speech pathologists. The idea was discussed during a meeting of the Managers of Sydney Metropolitan Speech Pathology Services in NSW, with the intent of forming a group or network of clinicians to “**facilitate opportunities** for Speech Pathologists in NSW to learn together, **share responsibility** in collecting evidence based data and **co-operatively evaluate** its practical application to clinical practice” (Quinn, Stevens, Bradd 2002). The original steering committee including Trish Bradd, Clare Quinn and Alison Stevens.

By working in **a structure that permits task-sharing, joint problem-solving and the production of practical and applicable information**, the Network aims to make the task of engaging in evidence-based practice possible.



How does it do this? The **Network links practising speech pathologists from across the state of NSW** into clinically based groups (e.g., swallowing, paediatric language, Autism), who together review of published research evidence, consider whether published evidence should guide changes to current clinical practice, and, guide clinicians in their evaluation of current clinical practice.

The **NSW Speech Pathology EBP Network** also aligns with **Speech Pathology Australia’s Position statement on “evidence-based practice in speech pathology”**, which states:

“It is the position of Speech Pathology Australia (The Association) that speech pathology is a scientific and evidence based profession and speech pathologists have a responsibility to incorporate best available evidence from research and other sources into clinical practice. Speech Pathology Australia has a strong commitment to promoting and supporting evidence-based practice. The development of a coordinated, national evidence-based practice strategy is a key strategic goal of the Association.”

(The Speech Pathology Association of Australia, 2010).

(SPAA EBP Position Statement is available at:

http://www.speechpathologyaustralia.org.au/library/position_statements/EBP_in_SP.pdf)

NSW Speech Pathology EBP Network: **Objectives**

The **primary objective** of the NSW Speech Pathology EBP Network (hereafter referred to as the EBP Network) is to facilitate speech pathologists conduct of EBP in the context of a shared, collaborative forum.

Specific objectives of the EBP Network include:

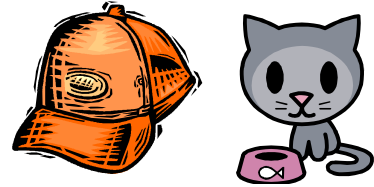
1. To foster a culture of evidence based practice within the speech pathology profession.
2. To provide a forum in which speech pathologists can share and encourage one another in the tasks involved in the conduct of EBP, including the:
 - i. the development of pertinent foreground and PICO style clinical questions,
 - ii. the identification of the best available external evidence (typically high quality, rigorous peer review published research) relevant to clinical questions
 - iii. the evaluation of the scientific rigor of identified evidence
 - iv. and, the implementation of EBP in everyday clinical practice, which may include but not be limited the objective comparison between clinical bottom lines, and, internal evidence on current clinical practice, the collection of and/or the evaluation of evidence from everyday clinical practice, and, the collection of and/or discussion surrounding the ethical consideration of patient characteristics, values and preferences relative to identified clinical bottom lines.
3. To provide speech pathologists and the wider community with public access to summaries of peer reviewed published research including critical appraisals of individual papers (CAPs), and, critical appraisals of topics (CATS) relevant to specific clinical questions.



Exercise 3:

- 1) How do you think the NSW EBP Network fosters a culture of EBP in the speech pathology profession.
- 2) Do you think there is a culture of EBP in your current workplace setting? Why / why not?

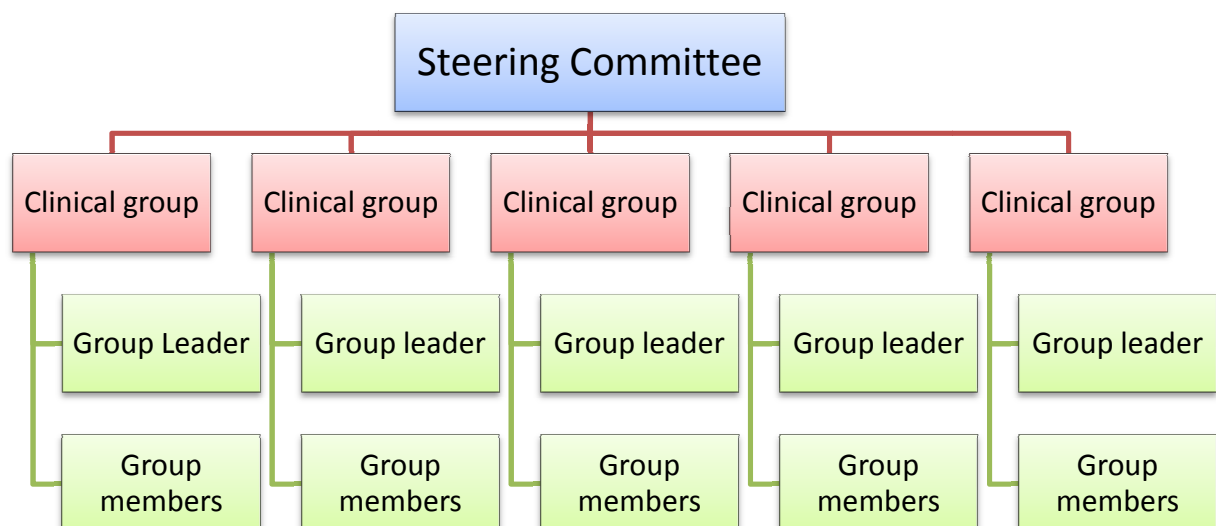
So what are CAPs and CATs? Critically Appraised Papers and Topics



Throughout this manual, you will come across the term “CAP” and “CAT”. Put simply, a CAP is a Critically Appraised Paper — it is **an easily digested summary of a critical review of a research paper**. A simple description of a Critically Appraised Topic (CAT) is that it is **an easily digested summary of a critical review of the best evidence on a particular topic**. Both documents are written outcomes of the EBP process. The CAPs and CAT templates used by the NSW EBP Network are available on the EBP Network’s website, under “resources”. During the training workshop you will learn how to complete a CAP. For more information, refer to the section in this manual on “Completing CAPS and CATS”.

NSW Speech Pathology EBP Network: Organizational structure

The EBP Network is comprised of qualified practising speech pathologists, from across various workplace sectors throughout NSW (e.g., public community health and hospitals, DADHC, private practice, non-government organizations, and universities). There are 3 levels to the organizational structure of the EBP Network, as shown in the figure below.



Role of the Steering Committee

The Steering Committee is made up of a number of Speech Pathologists with varying backgrounds in EBP, management, clinical practice and academia. They work in tertiary teaching hospitals, community health and universities in both adult services and paediatrics. They aim to represent the Network in all areas of Speech Pathology. The Steering Committee are responsible for training of new and current members, assisting clinical leaders, maintaining the website, reviewing CAPS and CATS, keeping the evidence up to date (and keeping up to date with the evidence!), and organizing the annual EBP Network Extravaganza, an event which showcases the work of clinical groups throughout the year.

The Steering Committee Leaders for 2012 include:

Name	Location	Contact
Tracy Kelly	Prince of Wales Hospital	9382 2862
Rachelle Robinson	Prince of Wales Hospital	9382 2865
Melissa Parkin	Sydney Children's Hospital	9382 1029
Dr Elise Baker	University of Sydney	9351 9121
Lisa Cantor	Peakhurst Community Health Centre	9534 2555
Pip Taylor	Westmead Hospital	9845 7744

Clinical groups that make up the NSW EBP Network

The NSW EBP Network typically comprises 10 clinical groups, including:

1. Augmentative and Alternative Communication (AAC)
2. Adult Language (Sydney)
3. Adult Swallowing
4. Autism
5. Newcastle/Hunter Adult Acquired Communication Impairment
6. Paediatric Feeding (Acute) –
7. Paediatric Feeding (Disability)
8. Paediatric Language
9. Paediatric Speech
10. Tracheostomy and Critical Care Discussion

The availability of clinical groups depends on the availability of clinical group leaders and members. Some groups have formed for a period of time, then dissolved only to re-form at a later date. **The terms of reference (TOR) for each clinical group are available on the Network website.** TORs are updated by clinical group leaders. You are encouraged to read the TOR for the clinical group(s) you are interested in joining, as the TOR vary across groups.

Clinical group leaders

- The role of a **clinical leader is to provide support to members of their clinical group**. The **leaders are expected to have specialty experience in their chosen clinical field**. The role is to direct the group through *assisting* in the development of clinical questions, compiling lists of appropriate articles for critically appraising, reviewing CAPS and CATS from members, compiling a CAT, preparing a presentation for the annual Extravaganza.
- Group leaders are responsible for:
 - **Organizing clinical group meetings**
 - Ensuring that all group members have completed the Network introductory training.
 - **Attending leaders meetings**, and providing feedback from their group to the Steering Committee. (One leader from each clinical group is expected to attend 2x Clinical Leaders Meetings, organized and run by the Steering Committee, each year).
 - **Maintaining a central database of members**, record of their groups' activities and any articles used.
 - Promptly **disseminating any information provided by the steering committee** intended for Network members via email.
- Ideally, **groups should have at least 2 leaders** to assist with not only the clinical demands but also the administration that goes along with running a group.
- All **leaders are assigned a member of the Steering Committee**. The steering committee member is available to mentor the leader, and help problem solve any issues involved in the running of the leaders' clinical group.
- For continuity it is suggested that a **leader remain in the position for a minimum of 12 months and that there is a staggered change over when a new leader commences**. In the event a leader is not able to continue their role, replacement leaders must be nominated and supported by the subgroup and endorsed by the Steering Committee.
- Groups are encouraged to have an **'academic link' involved with their group**. This could take the form of an academic being a member of a group (and therefore regularly involved in meetings), or, an academic who is not a member but willing to consult with member(s) of a clinical group about the latest research associated with a specific clinical question.
- Being a clinical leader can be a great experience and has at times allowed people to develop new interests and skills.

(Note: There is a Clinical Group Leaders manual that provides further details and guidance about leading a clinical group.)

Clinical group members

Clinical group members must be fully qualified Speech Pathologists, working in the state of NSW, Australia, who have undergone the initial EBP Introductory Training run by the Steering Committee. They are asked to **actively participate** in the activities coordinated by the group leader. This may involve **brainstorming a clinical question**, reading and **evaluating articles** and **electronically completing CAP and CAT forms**. It is assumed that group members will **attend the meetings prepared and ready to engage in the EBP discussion** process. There are usually varying degrees of experience and expertise within the group. Where relevant, *(and only if they choose to do so)*, clinical group members **can also share information regarding evidence** on their own everyday clinical practice and/or **participate in gathering everyday clinical evidence** from clinical practice associated with a particular clinical question.



NSW Speech Pathology EBP Network: Operational Rules and Guidelines

Meetings

The **Steering Committee** typically meets four times per year. The Steering Committee meets with group leaders biannually. It is recommended that **clinical groups meet** at least 4 times a year. The number and date for meetings can be decided by clinical groups. Information (dates, times and locations) regarding **group meetings** is posted on the website.

http://www.ciap.health.nsw.gov.au/specialties/ebp_sp_path/meetings.html



The entire network gathers together (face to face and via video teleconference) once a year for the **annual NSW Speech Pathology EBP Network Extravaganza** – where all clinical groups showcase a summary of the work they have done during the year – whether it be an overview of some CAPS, the summary of a CAT, or presentation of some internal clinical evidence. It is a great opportunity to celebrate the achievements of everyone involved in the network, and a great opportunity to foster the culture of EBP within the Speech Pathology profession.

Finance

Any income or property of the EBP Network should be applied solely towards the promotion of the objects of the EBP Network as set forth in the objectives.

Website

The NSW EBP Network has a website hosted by CIAP (*Clinical Information Access Portal*), run by NSW Health Support Services, NSW Department of Health. CIAP charges the NSW EBP Network an annual fee to host and upload information supplied by the Steering Committee.



The website address is: http://www.ciap.health.nsw.gov.au/specialties/ebp_sp_path/

Publications



The Steering Committee maintains full copyright entitlements of the EBP Network Introductory Training Manual, the NSW EBP Network Leaders Manual, in addition to original material posted on the NSW EBP Network Website. No forms or papers shall be altered or added without the knowledge and approval of the Steering Committee. It is the responsibility of the Steering Committee to maintain and update the Training Manual as required, incorporating feedback from the clinical groups. The Steering Committee is responsible for producing a regular (typically, bi-monthly) newsletter, which is be distributed electronically where possible to all group participants. Copies are also forwarded Speech Pathology Sydney Managers Group and Speech Pathology Advisors Group.

Issues of dispute

All group leaders and participants are asked to contact a member of the Steering Committee if issues of contention or dispute arise in the subgroups, which cannot be initially resolved by way of group consensus. Any conflicts of interest must also be directed to the Steering Committee.

Groups

Groups are not limited in size, but for the purposes of effective participation may be restricted by group leaders. All new subgroups must be approved by the Steering Committee. Clinical groups may also be affiliated with external interest groups, for example the Tracheostomy and Critical Care Discussion Group.

Admission to membership

To be a member of the NSW EBP Network, you need to be a qualified speech pathologist, practising in the state of NSW, Australia. Members are welcome from all speech pathology workplace settings (e.g., NSW Health, ADHC, non-government organizations, private practice). New members are required to undertake the NSW EBP Speech Pathology Network training prior to being accepted to their group of choice. Participants are welcome to contribute to more than one group.

Cessation of membership

Former participants are asked to inform their group leader should they choose to withdraw from involvement in the EBP Network. This will ensure up to date participant records.

Education and training

All participants must undertake mandatory training, run by the NSW EBP Network, using the EBP manual. While it is acknowledged that many participants will have already undertaken some form of training, this approach aims to ensure a consistency of approach across subgroups, and a common understanding about the purpose, objectives and membership of the Network.



These rules and guidelines were developed and originally endorsed November, 2002, by the NSW Speech Pathology EBP Network Steering Committee.

What is evidence-based practice (EBP)?



Exercise 4.

In your own words, write down what the term 'evidence-based practice' means to you.

Definitions of evidence-based practice: EBP and E³BP

Evidence-based practice (EBP) was defined by David Sackett and colleagues as "the integration of best research evidence with clinical expertise and patient values." (Sackett D et al. Evidence-Based Medicine: How to Practice and Teach EBM, 2nd edition. Churchill Livingstone, Edinburgh, 2000, p.1)

Using this definition, EBP can be represented by the following diagram:



Figure 1. "Traditional" evidence-based practice framework (From: <http://www.asha.org/members/ebp/default> 10/23/08)

This 'traditional' conceptualization of EBP has attracted some criticism, because it assumes that the application of research evidence is straight ward. In practice, it is not. The application of research to practice and the process of making clinical decisions in unique workplace settings with unique workplace constraints, with individual clients a case-by-case basis is complicated. Clinical settings are different, and clinicians have different types of expertise and experience. Clinical settings also have different types of resources, policies and procedures regarding how they are to be used.

In an effort to bring some balanced between empirically controlled research evidence, what is possible in everyday clinical practice, and, individual client characteristics, values and preferences, Dollaghan (2007) proposed a modified framework of EBP, known as **E³BP**. She defined it *"the conscientious, explicit, and judicious integration of 1) best available external evidence from systematic research, 2) best available evidence internal to clinical practice, and 3) best available evidence concerning the preferences of a fully informed patient."*

EXTERNAL EVIDENCE = the peer reviewed published research literature

INTERNAL CLINICAL EVIDENCE = your knowledge and clinic data / outcomes associated with a particular intervention, as a speech pathologist (e.g., *baseline, child scored percent consonants correct of 42%. Following 18 hours of individual weekly visits over a 9 month period, using multiple oppositions therapy approach, child's PCC improved to 82%*).



INTERNAL PATIENT EVIDENCE = the characteristics of clients, and their values, beliefs, and preferences



Clinical expertise integrates all three sources of evidence (published literature, clinical evidence, client evidence) **in the provision of optimal clinical care** (Dollaghan, 2007)



Figure 2. E³BP Framework (based on Dollaghan, 2007).

So, what's the difference between 'traditional' EBP and E³BP?

It comes down to how you think about your own clinical work – thinking of your work as a source of evidence, and being able to use that evidence in conjunction with published evidence to inform your clinical decision making (E³BP), or, making decisions by balancing your clinical judgment/expertise with recommendations from published research (EBP).

Consider this scenario. You have been given a diagnosis of disease X that requires surgical intervention. Your surgeon informs you can choose one of two treatment options (options Y and Z). Option Y is less invasive but more expensive. Option Z is more invasive but less expensive. He gives you information about each option – including an overview of benefits and risks based on published research. He then gives you a summary of the outcomes of each option based on his own clinical practice (his own excel spreadsheet updated once a month, the summarizes the general characteristics of his patients, individual treatment options, and outcomes). The summary shows that over the past 5 years, he's treated 82 patients with the same condition. He's used option Y with 40 patients who were discharged within an average of 3.2 days and no major complications, and option Z with 42 patients who were discharged within 5.2 days and no major complications. He reports having four minor adverse outcomes with each approach, and notes that compared with findings from published evidence, his rate of major and minor adverse outcomes is excellent. He tells you that that the choice of treatment is yours. This is E³BP in action!

Remember!

“our strong preferences for what we already believe to be true makes us poor judges of whether it is actually true”
(Dollaghan, 2007, p. 3).

In summary, E³BP (in contrast to the conventional definition of EBP) **puts you in a position** (perhaps uncomfortably so), **of being able to compare the outcomes of your clinical practice with (i) the findings reported in peer reviewed published research, and, (ii) those of your colleagues who have implemented the same intervention with similar clients.**

While this might seem a little uncomfortable (in that it might make you feel like you are being put into a position where your expertise is being judged in some way), the conduct of E³BP allows you to feel confident about your clinical decisions, and allows you to provide your clients with *informed* options about *your* service (not just informed options from peer reviewed published evidence).

From this point on in the manual, the term EBP assumes Chris Dollaghan's (2007) re-conceptualization of the term (i.e., E³BP).

Steps involved in EBP



There are a number of steps involved in the conduct of EBP. Based on the work of Baker and McLeod (2011b) and Gillam and Gillam (2006), they include:

- 1) Generating a PICO (patient, intervention, comparison, outcome) clinical question.
- 2) Finding external evidence that pertains to the question.
- 3) Critically evaluating the external evidence (and writing the evaluation up in the form of a “critical appraisal of a paper” (CAP) or overall summary of a group of CAPs that relate to the clinical question of interest in the form of a “critical appraisal of a topic” (CAT).
- 4) Evaluating the internal evidence from clinical practice.
- 5) Evaluating the internal evidence with respect to client factors, values and preferences.
- 6) Integrating the three sources of evidence to generate a clinical decision.
- 7) Evaluating the outcome of the decision.

During this introductory training seminar, you will learn about steps 1 through 3. The remaining steps are covered in the advanced training seminar, and during your participation in a clinical group.

Step 1: Clinical questions



Clinical questions need to be clear, specific and achievable. Sometimes you might have a question that leads to the development of a clinical question. Specific clinical questions typically emerge from your own preliminary thinking, questioning, discussion and/or brief literature searching on a general topic (Baker & McLeod, 2011b). Think of these types of preliminary questions as background questions, and your specific clinical questions as “foreground questions” (Dollaghan, 2007).

Examples of background questions include:

What is the best strategy for helping late talking toddlers? Is individual or group therapy better for people who have aphasia? “Is my current approach to therapy as efficient as the new approach I heard about at the convention?”

Clinical questions tend to follow a specific format – and contain information about the **Patient**, the **intervention**, the **comparison** intervention (which could be a control condition), and, desired **outcome**. The **Patient-Intervention-Comparison-Outcome** has been used as in the **acronym PICO**. Sometimes you will hear clinical questions referred to as “PICO” questions.

P = patient.

Who are the patients / clients of interest? Is there a particular subgroup of patients you'd like to consider? Make sure that you are describing the clients / patients or problem that you see. You don't need to get evidence about all groups of patients, but you want to make sure that you've got your group covered. For effective searching you also need to balance precision with brevity.

I = Intervention

What is the intervention or treatment available? Is the intervention question a matter of service delivery, or treatment intensity? Do you know of the interventions available, or do you need to do some background literature searching before you can specify this component of your question. You may want to backtrack later if you do not find much if any evidence.

C = Comparison

Is there a comparison treatment / intervention? Do you want to consider the efficacy of a recent treatment compared with current clinical practice? Sometimes the comparison might actually be "no treatment" (i.e., a control group).

O = Outcome

Outcome measures are particularly important when considering the question. What is the outcome you'd like to know more about? Consider the goal of an intervention study. The outcome might be measured in many different ways e.g., performance on a test, patients own rating. The outcomes could focus on patient-centred or clinically important outcomes, rather than those that do not always correspond with patient benefit or are not practical in the clinic setting.

Sometimes, your PICO questions won't be detailed until you've actually done a little preliminary literature searching and found out about the latest research on a particular issue. ***It is important to add that clinical questions designed to find evidence to support your current practice is not evidence-based practice.*** According to Kamhi (2009, p. 3), "if evidence is sought solely to support one's prior beliefs, contradictory evidence will likely be ignored or discounted." Generate your clinical question and be open to what you might find out!

It can be helpful to complete a table similar to the following, to generate your specific PICO clinical question.

	Patient	Intervention	Comparison	Outcome
Clinical question	e.g., Children with phonological impairment	e.g., Multiple oppositions therapy	e.g., Minimal pairs therapy	e.g., Improved speech intelligibility, as measured by percent consonants correct
Possible search terms relevant to each PICO component	e.g., Children with: <ul style="list-style-type: none"> • Speech sound disorder • Speech impairment • Phonological disorder • Phonological delay 	e.g., Multiple oppositions <ul style="list-style-type: none"> • intervention • treatment 	For example, <ul style="list-style-type: none"> • Minimal pairs • Minimal oppositions contrasts PLUS <ul style="list-style-type: none"> • Treatment • intervention 	For example, <ul style="list-style-type: none"> • PCC • Intelligibility • Score on standardized test

Examples of PICO questions include:

In children with phonological impairment, does minimal pairs intervention targeting stimutable speech sounds leader to greater improvements in percent consonants correct compared with minimal pairs intervention targeting non-stimulable speech sounds?

In adults with aphasia, does constraint-induced language therapy twice a week lead to improved functional communication with significant others compared with the same intervention four times per week?



Exercise 5.

(i) Write down a “background question” that has come up in your everyday clinical practice recently.

(ii) Convert your background question to a PICO style questions, remember to use Patient, Intervention, Comparison, and, Outcome.

PICO QUESTION:

Step 2: Finding the evidence!



There are lots of different options for ‘searching’ for the evidence.

Before you start searching, be clear on your key words (including synonyms for those key words).

To improve the efficiency of your search, start with constituted review groups that have already done a systematic summary (technically known as a “systematic review”) of the research. This basically means that they have asked a clinical question, searched for the evidence, and produced a summary. If you find a systematic review that is very recent on your question, then your clinical *could* almost go straight to completing a “CAT”. (You’d still want to double-check if there is any other recent research or articles in press that address your clinical question.) However, if you find a systematic review that is more than a year old, then, combine this document with a search for recent individual articles that address the question. The articles you find combined with the systematic reviews will make up your CAT. Most of the information on these websites is ‘open access’ (which means it’s freely available)...however, you will still need to access the actual systematic review article, and, if necessary, the individual research articles mentioned in a systematic review. (Sometimes a quick check on “Google scholar” can locate readily available PDF documents of some research articles. Another option is to search for and check the website of the authors, as authors sometimes upload their research papers to their website.)

- <http://www.asha.org/Members/ebp/EBSRs.htm> ASHA’s Evidence-based systematic reviews)
- <http://www.speechandlanguage.com/ebp-briefs> (Great summarises of research addressing specific clinical question, given a specific clinical case scenario. There are “EBP Briefs” across a number of areas of speech pathology practice. Occasional podcasts (from the authors of each Brief) are available on the same website.).
- <http://www.ncepmaps.org/> (ASHA Evidence-based practice MAPS. They are “intended to provide clinicians, researchers, clients, and caregivers with tools and guidance to engage in evidence-based decision making. These maps highlight the importance of the three components of evidence-based practice (EBP). **External Scientific Evidence, Clinical Expertise/Expert Opinion, and Client/Patient/Caregiver Perspectives.**” (ASHA, 2012). The amount of information on each “map” is growing all the time. Check out this site before you dive into database searches for individual articles. At the time of writing this manual, the maps covered the following topics:
 - Amyotrophic Lateral Sclerosis
 - Autism Spectrum Disorders
 - Cerebral Palsy
 - Cleft Lip & Palate
 - Head & Neck Cancer
 - Parkinson's Disease
 - Traumatic Brain Injury (Adults)
 - Traumatic Brain Injury (Children)
 - Dementia

- <http://www.cochrane.org>, (Systematic reviews across many areas related to health)
- <http://www.campbellcollaboration.org/> (This is the Campbell Collaboration Library of Systematic Reviews across various topics. website also has lots of helpful information on the conduct of EBP.)
- <http://guideline.gov> (US Department of Health and Human Services – contains evidence-based clinical practice guidelines.)
- <http://ies.ed.gov/ncee/wwc/> (The “What works clearinghouse” from the US Department of Education, primarily relevant to early intervention, and paediatric language and literacy.)
- <http://www.ancds.org/index.php> Evidence Based Practice Guidelines for the Management of Communication Disorders in Neurologically Impaired Individuals
- <http://www.internationalbrain.org/?q=node/135> This website is described as “as a “one stop source” for evidence searches for acquired brain injury interventions.”

If you don't find a systematic review or clinical practice guideline, then, consider searching databases. A selection of databases relevant to speech pathology practice includes:

- Medline -main source for the medical sciences.
- speechBITE is a database that provides open access to a *catalogue* (not the actual articles) of Best Interventions and Treatment Efficacy across the scope of Speech Pathology practice. This is an evidence based practice initiative between The University of Sydney and Speech Pathology Australia. <http://www.speechbite.com/>
- CINAHL (Cumulative Index to Nursing and Allied Health Literature). This database covers aspects of nursing and allied health disciplines.
- PsycINFO - database for Psychology produced by the American Psychological Association.Covers psychology: social, clinical, cognitive and neuropsychology; psychiatry, sociology, anthropology and education.
- ERIC access to educational-related literature.
- Scopus multidisciplinary database covering published material in the humanities and medical sciences.
- ASSIA: Applied Social Science Index and Abstracts (ASSIA covers health, social services, psychology, sociology, economics, politics, race relations and education).
- Web of Science - science databases that provides access to current and retrospective information from high impact research journals.

NOTE: OT Seeker (database relevant to occupational therapy (<http://www.otseeker.com/>) PEDro (physiotherapy evidence database), and, PsychBITE (database of evidence relevant to cognitive, behavioural and other treatments for cognitive and behavioural problems) <http://www.psycbite.com/> may also be helpful.

There are YouTube videos on how to use a selection of these databases. For example:

- <http://www.youtube.com/watch?v=xN4fBin7YlQ> (Tutorial on how to search using the Cochrane library)
- <http://www.youtube.com/watch?v=kQW3vljSHZM> and <http://www.youtube.com/watch?v=eJZsQLxlbJk> each contain a helpful video tutorial on the basics of Medline.
- <http://www.youtube.com/watch?v=XXUnOT4Yd6M> (Tutorial on using ERIC)
- <http://www.youtube.com/watch?v=SAbZPGVZcJQ> (Tutorial on SCOPUS – very user friendly databased!)

Remember - Google scholar can also be very helpful (and provides links to PDF versions of articles, if there is a PDF version available somewhere in the world!). If you don't find online tutorials helpful, can we encourage you to access your local library service to complete a source on using specific databases.

A journal that won't typically come up in a database (that is relevant to SLP practice), is Contemporary Issues in Communication Sciences and Disorders. This journal is "open access" (which means it is freely available). See: <http://www.nsslha.org/publications/cicsd/default/>

Step 3: Evaluate the evidence!

Now that you have your evidence (i.e., the articles resulting from your search), you need to evaluate the **nature** and **credibility** of the evidence base (Baker & McLeod, 2011). What does this mean?



1) Nature of the evidence

When you begin to read an article, you get a sense of whether this is one of the first "preliminary" investigations into a new treatment. As the evidence-base for a particular approach grows, the nature of the evidence changes from small scale studies, to larger scale experimental studies, to large scale trials in the community (in everyday practice). There are various models in published literature about the "PHASES" of research. For the purposes of 'simplicity', the NSW EBP Network just uses three broad phases - early feasibility study, efficacy study and effectiveness studies. As you read through an individual article, consider which phase of research the study best represents:

- **Early feasibility study** – this would be a small scale study to determine whether an idea is worth pursuing in a larger efficacy study. Feasibility studies are typically conducted before efficacy and effectiveness studies. Feasibility studies typically have small participant numbers (or even one participant), don't tend to have a control group, and are usually the first study of its kind (or one of the first few). If it is a small group study, it might be pre-post

only, with little experimental control. This type of study is done to work out whether a proposed treatment or assessment control is actually doable — whether it is feasible, whether outcome measures are appropriate, whether the time given to study the intervention is adequate, whether the predicted outcomes actually eventuate. Some authors might refer to their feasibility research as a “pilot” study. Sometimes authors will state whether their study is a ‘feasibility’ study. For example: Langevin, M., & Narasimha Prasad, N. G. (2012) A stuttering education and bullying awareness and prevention resource: A feasibility study. *Language, Speech, and Hearing Services in Schools*, doi:10.1044/0161-1461(2012/11-0031).

- **Efficacy study** - these types of studies constituted the bulk of most speech pathology research. Efficacy studies are typically ‘experimental’ and conducted within a relatively controlled research environment. Often you might find yourself reading an efficacy study and thinking “...yes, interesting, but how do I apply this to my clinical practice, when I can’t match the treatment intensity”. Efficacy studies are important however for demonstrating experimental control. Well designed efficacy studies are typically randomized controlled trials, however, efficacy research can include non-randomized controlled trials, and, studies that use single case experimental designs (SCED). If the authors don’t say that the study was a large scale trial of clinical effectiveness, then, it will most likely be an efficacy study.
- **Effectiveness study** – these are typically large scale studies conducted in everyday clinical practice once efficacy research has been conducted. Effectiveness studies typically provide ‘proof’ or experimental evidence that the intervention works in everyday clinical practice, with a range of clients (...the inclusion /exclusion criteria is typically not as controlled). Effectiveness studies (in contrast with efficacy studies) typically have good external validity.

For more information about “phases” of research check out:

- Fey, M. E. , & Finestack, L. H. (2009). Research and development in child language intervention: A five-phase model. In R. G. Schwartz (Ed.), *Handbook of child language disorders* (pp. 513-529). New York: Psychology Press.
- Robey, R. R. (2004). A five-phase model for clinical-outcome research. *Journal of Communication Disorders*, 37, 401-411.



You can usually work out the nature of a study by reading the method section of an article. Authors might state that the study was a 'feasibility study', or, 'efficacy study' or 'effectiveness study'. If they don't, then, given the present state of the evidence based in speech pathology, it will either be a feasibility study or an efficacy study. There is a section in the CAP template to check whether a study is a feasibility study, efficacy or effectiveness study. If in unclear or doubt; just can write 'unclear'.

Nature of Evidence: ☐ feasibility study ☐ efficacy study ☐ effectiveness study

On the CAT, there is a section to numerically summarize the overall nature of the evidence-based

Nature the evidence base: (number of feasibility, efficacy and effectiveness studies)

Feasibility _____ Efficacy _____ Effectiveness _____

2) Credibility of the evidence

Credibility encompasses three issues:

1. **Quantity of the evidence** (...if there's only one study, the evidence base isn't as credible as an evidence based with 25 studies!) You typically note the *quantity* of the evidence base when completing a CAT.

Quantity of the evidence based:

Number of papers identified: _____ Number of suitable papers actually capped: _____

2. **Level of evidence (LOE):** There are LOTS of different systems for ranking the "level of evidence" of a study. Typically, these systems divide studies according to the type of research design. Appendix A of this manual contains two different ranking systems – the NHMRC (2009) system, and ASHA (2004). The NSW EBP Network uses the NHMRC (2009) LOE. Basically, you determine the level and circle it on the CAP form.

Level of Evidence (NH&MRC, 2009) Circle one I II III-1 III-2 III-3 IV

Note that just because a study may have used a design associated with a higher level of evidence (e.g., RCT), it does mean that you don't consider the quality of the study, nor does it mean that you can assume that the study has automatic credibility (Brackenbury et al., 2008).

If you would further information about the types of studies associated with each level in the NH&MRC (2009) system, then check the following document (particularly page 15):

http://www.nhmrc.gov.au/files/nhmrc/file/guidelines/developers/nhmrc_levels_grades_evidence_120423.pdf

3. **Scientific quality:** Various systems have been proposed to critically evaluating the quality of research evidence. Here is a link to the two main systems used by SpeechBITE.

The **PEDro scale** (Maher et al., 2003) is an 11-item scale originally designed to assess primarily the internal validity of RCTs archived in the Physiotherapy Evidence Database (PEDro: Herbert, Moseley & Sherington, 1998/9). See <http://www.pedro.org.au/english/downloads/pedro-scale/>

The **SCED scale** was designed assess the methodological quality of SCED research; addressing issues such as the definition of targeted behaviors, the type of design used, the reliability of the reported observations, and the independence of the assessors involved in evaluating the outcome of an intervention (see Tate et al., 2008). See: http://www.psycbite.com/docs/The_SCED_Scale.pdf

SpeechBITE uses these two scales to assess the quality of RCT's and SCED research on the SpeechBITE website. Check out SpeechBITE to see if a paper has been rated, then, if it has, enter the score on the CAP template, similar to the box below:

Quality of Evidence: (i) rating system (e.g., PEDro, SCED Scale from SpeechBITE)	(ii) score
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Other helpful checklists include:

The TREND statement - this is made up of a 22-item checklist, specifically developed to guide standardized reporting of nonrandomized controlled trials. (TREND stands for: Transparent reporting of evaluations with nonrandomized designs.) It is available at: <http://www.cdc.gov/trendstatement/>

The CONSORT statement – this is an evidence-based, *minimum* set of recommendations for reporting randomized controlled trials, and it stands for *Consolidated Standards of Reporting of Trials*. The statement is available from: <http://www.consort-statement.org/consort-statement/overview0/>

As a general guideline, consider the following points when evaluating the evidence:

- For a treatment study, what was the research design?
- If it was a group design:
 - were the participants randomly allocated to the various 'groups'?
 - were the participants similar at baseline (ie: prior to treatment)?

- were the researchers measuring the effect of a treatment blind to the group that a participant was allocated to? (If researchers /assessors know which group a person was in, this introduced a source of bias in their assessment....they might really believe that the treatment works, and so not be entirely open to actual results.)
- If it is a single-subject experimental design (SCED) design:
 - were there 3 phases (baseline –treatment-baseline) or a similar type of design with control, such as multiple baseline design across behaviours or across participants?
 - Was a baseline of ideally 3 data points collected, and were there sufficient numbers of treatment data points?
 - were all the participants similar at baseline (ie: prior to treatment)
 - were the researchers measuring the effect of treatment not involved in the delivery of the treatment, and so to some extent blind to the hypothesis
 - what information / data provided about generalization of the targeted skill, to the participants overall desired skill / ability?
- How many participants were included in the study?
- Were the participants described in sufficient detail that you know what they are like, relative to the clients on your own caseload? Consider how the participants in the research were similar or different to the clients on your own caseload.
- What were dependent variables, and how were they measured?
- Was the reliability of the data checked and reported?
- Was an effect size reported? If so, what was it? (More about this later in the manual.)
- Was 'fidelity' checked by the researchers, and if so, how? (Fidelity refers to whether the research was implemented in keeping with proposed plan – did the researchers actually do what they said they would do? This is particularly important for treatment research – because, if researchers said one thing, but actually modified it a little when they implemented it, the results need to be questioned – because you can't say that what they 'proposed' they would do actually had an effect, because it's what they actually did had the event!)
- was there enough information about the assessment or treatment procedure that means you could 'replicate' the study?

Independent and dependent variables?

Independent variables – what is being manipulated by researchers, to induce or cause change in the dependent variable. In treatment research, the treatment is the independent variable.

Dependent variables – what the researchers hope to change or have an effect on. Often the dependent variable is in the research question or hypothesis. For example, what is the effect of X treatment on *children's speech intelligibility*....in this case, speech intelligibility is the dependent variable. When considering the quality of a research study, it can be helpful to consider how the dependent variable was measured, how often it was measured, and whether you could measure the same skill relatively easily, efficient and reliability in everyday clinical practice.





If you'd like to know more about scales, and evaluating the quality of research, check out Chris Dollaghan's (2007) - she provides a series of helpful forms as Appendices, such as a Critical Appraisal of Treatment Evidence (CATE) and Critical Appraisal of Systematic Review of Meta-analysis (CASM), She dedicates chapters to each of these templates (which are similar to the EBP Network's CAP and CAT forms).

Terminology

If you need a refresher on design types, and terms used when evaluating the quality of research, review the terms below.

- **Bias:** any tendency to influence the results of a trial other than the experimental intervention; can occur if the patients allocated to the treatment group are different to those allocated to the control group
- **Group characteristics:** potentially relevant characteristics should be displayed in tabular form, to ensure that no bias has occurred in the selection process between the treatment and control groups
- **Randomization:** important because it reduces bias. It spreads all confounding variables evenly amongst the study groups, even the ones we don't know about. Some possible methods of randomization are not truly random and may be susceptible to bias, e.g., patients presenting on alternate days, birth date. It is preferable that the randomization list be concealed from the clinician.
- **Blinding:** used to eliminate bias by hiding the intervention (and the allocation of patients) from the patient and clinician who are interpreting. If both are "blind", it is referred to as "double-blind".
- **Equal treatment:** the control and treatment groups should be treated equally apart from the experimental intervention
- **Placebo:** an inactive version of the active intervention eg drug or treatment, that is given to the control group so that they don't know whether or not they are receiving treatment
- **Gold standard:** a diagnostic test used in trials to confirm the presence or absence of the target disorder
- **Randomised controlled clinical trial:** the most important type of research for answering therapy questions; a group of patients is randomized into an experimental group and a control group. Both are followed up for the outcomes of interest.
- **Crossover design:** two or more interventions one after the other in a specified or random order to the same group of patients
- **Overview:** a summary of literature in a particular area.
- **Narrative review:** a summary of the literature in a particular area. A narrative review may be based on a selection of studies (chosen by the author), or, more detailed methodologically robust review (similar to a systematic review), in which all studies associated with a particular topic (including case studies) are identified using a specified searching strategy, for example:

- Baker, E. M., & McLeod, S. (2011). Evidence-Based Practice for Children with Speech Sound Disorders: Part 1 Narrative Review. *Language, Speech and Hearing Services in Schools*, 42(2), 102-139.
- **Systematic Review:** an article, in which the authors have systematically searched for, appraised and summarized research on a particular topic – often systematic reviews limit the scope of research to randomized controlled trials, and/or experimental research excluding case studies and quasi-experimental research. Cochrane reviews are systematic reviews. For example:
 - Law J, Garrett Z, Nye C. Speech and language therapy interventions for children with primary speech and language delay or disorder. *Cochrane Database of Systematic Reviews* 2003, Issue 3. Art. No.: CD004110. DOI: 10.1002/14651858.CD004110.
 - Brady MC, Kelly H, Godwin J, Enderby P. Speech and language therapy for aphasia following stroke. *Cochrane Database of Systematic Reviews* 2012, Issue 5. Art. No.: CD000425. DOI: 10.1002/14651858.CD000425.pub3.
- **Meta-analysis:** an systematic review which uses quantitative methods to summarize the results. Often you will find systematic reviews and meta-analysis together in a paper.
- **Heterogeneity:** in systematic reviews, the amount of incompatibility between trials included in the review, whether clinical(ie the studies are clinically different) or statistical(ie the results are different from one another)
- **Cohort study:** two groups of patients, only one receives the experimental intervention, both are followed for the outcome of interest.
- **Case-control study:** involves the identification of patients who have the outcome of interest and control patients without the same outcome, and looking back to see if they had the exposure of interest
- **N-of-1 Trials:** the patient undergoes pairs of treatment periods organized so that one period involves the use of experimental treatment and one period involves the use of an alternate or placebo therapy. The patients and clinicians are blinded, if possible, and outcomes are monitored. Treatment periods are replicated until the clinician and patient are convinced that the treatments are definitely different or not.
- **Clinical practice guideline:** a systematically developed statement designed to assist practitioner and patient make decisions about appropriate health care for specific clinical circumstances
- **Confidence interval:** the range around a study's results within which we'd expect the true value to lie. CIs account for the sampling error between the study population and the wider population the study is supposed to represent
- **Statistically significant:** a finding that is unlikely to have occur by chance.
- **P value:** shows the probability that the result would have happened by chance, e.g., a p value of <0.01 means that there is less than 1 in 100 chance of the result occurring by chance; $p < 0.05$ means there is less than 1 in 20 chance.
- **Sensitivity:** a sensitive test is one that will pick up all the people that have the condition (sensitivity of 99% will pick up 99% of those having the test that have the condition). These are referred to as TRUE POSITIVES.
- **Specificity:** a specific test is one that will pick up all the people that do not have the condition (specificity of 89% - if 100 people have the test, 89 will have a negative result). These are referred to as TRUE NEGATIVES.

- **Confounding variable:** a factor that distorts the apparent magnitude of the effect of the exposure on outcome. *Example: men working in mines found to have higher rates of mesothelioma. Later found out they were also more likely to smoke – smoking is a confounding variable.*
- **Effect size:** This is a measure of how important the finding is – it addresses the question beyond the simple “does the treatment work”, to “if it works, how well does it work?”. It is a little different to the concept of a finding being statistically significant, because even though a finding might be statistically significant, it may not be all that clinically important. **An effect size tells you about the size or magnitude of an effect.** For instance if a study had two treatment groups, an effect size tells you just how different the two groups were following treatment e.g., (...and the following are all hypothetical!...), people in Group A received treatment 10 minute sessions, 5 x week and achieved a mean score of 50 at the end of the treatment while people in Group B received the same treatment once a week, in a 50 minute session and achieved a mean score of 40 at the end of the treatment. Your t-test might tell you that the groups’ performance were significantly different at the end of treatment, however, what’s the big deal about 10 points –what does this mean clinically? Effect size calculation can help! There are various different types of measures of effect size (e.g., Cohen’s d , R^2) – don’t get too confused by the terminology. If you find a new type of effect size calculation – find out a little about what it means and expand your repertoire of knowledge about effect size terms. Perhaps the most commonly reported effect size in treatment research is “Cohen’s d ” - it often accompanies reports of a t-test or ANOVA.
 - **Cohen’s d :** *This effect size measure is used to examine the difference in the means of two or more groups.* According to Dollaghan (2007, p. 49) “if you understand the concept of a z-score or a standard deviation (SD) unit score, then you understand the concept of d , which is nothing more than the size of the difference between the means of the two groups in SD units.” To calculate effect size you need a few bits of ‘simple’ information - the mean score and standard deviation of each group (which you convert into the pooled [average] standard deviation of the groups...provided they are fairly similar). **Hopefully, the paper you are critiquing has done the hard work for you, and have reported the effect size.** If they haven’t reported effect size, you can calculate it yourself.

$$\text{Effect size} = \frac{\text{mean of the treatment group} - \text{mean of the control (or comparison group)}}{\text{pooled (average) standard deviation of the groups}}$$

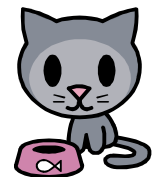
Many online effect size calculators could do the maths for you. (Check it’s the right formulae before you simply plug in the numbers. Here’s one: <http://www.uccs.edu/~faculty/lbecker/>)

According to Cohen (1988), an effect size of 0.8 is considered large, 0.5 is medium, and 0.2 is small.

(If you’d like more detailed information, about effect sizes, see Chris Dollaghan’s (2007) text *The Handbook for Evidence-based practice in Communication Disorders* published by Brookes. Chapter 5 has a particularly helpful overview of effect sizes and examples of how to calculate them.)



Critical appraisals of papers and topics: CAPs and CATs!



Now that you know a little about generating clinical questions, finding evidence and evaluating it, it's time to produce a concise, written summary of your question, and what you found out – using the CAP and CAT templates.

Here are a few tips when completing your CAP/CAT:

- If you have found a recent systematic review, and a few recent articles specifically related to your clinical question, then, CAP the few articles you have found, and combined your findings with the systematic review to complete a CAT.
- If a systematic review or clinical practice guideline presents conflicting information, then consider accessing the highest level research (e.g., RCT's) first, and complete CAPs on each one to get a better sense of the issue.
- The person reading the completed CAP/CAT form should NOT have to pick up the article in order to understand it.
- The *clinical question should be consistent* across all CAPS completed in order to produce one final CAT on that clinical question – i.e., you should not be critiquing that article if it is not relevant to the clinical question
- When you produce your list of references from your clinical search, it is very unlikely that you will do a CAP on all articles. The reason for this is that some will not be relevant to the clinical question. Therefore these references should be removed from the search list.
- Remember, “Method” includes design and procedure, followed by participant description. Provide enough information that would allow someone else to have a general idea of what the study involved. If the method was particularly detailed (and helpful for directing replication!), then direct the reader to the method section of the article including page numbers. If there was a helpful appendix in the article, then direct the reader to the appendix too! (Let them know what's helpful in the article – sometimes article appendices can be have clinical resource!)
- Level IV does not necessarily equal “useless”
- Remember to check your vocabulary, spelling, abbreviations, grammar
- Your clinical bottom line needs to be “your take home message”. It should be compiled from your ‘results’ ‘comments on your design’, and ‘level of evidence’.



Exercise 6.

As a group, use a CAP-T template (available on the NSW EBP Network website and/or your seminar trainer), and complete a CAP on the article supplied during the workshop.

I've reviewed the evidence.... now what?

In this introductory training session, you have learned about the first three important stages in the conduct of EBP:

- 1) Generating a PICO (patient, intervention, comparison, outcome) clinical question.
- 2) Finding external evidence that pertains to the question.
- 3) Critically evaluating the external evidence (and writing the evaluation up in the form of a “critical appraisal of a paper” (CAP) or overall summary of a group of CAPs that relate to the clinical question of interest in the form of a “critical appraisal of a topic” (CAT).

As described earlier in this manual, the evaluation of peer review published evidence is only part of the process. You need to consider what the outcome of your evaluation (i.e., the clinical bottomline) means for your current clinical practice. You will think about some of these issues when you complete the CAT. Specifically, you need to think about:

- 4) Evaluating the internal evidence from clinical practice.
- 5) Evaluating the internal evidence with respect to client factors, values and preferences.
- 6) Integrating the three sources of evidence to generate a clinical decision.
- 7) Evaluating the outcome of the decision.

The above issues will be discussed in clinical group meetings, and, will be addressed in the “Beyond the Basics Workshop”now that you are a member of the NSW EBP Speech Pathology Network! Welcome!

Appendix 1: Levels of evidence

Level of evidence (used by ASHA, 2004)

Ia: Well-designed meta-analysis of >1 randomized controlled trial

Ib: Well-designed randomized controlled study

IIa: Well-designed controlled study without randomization

IIb: Well-designed quasi-experimental study (including single-case experimental designs (SCED) such as multiple baseline design across participants or behaviors)

III: Well-designed nonexperimental studies, i.e., correlational and case studies

IV: Expert committee report, consensus conference, clinical experience of respected authorities

Accessed and available from: <http://www.asha.org/members/ebp/assessing.htm>

Level of evidence (used by NHMRC, 2009)

I: Systematic review of level II studies

II: Randomized controlled trial

III-1: A pseudorandomised controlled trial (i.e. alternate allocation or some other method)

III-2: A comparative study with concurrent controls:

- Non-randomised, experimental trial⁹
- Cohort study
- Case-control study
- Interrupted time series with a control group

III-3: A comparative study without concurrent controls:

- Historical control study
- Two or more single arm study
- Interrupted time series without a parallel control group

IV: Case series with either post-test or pre-test/post-test outcomes

SEE: <http://www.nhmrc.gov.au/guidelines/resources/guideline-developers> for further details.

Appendix 2:

Helpful websites and references about EBP

Websites

There are many many many websites out there with information and tutorials on the conduct of EBP. Here is a selection relevant of relevant websites.

- <http://www.asha.org/Members/ebp/web-tutorial.htm> This website has LOADS of weblinks to excellent tutorials on the various stages involved in the conduct of EBP.
- <http://www.speechandlanguage.com/ebp-briefs>
- <http://SpeechBITE.com> Speech BITE – Best Interventions in Treatment Efficacy
- <http://www.psycbite.com> Psychological Database for Brain Impairment Treatment Efficacy
- <http://www.tripdatabase.com> Turning Research into Practice Database
- <http://www.cebm.net/> Centre for Evidence-based medicine
- <http://www.ucl.ac.uk/library/lasslinks.shtml> University of College London, Language and Speech Science library – basically has links to websites dedicated to specific topics
- <http://www.york.ac.uk/inst/crd/projects/register.htm> Centre for Reviews and Dissemination (CRD) is developing an international register of ongoing systematic reviews.
- <http://www.opendoar.org/> This website is a well organized list of “open access” repositories around the world –primarily, links to freely available research at universities and research centres (e.g., students PhD thesis, research to emerge from a particular research centre or institute,

The NSW EBP Network website also has a series of helpful links on the conduct of EBP. The Network’s web address is: http://www.ciap.health.nsw.gov.au/specialties/ebp_sp_path/

A selection of helpful references

- American Speech-Language-Hearing Association (2004). *Evidence-based practice in communication disorders: An introduction* [Technical Report]. Retrieved 24 September 2008 from www.asha.org/policy.
- Baker, E., & McLeod, S. (2011a). Evidence-based practice for children with speech sound disorders: Part 1 narrative review. *Language, Speech, and Hearing Services in Schools, 42*, 102-139.
- Baker, E. & McLeod, S. (2011b). Evidence-based practice for children with speech sound disorders: Part 2 application to clinical practice. *Language, Speech, and Hearing Services in Schools, 42*, 140-151.
- Barlow, D. H., Nock, M, K., & Hersen, M. (2009). *Single-case experimental designs: Strategies for studying behavior change* (3rd ed.). Boston, MA: Allyn & Bacon,
- Brackenbury, T., Burroughs, E., & Hewitt, L. E. (2008). A qualitative examination of current guidelines for evidence-based practice in child language intervention *Language, Speech, and Hearing Services in Schools, 39*, 78-88.

- Dollaghan, C. A. (2007). *The handbook for evidence-based practice in communication disorders*. Baltimore, MD: Paul H. Brookes Publishing.
- Gillam, S. L., & Gillam, R. B. (2006). Making evidence-based decisions about child language intervention in schools. *Language, Speech, and Hearing Services in Schools*, 37, 307-315.
- Herbert, R., Moseley, A., & Sherrington, C. (1998/99). PEDro: A database of RCTs in physiotherapy. *Health Information Management*, 28, 186-188.
- Justice, L. M. (2010). When craft and science collide: Improving therapeutic practices in schools through evidence-based innovations, *International Journal of Speech-Language Pathology*, 12(2), 79-88.
- Kamhi, A. G. (2009). Balancing certainty and uncertainty in clinical practice. *Language, Speech, and Hearing Services in Schools*, doi:10.1044/0161-1461(2009/09-0034)
- Kelly, T., Miles-Kingma, R., Robinson, R. (2010). Building and supporting a multi-stream evidence-based practice network. In H. Roddam & J. Skeat (Eds). *Embedding evidence-based practice in speech and language therapy: International examples*. (pp. 129-138). Chichester, West Sussex, UK: Wiley-Blackwell.
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- Maher, C. G., Sherrington, C., Herbert, R. D., Mosley, A., & Elkins, M. (2003). Reliability of the PEDro Scale for rating quality of randomized controlled trials. *Physical Therapy*, 83, 713-721.
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- Tate, R. L., McDonald, S., Perdices, M., Togher, L., Schultz, R., & Savage, S. (2008). Rating the methodological quality of single-subject designs and no-of-1 trials: Introducing the Single-Case Experimental Design (SCED) Scale. *Neuropsychological Rehabilitation*, 18, 385-401.
- Verhagen, A. P., de Vet, H. C. W., de Bie, R. A., Kessels, A. G. H., Boers, M., Bouter, L. M., & Knipschild, G. (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), 1235-1241.
- Zipoli, R. P., & Kennedy, M. (2005). Evidence-based practice among speech-language pathologists: Attitudes, utilization, and barriers. *American Journal of Speech-Language Pathology*, 14, 208-220.