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Demystifying Research: Accessing and Understanding Evidence for Clinical Practice

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Rockhurst University — Where leaders learn.

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What is EBP and why do we care?

EBP is the integration of:
- Clinical expertise/expert opinion
- External scientific evidence
- Client/patient/caregiver values

ASHA (2004)

The EBP process:
- Ask a question
- Acquire knowledge – search the literature
- Appraise the literature – is it valid
- Apply the knowledge – clinical practice
- Assess client improvement

http://guides.mclibrary.duke.edu/ebmtutorial

The goal of EBP:
- Provide optimal client-centered service
- Provide dynamic integration of external evidence and clinical expertise
- Provide high-quality services

ASHA (2004)

What is clinical evidence?
- Treatment is grounded in theory
- Treatment data including the client's response to intervention, changes in intervention, generalization, and control

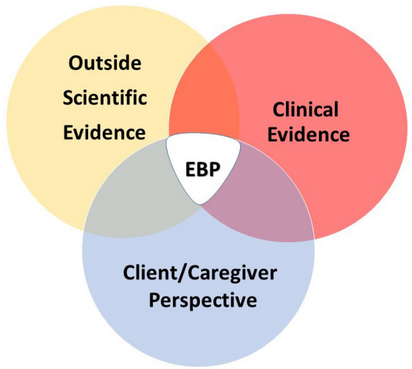
Lemoncello, R., & Ness, B. (2013)

Why do we care about EBP?
- Research has been known to discredit popular clinical opinion (e.g., oxygenating premature infants, facilitated communication, and the use of opium to treat diabetes)
- Backing expert opinion with research is necessary to improve the evidence base
- Using all three elements of EBP allows the clinician to avoid subjectivity and bias

ASHA (2004)

How to do EBP in the clinical setting?
- Recognize the needs of the client and their caregivers
- Acquire and maintain the knowledge needed for high-quality professional service
- Collect data – document treatment methods and progress and evaluate for effectiveness
- Monitor and incorporate new research evidence

ASHA (2004)



Adapted from: UWYO: Evidence Based Practice Guide for Nursing Students: EBP Models. https://uwyo.libguides.com/c.php?g=97837&p=2587870

From the Library of Health Sciences-Chicago, University of Illinois at Chicago
http://ebp.lib.uic.edu/pharmacy/node?page=6

How do SLPs gather information?

- **Must find research evidence that pertains to the question** *(Baker & McLeod, 2011; Gillam & Gillam, 2006)*
- **Where are SLPs getting their information?**
  Personal contacts most common, followed by **open internet search** (Nail-Chewetalu & Ratner, 2007)
  Continuing education experiences & personal contacts rated as **most helpful** (Nail-Chewetalu & Ratner, 2007)
  NOTE: Continuing ed courses are "…not exhaustively reviewed prior to approval, unlike peer-reviewed journal publication content." (Nail-Chewetalu & Ratner, 2007)
- **Barriers:** Time constraints (Nail-Chewetalu & Ratner, 2007; Hoffman et al., 2013 for review)
  But would we, if gifted the time? Takes 3–7 hours to pose a question, research it, read the evidence, and pose a solution (Brackenberry et al., 2008)
- SLPs' ideas of what they need other than time (Hoffman et al., 2013):
  - 70% = additional training in EBP
  - 62% = EBP policies in place at state or district level
  - 54% = EBP study group

Where do I find the best evidence?

Databases

A tradeoff between sources designed to be *exhaustive* and sources designed to support EBP and reduce the time barrier. Often good to use *both*:

	Topics	Exhaustive	Quality Appraisal	Article Summary/ Conclusions	Clinical Relevance Filter
PubMed	**Medical**	✅	x	x	x
ERIC	**Education**	✅	x	x	x
SpeechBITE	SLP	x	✅	x	x
ASHA's Evidence Maps	SLP	x	✅	✅	x
The Informed SLP	SLP	x	x	✅	✅

How to search a database: https://www.nlm.nih.gov/bsd/disted/pubmedtutorial

EBP Guidelines& Systematic Reviews

Some predict that **EBP guidelines** would substantially improve the time barrier of accessing and reading evidence for practice (Fey, 2006). Some options for SLPs:

- Autism PDC's EBP Guides (Autism)
- ASHA Practice Portal (Speech–Language Pathology)
- ASHA SIG Perspectives Pieces (Speech–Language Pathology)
- ASHA's Systematic Reviews (Speech–Language Pathology)
- Campbell Collaboration (Social–Economic)
- Cochrane Database of Systematic Review (Medical)
- Pearson EBP Briefs (Speech–Language Pathology)
- U.S. Department of Health & Human Services National Guideline Clearinghouse (Medical)
- What Works Clearinghouse (Education)

Basically, you're looking for summaries of the best available evidence.

So what about **textbooks***?*
Look for evidence of peer review; Volume Editor

Getting Access to Evidence

Cost of articles is a barrier. Options:

- Pay for it ($12–$55 for our top journals); rent it (e.g. $6, 48 hrs)
- ASHA journals (free for members)
- Google (not Google Scholar) article title alone, then author name. If brand new, wait and try again later.
- Author's institutional repository (aka Scholarly Commons; search www.opendoar.org)
- Visit a university; get alumni or community access
- Get it from your employer
- Ask the author for it (email)
- Remember: publisher owns the article, not author

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Poster, references, and resources can be retrieved from http://digitalcommons.odu.edu/cdse_pubs/16

How do I evaluate the evidence I've found?

Research Type

Common research methods in our field
- Case study
- Correlation
- Comparison of means
- ANOVA and ANCOVA
- Regression and multiple regression
- Single subject design

Types of research designs that indicate higher level of evidence
- Experimental (and quasi-experimental)
- Randomized control trial RCT
- Systematic review
- Meta-analysis

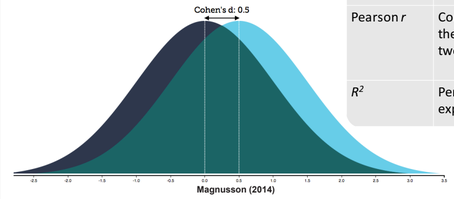
More advanced statistical methods may provide more precise results
- HLM - hierarchical linear modeling
- SEM - structural equation modeling
- Growth models

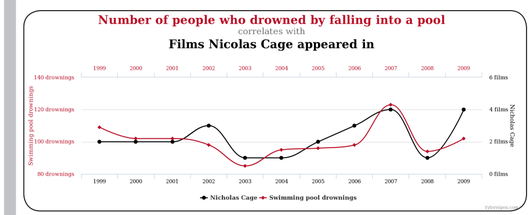
(Wood, McIlraith, & Fitton, 2016)

Statistical Analysis

Commonly reported statistics

Statistic	What it tells you	How to interpret
p value	Statistical significance – is there a difference	< .05 "significant" ≥ .05 "not significant"
Cohen's *d*	Effect size – how big the difference is	.2 is small .5 is medium .8 is large
Pearson *r*	Correlation – the strength of the relationship between two variables	.3 is weak .5 is moderate .7 is strong Can be negative or positive
R^2	Percent of variance explained	The higher the value, the more variance explained





Vigen (n.d.)

- A statistically significant result is not necessarily an important or meaningful result!
- Large sample sizes make it easier to get a statistically significant result (i.e., $p < .05$)
- We need to look at *effect sizes* - how big or important the difference is
- Correlation does not equal causation

Critical Appraisal

Beware the pseudoscience!
- Science vs. Pseudoscience Checklist
- Baloney Detection Kit

- Published research is not automatically free from error or bias
- Critical thinking and a healthy dose of skepticism are important

Things to look for in a study
- Peer-reviewed, reputable journal
- Qualified and unbiased researchers
- Theoretical rationale – chain of argument
- Scientific method
- Description and relevance of the sample
- Data
- Reporting of limitations

Evaluating a body of evidence
- Evidence base – quantity, quality, level
- Consistency
- Clinical impact
- Generalizability
- Applicability

Table 1 Body of evidence matrix

Component	A	B	C	D
	Excellent	Good	Satisfactory	Poor
Evidence base[1]	one or more level I studies with a low risk of bias or several level II studies with a low risk of bias	one or two level II studies with a low risk of bias or a SR/several level III studies with a low risk of bias	one or two level III studies with a low risk of bias, or level I or II studies with a moderate risk of bias	level IV studies, or level I to III studies/SRs with a high risk of bias
Consistency[2]	all studies consistent	most studies consistent and inconsistency may be explained	some inconsistency reflecting genuine uncertainty around clinical question	evidence is inconsistent
Clinical impact	very large	substantial	moderate	slight or restricted
Generalisability	population/s studied in body of evidence are the same as the target population for the guideline	population/s studied in the body of evidence are similar to the target population for the guideline	population/s studied in body of evidence differ to target population for guideline but it is clinically sensible to apply this evidence to target population[3]	population/s studied in body of evidence differ to target population and hard to judge whether it is sensible to generalise to target population
Applicability	directly applicable to Australian healthcare context	applicable to Australian healthcare context with few caveats	probably applicable to Australian healthcare context with some caveats	not applicable to Australian healthcare context

SR = systematic review; several = more than two studies
[1] Level of evidence determined from the NHMRC evidence hierarchy – Table 3, Part B
[2] If there is only one study, rank this component as 'not applicable'.
[3] For example, results in adults that are clinically sensible to apply to children OR psychosocial outcomes for one cancer that may be applicable to patients with another cancer

Miller et al. (2009)