IMPLEMENTATION OF EVIDENCE-BASED PRACTICE IN COMMUNICATION DISORDERS COURSE WORK AND PRACTICUM

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How do you learn evidence-based practice (EBP)? What methods are most effective in helping practicing professionals and students in training become familiar and comfortable with the underlying assumptions and concepts inherent in evidence-based practice and skilled in its implementation? What progress have we made in communication sciences and disorders in implementing EBP?

In attempting to answer the above questions I will share what has been a decade long personal journey of discovery, intellectual challenge, uncertainty, and fortunately also growth. This journey began while I served as the American Speech-Language-Hearing Association's (ASHA) Vice-President for Research and Technology from 1991-1993. At that time speech-language pathologists and audiologists were under increasing pressure to "prove the worth of their services." Particularly those speech-language pathologists who were practicing within health care settings in an increasingly managed care environment were being asked to estimate such things as the average number of treatment sessions needed for patients/clients with different disorders, the optimal length of those treatment sessions, and the probable improvement in outcome that could be anticipated.

Policy makers defined outcome in broad functional terms. Clinicians were asked questions like: What difference will it make to patients in overall functioning if they do or do not receive these services? If we authorize 6 treatment sessions, will the level of nursing care required for that person following treatment be reduced? Will patients be able to comprehend medication instructions and administer their own medications? Will they be able to use the telephone to call for help, and if they use it will they be able to speak clearly enough to be understood. Similar questions were also being asked in other

service delivery settings such as schools and clinics. (The term “patient” will be used throughout as a generic reference for those receiving services regardless of setting and “treatment” as a generic reference to services provided.)

ASHA formed a task force that served from 1993-1995 that I co-chaired with Nancy Swigert, who was then serving as ASHA’s Vice-President for Governmental and Social Policies. When the task force reviewed the literature in communication sciences and disorders, the answers to the questions being addressed to clinicians largely were not there. In general, treatment research studies were limited in number and scope and had not explored issues regarding the impact of improvement on overall functioning. A review of the functional outcomes instruments that were in use, such as the Functional Independence Measure (FIM), indicated few or no items relating to speech-language pathology and audiology services, and as was the case with the FIM, they were found to have large ceiling effects that mitigated against the possibility of adequately demonstrating significant change.

The task force concluded that functional communication outcomes instruments would have to be developed and used to collect needed data on treatment outcomes for speech-language pathology and audiology services. The task force recommendations were implemented and efforts to develop and field what has become the National Outcomes Measurement System in Speech-Language Pathology and Audiology (NOMS) were begun. This project now has three speech-language pathology components: NOMS: Adults in Health Care Settings; NOMS: K-6 Schools; and NOMS: Pre-K. The NOMS databases were established as a set of cumulative national databases containing data from the use of these instruments. The databases enabled national summaries of the functional communication outcomes of SLP treatment services to be produced and distributed annually, and specific data summaries to be shared with participating facilities quarterly.

What became clearer as the project proceeded was that not only were a set of instruments measuring functional communication change being developed, but also that national treatment outcomes database that entailed influencing speech-language pathology practice patterns on a national scale would be established. Within the NOMS project, speech-language pathologists were being asked to incorporate functional communication measurements pre- and post-treatment into their routine service delivery regimens for all patients. Further, clinicians were being encouraged to read and interpret patient outcome data trends and to integrate the information they gained about the treatment outcomes of SLP services, in general, and treatment outcomes of their own practices, in particular.

I began what became an eight-year leadership responsibility for a project that is still ongoing, conceiving of it as a research project, and concluded that responsibility this December having learned how complex it is to develop functional communication outcomes instruments and to implement evidence-based practice change. I will use what I have learned from the EBP literature and my own experience with the NOMS project to illustrate general principles and methodologies for teaching and gaining acceptance for evidence based practice. The examples I will use, therefore, will refer to speech-language pathology but the principles and methodologies discussed are applicable to both speech-language pathology and audiology.

The early perception of the NOMS project was that it was primarily a research project that would be time-limited. In the early stages of data collection, clinicians shared comments (paraphrased) such as the following:

- “I’d like to help but I can’t collect data for ASHA right now, we’re really understaffed.”
- “We really need the data you’re collecting for administrators/policy makers here.

Can you send it as soon as you get it?”

Later comments by clinicians who were participating in the project reflected a growing awareness that incorporating NOMS data collection into their practices provided important information that they needed on an ongoing basis. Later comments (paraphrased) included examples such as the following:

- “Looking at our data led me to change things I was doing that I don’t think I otherwise would have changed.”
- “I use the data to help me explain why I am recommending what I am in patient management to other members of our treatment team. It’s better than just saying what I’m recommending based on assessment test scores because I can talk about probable functional outcomes in ways we can all relate to. I think I’m a more effective patient advocate and team member now.”
- “Comparing data from our hospital to the national averages, we were able to demonstrate what we had always thought, that our patient mix included a higher proportion of those needing extended services than is typical. It helped us make a case for more staff.”

From an evidence-based practice perspective, these statements reflect an important advance. Clinicians were incorporating functional communication outcome data into their treatment planning and bench-marking their services against national data trends. The process was an example of an evidence-based practice change in speech-language pathology that was occurring in those facilities.

We had moved the project forward, as our own thinking about the process in which we were engaged became clearer, by using a combination of methodologies that have been discussed in the EBP literature (Sackett, Strauss, Richardson, Rosenberg, & Haynes, 2000). These methodologies reflect the following core assumptions of EBP (Sackett, 1996):

1. Clinical practice is based on data, clinical expertise, and patient values and expectations;
2. Learning how to integrate new data into clinical practice must be taught and not just assumed to take place as a result of a vaguely defined “translation” process;
3. Clinical skills grow with the application of cutting edge data to service delivery not just with experience;
4. Expert clinicians are skilled at evaluating what they do and are constantly seeking new information to improve their effectiveness; and,
5. Clinicians are active data seekers, data integrators, and applications evaluators.

Sackett and Parkes (1998) have investigated EBP skill development with medical students, and have concluded that the most effective educational efforts begin with the patient, include active student involvement in skill development, and maintain clinical relevance throughout. The inclusion of individuals who are interacting with students in the clinical context as a part of educational exercises facilitates the translation of EBP into the clinic. Components of an EBP curriculum include meeting informational needs, developing and practicing requisite skills, addressing the clinicians’ attitudes and beliefs, and providing infrastructure supports and incentives.

COMPONENTS OF AN EBP EDUCATIONAL EFFORT

Educational Programs: Informational Needs

Courses or programs that meet clinicians’ informational needs are an important part of an effective EBP educational effort. These include critical content. Within communication sciences and disorders examples would be communication sciences and disorders theories, clinical assessment and intervention research, research design, and statistics. Topics within these content

areas of particular importance include criteria for evaluating assessment research and assessment instruments such as sensitivity, specificity, and predictive value; criteria for evaluating and interpreting treatment research such as the relative strengths and weaknesses of different types of treatment research studies (e.g., randomized clinical trial studies, descriptive studies, case-control studies, cohort studies, case studies, etc.); and, criteria for determining the strength of the evidence presented in research studies (e.g., randomized assignment to treatments, treatment assignments that were blind, comparability among treatment groups in all respects other than treatment). Courses that provide needed content information are an essential foundation for EBP.

The NOMS project had a major advantage in providing critical content information. ASHA made available multiple venues for educating members about NOMS core concepts including journal publications, regional meetings, the annual national convention, press releases and other forms of publicity. These venues were already well established, accepted sources of information for members.

Early NOMS educational efforts were almost exclusively information focused. Information was provided about outcomes measurement as a research methodology, about the pressure for data from external sources, and about the utility of data in advocacy for services and in program planning and management. Information was also provided regarding how functional communication was defined and how it was being measured, as well as features of the NOMS components and what NOMS included and why.

An information focused educational effort is important and necessary but as the literature on EBP highlights (Sackett et al., 2000), it is not sufficient. A report from the NHS Centre for Reviews and Dissemination in 1999 concluded that "The naive assumption that when research information is made available it is somehow accessed by practitioners, appraised, and then applied in practice is

now largely discredited." To learn about something is not the same as being able to put that knowledge into action. Bess (1995) recently wrote "Our current way of practicing audiology is based on the assumptions that . . . an understanding of the disease process is a sufficient guide for clinical practice; and good audiologic training combined with common sense is sufficient to allow one to evaluate tests and treatments." (p.5)

Educational Programs: Skill Development

In addition to information, educational programs need to actively develop skills in the translation of research into practice. Ghali, Saitz. Eskew, Gupta, Quan, and Hershman (2000) have suggested that practitioners and students need hands-on, interactive, practical experience in translation. EBP skills include problem formulation, literature searching, critical appraisal, clinical integration, and evaluation (Sackett et al, 2000; Smith et al., 2000).

Problem formulation. Skill development in EBP requires guided practice in asking focused, specific, answerable questions about realistic clinical cases, either using clinical scenarios or actual clients (Strauss & Sackett, 1998). Students need practice in framing these types of clinical questions. What decision are they trying to make given a set of facts about a particular patient/client? Is the question one of choice among two or more possible options in assessment or intervention? If so, have the options been stated clearly so that a targeted literature search can be pursued? Instructors can help students refine and focus their questions by continuing to direct their attention to the particular patient in question rather than an abstract category and on the decision they are trying to make by offering suggestions, and directing revisions and modifications until the student is ready to proceed with a literature search.

Literature searching. The next step in implementing EBP requires the development of literature searching skills (Booth & Madge, 1998). Where can the information to answer the questions posed be found? Search strategy skills

include efficient use of databases, cumulative indices, and directories of information that will facilitate the students' identification of articles, books, and other reference materials containing needed information. (See Appendix for examples.) Students need to practice efficiently accessing these sources by learning how to select and use search terms, key words, hedges, filters, and index codes. Key concepts are efficiency and applicability (Strauss & McAlister, 2000). The emphasis is on the efficient collection of primary and secondary sources of information that are as closely applicable to the questions posed as possible. Reference librarians can be very helpful in aiding students in the development of literature searching skills.

Critical appraisal. Critical appraisal of the information retrieved is the next step in the process. Knowledge of research design is applied to the information that has been collected. Students practice applying what they have learned about factors that determine the strength of the evidence in the materials they have collected and the relevance of the information to the question they have posed (Bury & Jerosch-Herald, 1998). The most useful information is that which is the most valid and the most relevant to the question. By that standard, the best designed studies may not be the most applicable to the students' assessment or treatment questions due to critical differences between the research studies and the particular questions posed. For example, although randomized clinical trials (RCT) is the most rigorous treatment research design, the subjects within the available literature may not be similar enough or the situations comparable enough to be directly applicable to the questions posed.

Unfortunately, the number of rigorously designed assessment and treatment studies available within the communication disorders literature is still limited in comparison to clinical information needs. For these reasons, it is particularly important that students gain practice in the critical appraisal of the available literature in order to be able to evaluate its relevance, applicability and

strength and to weigh that information against the alternative of acting on opinion.

Helping students systematize the critical appraisal process facilitates this step. Worksheets can be provided that make it easier for students to quickly tabulate critical aspects of articles such as whether there was an independent, blind comparison, whether the assignment to treatments was randomized, whether the subjects were matched and so forth.

Clinical integration. The next skill, clinical integration, involves incorporating patient preferences and characteristics into the clinical decision and implementing it. In addition to the strength of the scientific evidence and the relevance of that evidence in supporting a clinical decision, individual patient's values, preferences, and life circumstances need to be considered (Bensing, 2000). A decision regarding implementation is then made in consultation with the patient. It is at this step that it is most helpful to have students interacting with actual patients rather than depending upon case scenarios.

Evaluation. The final step in the process is evaluation (Strauss & Sackett, 1998). Both teachers and students need to evaluate the students' success in completing the process. Each step in skill development is reviewed. Could the question, the literature search, the critical appraisal, or the clinical integration have been improved? Were the steps completed most efficiently and effectively? Is there additional information or practice with particular steps that the students need in order to be confident enough to incorporate EBP into their professional practices following graduation? Repetition of the steps in this process increases the students' skill and comfort levels in implementing EBP.

A sample of titles from a series of articles in the Journal of the American Medical Association illustrates a recognition within members of the medical community of the need for EBP skill development, and a commitment to

facilitating that development. The series is entitled “Users Guides to the Medical Literature” and in the last two years has included the following articles:

- “Users Guides to the Medical Literature: How to Use Guidelines and Recommendations About Screening” (Barratt et al, 1999)
- “Users Guides to the Medical Literature: How to Use an Article About Disease Probability for Differential Diagnosis” (Richardson, Wilson, Guyatt, Cook, and Nishikawa, 2000)
- “Users Guides to the Medical Literature: Integrating Research Evidence With the Care of the Individual Patient” (McAlister, Straus, Guyatt and Haynes, 2000)
- “Users Guides to the Medical Literature: How to Use a Treatment Recommendation” (Guyatt, Sinclair, Cook and Glasziou, 1999)
- “Users Guides to the Medical Literature: Using Electronic Health Information Resources in Evidence-Based Practice” (Hunt, Jaeschke and McKibbon, 2000)
- “Users Guides to the Medical Literature: Principles for Applying the Users’ Guides to Patient Care” (Guyatt et al., 2000)

Each of these articles begins with a clinical scenario that poses a specific assessment or treatment question about the patient and then follows the steps discussed above relative to the particular skill that is the focus of the article. As a field, communication sciences and disorders has not invested as much energy in making available to practitioners and students these types of articles. As more libraries of communication disorders EBP information are developed, attention should be given to providing publication vehicles that would facilitate dissemination of this information as widely as possible as JAMA has done.

As the NOMS project grew and worked toward greater participation, educational programs began to include skill development. Case studies were published that highlighted how clinicians had used NOMS data to answer specific clinical questions. Presentations on the NOMS project moved from a primary

focus on its technical features and began to demonstrate how the data could be used in a series of sequential steps to answer various types of questions that were posed. Participation was extended to include university clinics, if a registered NOMS user worked with students and NOMS values were recorded for internal purposes only. This facilitated students' learning about NOMS prior to graduation and helped students practice its use.

Attitudes, Beliefs and Advocacy

Educational programs are necessary components of EBP; however, it is also important in implementation efforts to address clinicians' attitudes and beliefs (Richardson et al., 1999). The literature on EBP recommends that the attitudes of those involved in incorporating practice change be sampled through consultation and that those attitudes be addressed. How is EBP perceived? If EBP course content is included in the CSD curriculum, for example, how do the faculty feel about that? Are they supportive? Are clinical supervisors supportive? In the externship practice environment, how do clinicians and their colleagues perceive EBP? How do the students perceive EBP?

The consultation process permits comments, concerns, and questions to be heard and to begin to be addressed. Efforts directed at attitudes and beliefs may be as important to the success of the program as the quality of the educational programs that provide information, and develop student skills.

One of the attitudes that the NOMS project encountered was the concern that incorporating functional communication outcomes measurement into practice protocols would be too time consuming to be feasible. Project staff worked with groups of clinicians reviewing NOMS forms and modified them to balance information needs with the need for the form to take only a couple of minutes to complete. Items were deleted, modified, and/or combined, scoring was automated, and choices in the means used to report data were provided (paper and pencil bubble forms, paper and pencil check forms, and computer forms).

All of the forms were scanned and tabulated by the ASHA office and the results were sent to participating facilities quarterly in data tables and in graphic form accompanied by interpretive text. Clinician time requirements were kept to a minimum. Clinician focus groups have become an ongoing part of the project in order to continue to provide a mechanism for input on all aspects of the project.

The higher the stress levels are, the harder it is to implement changes (Richardson & Droogan, 1999). The professions of speech-language pathology and audiology have experienced considerable pressure in the last few years related to managed care, the $1500 cap, PPS changes, staff cut-backs, job compression, and so forth. All of these factors can create an environment where contemplating practice changes may be daunting. Hearing clinician concerns and trying to respond to them was an important part of the implementation plan for the NOMS project.

Advocacy is also important. The EBP literature underscores the critical role of visible and vocal advocates. Wyszewlanski and Green (2000) have investigated practicing physicians' responses to new clinical information. They found that physicians fell into one of the following four groups:

1) Seeker Clinician: someone who actively seeks new information by reading journals, critically evaluates it and is willing to incorporate new strategies even if they are different from prevalent practice patterns;
2) Receptive Clinician: someone who is receptive to change if it is supported by respected, scientific authorities;
3) Traditionalist Clinician: someone who is receptive to change if it is supported by respected clinicians with recognized clinical skill and authority; and,

4) Pragmatist Clinician: someone who is receptive to change if he/she concludes that it is practical, not disruptive, and will not risk patient satisfaction.

This work suggests that a bias towards implementing change, almost exclusively through educational programs, reflects a belief that all clinicians are seekers all of the time. What is more probable is that practitioners demonstrate a combination of these characteristics in varying proportions at different times.

Within the NOMS project, well-respected clinicians and local champions were recruited and continue to be a very important part of gaining support for the project. Key respected individuals within various clinical communities have served and are serving on advisory groups to the project.

Infrastructure Supports and Incentives

A final component of implementing EBP is to provide infrastructure supports and incentives for the change. Infrastructure supports for NOMS include state and facility NOMS coordinators that recruit participants, remind participants to return forms, and serve as on-site consultants to answer questions. Project staff have also begun to develop mechanisms by which NOMS data reports can be formatted to serve as status reports for quality improvement and NOMS data graphs can be easily imported into other documents to serve other reporting needs. These adaptations are examples of changes in infrastructure that support the use of NOMS in clinical practice.

Significant infrastructure support for EBP in communication sciences and disorders would be the development of a readily accessible bank of informational and data access resources that would increase the ease and efficiency of the literature search and critical appraisal processes. Having hardware, software and best evidence sources, such as a library of review articles, best evidence summaries of journals, and databases of previously completed critically

appraised questions readily available to students and professionals would provide important infrastructure support for EBP to be sustained. These libraries of information could be developed nationally as part of the ongoing journal, book and reference system that is already available and could also be developed locally using individual facility or consortium facility efforts. CSD academic programs, as they train students in EBP, would be in a good position to provide leadership in the development of these types of infrastructure supports.

Progress in EBP

How far have we come? Let me summarize using the NOMS project as an example of an EBP change in speech-language pathology practice.

The NOMS: Adults component, which was the first component developed, and contains Functional Communication Measures (FCMs) for Motor Speech, Voice, Fluency, Swallowing, Spoken Language Comprehension, Spoken Language Expression, Reading, Writing, Attention, Memory, and Pragmatics, now includes 25,000 cases in the database. Two thousand clinicians in 600 facilities from 48 states are participating.

The NOMS: Schools component, which contains FCMs for Intelligibility, Pragmatics, Fluency, Speech Sound Production, Spoken Language Comprehension, Spoken Language Production, and Voice, now includes 9000 cases in the database. Seven hundred and fifty clinicians in 67 school districts from 28 states are participating.

The NOMS: Pre-kindergarten component, which contains FCMs for Articulation/Intelligibility, Cognitive Orientation, Pragmatics, Swallowing, Spoken Language Comprehension, and Spoken Language Production, includes 3000 cases in the database. Seven hundred and fifty clinicians in 225 facilities from 38 states are participating.

Through the NOMS project we have learned that wide-spread change in speech-language pathology practice will require intensive, varied methodologies some of which have not yet been fully utilized. Researcher-clinician partnerships are still difficult to forge, but for those who have long sought to bridge the researcher-clinician gap, NOMS has provided a productive mechanism for building strong, ongoing partnerships. One highly valued outcome of the NOMS project would be for the researcher-clinician teams that are forming to continue and provide a basis for the clinical research studies that are still sorely needed.

Attitudinal change is an aspect of clinical practice change that warrants considerably more study in communication disorders. The literature in EBP has described clinical change as a process that is not linear but negotiated and uncertain. By that standard, although the NOMS project must still grow to have optimal impact, we have learned a great deal. It has been the most ambitious effort in communication disorders to date to implement and measure a wide-spread clinical practice change. Further progress of the project warrants careful study as means of extending our understanding of the process of clinical change in CSD.

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APPENDIX

Selected Reference Sites

www.asha.org/professionals/information/evaluation.htm

www.asha.org/professionals/NCTED/treatment_outcomes.htm

www.mssm.edu/library/ebm.ebmhedges.htm

www.ticeinfo.com/speech/references/evidence-based.htm

www.hiru.mcmaster.ca/cochane/default.htm

www.health.latrobe.edu.au/Health/Schools.HCS/research/evidencebased.html

www.aac.unl.edu/reference/evidenceref/htm