

AAC EVIDENCE-BASED CLINICAL PRACTICE: A MODEL FOR SUCCESS

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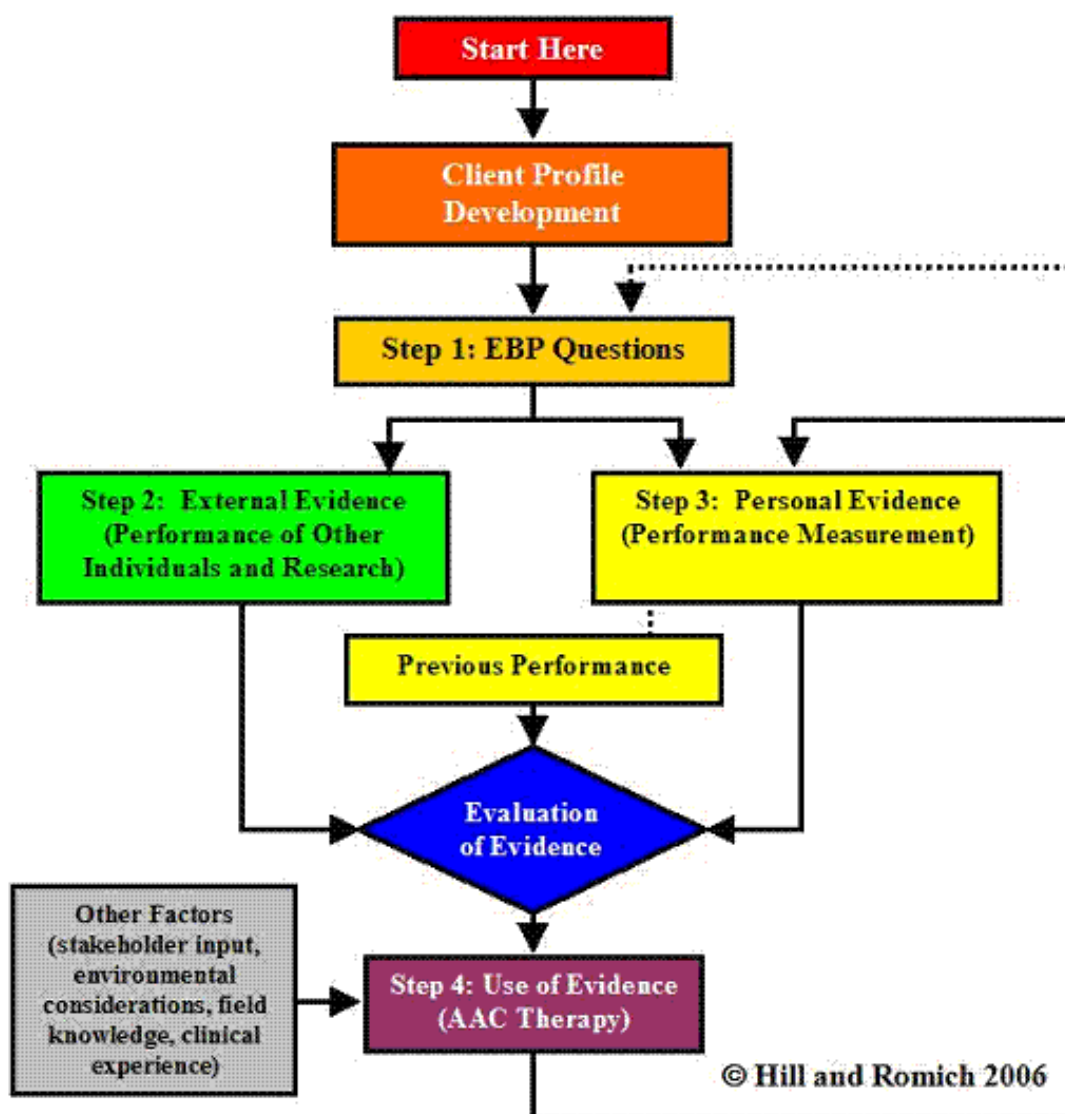


Figure 1. A Model for AAC Evidence-Based Practice

AAC (augmentative and alternative communication) service delivery has been making a rapid shift from the art form of

the past to the science of today. By virtue of the important language component, AAC service delivery is the domain of the speech-language pathologist (SLP), often working on a team with other professionals and stakeholders. The American Speech Language Hearing Association (ASHA) has recognized and encouraged the shift toward scientific methods through the revised ASHA Scope of Practice, the very definition of the profession of speech-language pathology in the United States (ASHA 2001). That document now articulates the expectation of data collection, outcomes measurement, and the provision of services in accordance with the principles of evidence-based practice.

CLINICIAN AND CONSUMER AWARENESS

Achieving the goal of AAC, the most effective communication possible for the individual, can only be expected through evidence-based practice. While the notion of evidence-based practice is accepted and the methods and tools are available to support data collection and analysis, many practicing SLPs have not received formal training on how to take this approach. Many university SLP training programs still do not offer a course on AAC, although over two thirds of SLPs claim to include AAC in their practice (ASHA 1999). Many AAC courses have allocated time and resources to teach only the basics, leaving students without course content on performance evidence or experience with the performance differences among various AAC language representation methods. Training in evidence-based practice requires instruction of systematic approaches on how to access, evaluate, interpret, and apply the research literature.

In addition, consumers and other stakeholders are frequently uninformed of the evidence related to clinical-decision making or are unaware of questions to ask regarding performance measurement and comparisons on communication performance. The purpose of this paper is to present an AAC evidence-based practice flow chart to serve as a systems model for clinical service delivery. The foundation for the model was established on the principles of evidence-based medicine, however, it is not within the scope of this paper to present a thorough review of the tenets of and approaches to evidence-based practice.

UNDERSTANDING AAC EVIDENCE-BASED PRACTICE

The principles of AAC evidence-based practice (EBP) are derived from evidence-based medicine. Evidence-based medicine requires conscientious and judicious use of current best evidence in making decisions about the care of individuals (Sackett, Rosenberg, Gray, Haynes, & Richardson 1996). Evidence-based practice is an

approach that promotes the collection, interpretation, and integration of valid, important, and applicable patient-reported, clinician-observed, and research-derived evidence (McKibbon, Wilczynski, Hayward, Walker-Dilks, & Haynes 1995). In addition to the collection, evaluation, and interpretation of data, EBP emphasizes the dissemination of information so that the evidence can reach clinical practice. Therefore, well thought-out and careful clinical planning involves both individual clinical expertise and the best available external clinical evidence in addition to data collected from the individual.

The judgment and competencies for achieving clinical expertise in AAC are acquired through clinical experience and clinical practice. Recognition of clinical AAC expertise has not been formalized nationally or internationally for consumer protection as of this writing. However, DeCoste (1997) has indicated that a clinician should be involved in a substantial number of AAC evaluations before establishing a basic comfort level (proficiency). Suggested guidelines for AAC clinical competence have been developed by ASHA (2002). The various knowledge and skills identified in the report complement EBP, and include the following:

- **Knowledge and skill in using systematic observation.**
- **Knowledge and skill in identifying and measuring outcomes.**
- **Skill in preparing, monitoring, documenting, and analyzing goals, objectives, procedures, and progress.**
- **Knowledge of performance ratings for AAC systems.**

AAC external clinical evidence is obtained from clinically relevant and systematic research. Systematic research is identified in terms of levels of evidence. Various levels of evidence have been established as guidelines for reviewing the strength of the evidence from research studies. The Centre for Evidence Based Medicine has a hierarchy of ten levels of evidence (Phillips, Ball, Sackett, Badenoch, Straus, Haynes, & Dawes 1998). The American Academy for Cerebral Palsy and Developmental Medicine (AACPDMD) has a classification system based on five levels of evidence (Butler 2001). The AACPDMD Levels of Evidence provide a hierarchy for identifying the highest level of evidence for the research design used in a clinical study. In addition, the AACPDMD has established a database to provide a description of the current state of evidence about various interventions used in the management of developmental disabilities. The AAC Institute has adopted the five Levels of Evidence of the AACPDMD database as the standard for reporting evidence related to AAC clinical practice. However, categories of evidence reflect the distinction between research that is based on individuals who rely on AAC and research that is not. The results of research based on non-AAC subjects may not be valid in supporting evidence-based practice. Research based on AAC

subjects may not apply to a particular individual. This growing database of evidence to support AAC practice is available at the web site of the AAC Institute.

Levels of Evidence take on significance when making clinical decisions. Clinicians evaluate the strength of the research evidence along with evidence collected from the individual receiving services to support decisions and advance practices. For example, the best available AAC clinical evidence can be used to invalidate previously accepted assessment and intervention practices. In addition, current best evidence replaces old assumptions and beliefs about AAC approaches with more powerful, accurate, and effective service delivery strategies and techniques.

Level	Subjects who rely on AAC		Subjects who do not rely on AAC		(e) Non-Empirical Research
	(a) Group Research	(b) Single Subject Research	(c) Group Research	(d) Single Subject Research	
I	<ul style="list-style-type: none"> •Randomized controlled trial •All or non case series 	<ul style="list-style-type: none"> •N-of-1 randomized controlled trial 	<ul style="list-style-type: none"> •Randomized controlled trial •All or non case series 	<ul style="list-style-type: none"> •N-of-1 randomized controlled trial 	
II	<ul style="list-style-type: none"> •Non-randomized controlled trial •Prospective cohort study with concurrent control group 	<ul style="list-style-type: none"> •ABABA design •Multiple baseline across subjects 	<ul style="list-style-type: none"> •Non-randomized controlled trial •Prospective cohort study with concurrent control group 	<ul style="list-style-type: none"> •ABABA design •Multiple baseline across subjects 	
III	<ul style="list-style-type: none"> •Case-control study •Cohort study with historical control group 	<ul style="list-style-type: none"> •ABA design 	<ul style="list-style-type: none"> •Case-control study •Cohort study with historical control group 	<ul style="list-style-type: none"> •ABA design 	
IV	<ul style="list-style-type: none"> •Case series and registries without control group 	<ul style="list-style-type: none"> •AB design 	<ul style="list-style-type: none"> •Case series and registries without control group 	<ul style="list-style-type: none"> •AB design 	
V					<ul style="list-style-type: none"> •Descriptive case series or case reports •Anecdote •Expert opinion •Theory based on physiology, bench or animal research •Common sense

Table 1: AAC Institute Levels of Evidence classification hierarchy

TOOLS, METHODS and RESOURCES to SUPPORT AAC EVIDENCE-BASED PRACTICE

Historically, the best available external clinical evidence has been collected using traditional or manual methods of observation and analysis. The AAC assessment has been defined as a process

whereby data are collected and information is gathered to make clinical decisions (Lloyd, Fuller, & Arvidson 1997). Traditional methods of collecting language or performance samples for clinical practice or research generally have included personal observation or video and audio recording with subsequent transcription and analysis. These tools and methods represent a significant investment in human resources and time as well as delays between collecting the data and having analyzed results. Nevertheless, language sampling is considered the best evidence of an augmented communicator's performance (Light & Binger 1998).

Clinical research assessing the performance specific to individuals who rely on AAC systems has been limited. A systematic review of the research evidence identified a limited number of studies reporting results based on the performance of augmented communicators. Examples of frequently cited studies include identifying vocabulary use with alphabet-based systems (Beukelman, Yorkston, Poblete, & Naranjo 1984), studying the efficacy of various rate-enhancement strategies (Koester & Levine 1994), and investigating the vocabulary development of cognitively challenged children and adolescents (Ronski & Sevcik 1996). In addition, most of the evidence makes comparisons across various studies difficult, because of the lack of agreement on the reported summary measures used to assess performance.

Currently, automated performance monitoring is providing methods and tools that report quantitative data based on units of measurement to support clinical decisions. A **language activity monitor (LAM)** was developed originally as a device to be added to existing AAC assistive technology systems (Romich & Hill 1999; Hill & Romich 2002). Several modern high performance AAC systems now have the data logging function as a built-in standard feature. Methods have been developed to use the LAM data to generate a summary measure report of communication performance (Hill & Romich 2001). Software applications such as the Augmentative Communication Quantitative Analysis (ACQUA) (Leshner, Rinkus, Moulton, & Higginbotham 2000) and others are forthcoming for automating the analysis process. Clinical research has reported evidence on summary measures that includes number of utterances, percent complete, percent spontaneous, mean length of utterance, total number of words, number of word roots, average and peak communication rates, selection rate, rate index, use of and communication rate using different language representation methods, selection errors, and spelling errors. **These units of measurement provide a systematic and operationalized approach to reporting evidence on communication performance.**

Table 2 provides an example of how automated performance measurement can be used to systematically collect and report results to answer clinical questions following the principles of evidence-based practice (Hill 2001). Similar units of measurement may be

identified using traditional methods of observation and recording when considering other aspects of communication.

Domain of Communicative Competence	Intervention Outcome	Performance Measures Using Language Activity Monitoring
Language Representation Skills	Access to single word vocabulary using multiple language representation methods: single meaning pictures, alphabet-based methods, and/or semantic compaction	Frequency of use of language representation methods
Linguistic Skills/Form	Length of utterances	Mean Length of Utterance (MLU)
Linguistic Skills/Content	Access to core and extended vocabulary	Frequency of use of core versus extended vocabulary
Strategic/Construction Skills	Generation of spontaneous novel utterances (SNUG) and/or access of pre-stored messages	Frequency of use of SNUG versus pre-stored messages
Strategic Rate Skills	Communication rate for spontaneous utterances	Number of words per minute (wpm)*
Access Skills	Selection rate based on access method	Number of bits per second**

* Romich & Hill 2000

** Romich, Hill, & Spaeth 2001

Table 2. Collecting and reporting evidence based on performance measurement

A language sample library containing analyzed performance data can be a powerful resource to support evidence-based practice. Such a library is being built and maintained at the web site of the AAC Institute . Entries can be retrieved using different methods, including the profile characteristics of the individual. Therefore, by entering the characteristics of the individual being served, analyzed language samples of others of like profile can be accessed for comparative purposes. (Contributions of samples representing best practice are welcome.)

A MODEL FOR AAC EVIDENCE-BASED CLINICAL PRACTICE

An AAC evidence-based practice flow chart (Figure 1) serves as a systems model for clinical service delivery. The model reflects use of the recently developed methods and tools and the growing body of evidence of communication performance that can be achieved by various populations of individuals who rely on AAC.

The process starts with characterizing the individual. The primary purpose of this step is to permit the retrieval of the communication performance that others with similar profiles have been able to achieve. Then the communication performance of the subject individual is measured. This may be done using automated language activity monitoring to collect a language sample and then analyzing the LAM data to create a performance report. The performance is compared to the previous performance of the individual and also to that of others, with consideration of relevant research. This evidence, combined with stakeholder input, environmental considerations, field knowledge, and clinical experience, drives the therapy process.

Response to therapy is determined by reiteration of this process starting with performance measurement. When the individual's characterization changes, such as with aging, diagnosis, education, etc., that should be noted with corresponding changes to the performance of other individuals and the most current research. Documentation of progress and outcomes measurement is inherent.

EVALUATE THE EVIDENCE

In "How to Get Started" (Oxman, Sackett, & Guvatt, 1993), clinicians are provided with tools to evaluate the literature. Three basic questions should be asked to evaluate the strength of the evidence for clinical practice: 1) Are the results of the study valid? 2) What are the results of the study? 3) Will the results help me in caring for my patients (clients). Once these basic questions are answered, the following questions may be used to help evaluate the evidence and support clinical decisions that will lead to the most effective communication for individuals who rely on AAC systems:

- 1. Was the evidence collected using individuals who rely on AAC systems or able-bodied participants?**
- 2. What was/were the methods of utterance generation used during communication?**
- 3. What were the language representation methods available to the individuals for vocabulary selection?**
- 4. Were the units of measurement clearly described and reported?**

CONCLUSION

As in good medicine, good AAC practitioners use both individual clinical expertise and the best available external evidence to support practices. This model blends clinical expertise with data to provide the services that result in the most effective communication for individuals who rely on AAC systems. As appropriate to the situation, the frequency of use of the model may range from weekly with every therapy session to quarterly. The growing library of analyzed language samples available at the AAC Institute web site can be accessed for the performance of other individuals. Practical use of this model should satisfy in part the IDEA (Individuals with Disabilities Education Act) requirements of outcomes measurement for every student on an IEP (Individualized Education Plan). Inclusion of this model and related performance reports can substantially strengthen requests for funding for AAC assistive technology.

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ABOUT THE AAC INSTITUTE

The AAC Institute, established in 2000, is a resource for all who are interested in enhancing the communication of people who rely on AAC. Organized as a 501c3 not-for-profit charitable organization, the AAC Institute offers information and provides services worldwide. AAC Institute promotes the goal of AAC, the AAC Rules of Commitment, and evidence-based AAC clinical practice. This mission is accomplished through service delivery, research,

information dissemination, and education. The AAC Institute Press publishes peer-reviewed materials to support AAC evidence-based practice and advance the field of AAC clinical service delivery.

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