

***PRE-CONFERENCE WORKSHOP FOR PROGRAM DIRECTORS,
CLINIC DIRECTORS, AND FACULTY***

***MOVING TOWARDS EVIDENCE-BASED PRACTICE IN COMMUNICATION
SCIENCES AND DISORDERS***

INTRODUCTION TO EVIDENCE-BASED PRACTICE

Alan M. Jette, Ph.D., Dean
Sergeant College of Health and Rehabilitation Sciences
Boston University

[Editor's note: The editors derived this manuscript from transcribed and edited audiotapes of Dr. Jette's presentation.]

Introduction

This is a topic near and dear to me. My clinical roots are in physical therapy. I no longer practice in that field but I have spent a lot of time working with my colleagues in physical therapy, as well as with my colleagues in the gerontology field, trying to move our field towards evidence-based practice. I have also done a lot of health services research over the years with colleagues in medicine. That is where I first became grounded and experienced in doing research in evidence-based practice. What I discovered is that we have come very late to this whole topic of evidence-based practice. It is from that perspective I will introduce the topic this afternoon and try to set the stage for Dr. Gallagher to take us to the next level and make the application specifically to your field.

I have several objectives this afternoon which I hope to cover with you. I have found from working with various rehabilitation professions that we do not all

mean the same thing when we use the term evidence-based practice. I also want to tell what I see from my vantage point, both as a health services researcher and a dean in an academic school, as some of the key challenges we rehabilitation professionals face at the dawning of this new century. I am also going to leave you with some of my thoughts on what we should be doing. Hopefully, I will be able to relate those strategies to your field of communication sciences. I hope you will consider pushing these strategies forward in your own field to meet some of these challenges and move our professions forward to a very bright new century.

This is the fundamental problem that we in the health professions, particularly in the rehabilitation professions, are experiencing. It is the dilemma of insufficient evidence. Over last several decades we have not done a very good job collecting the research evidence that we need to conduct evidence based practice. Therefore, we are faced with a very urgent dilemma because society has begun to demand evidence to support what we have been doing in our respective professions.

There has been a major transformation in the rehab professions since the 1970s, when I became a rehab professional. It was accepted in those days that what we provided to our clients and to our patients was valuable. Issues we were struggling with in the early 70s were “How do we improve access?” “How do we deal with these new health insurances of medicare and Medicaid” and “How do we expand to meet the growing needs of people out there who really need our services?” In my socialization as a PT, no one ever talked about the need for scientific evidence to support and defend what I was being trained to do. Today we are faced with a real dilemma of insufficient evidence.

As I look at where we are today, I see us in an age of justification. We are playing catch-up in today’s marketplace and we have been put on the defensive because much of what we provide today in our field is based on tradition and on

anecdote, not on science. In my conversations with my communication sciences colleagues, it has become quite clear that this is a problem shared by all the rehab fields. The marketplace is now demanding research and evidence to justify continued reimbursement and support for our services.

The good news is that society cares about our services. For a long time, no one cared about evidence except for mainstream medicine. Today, society cares about the investment made in the non-medical health field, in rehabilitation. Because of that caring and because of the concern about money, people are challenging us. We are being put in the position of having to justify what we are trained to do, what we have been providing to our patients for many years. This is a very uncomfortable position in which to practice and also in which to teach in our academic programs.

There are three major areas that clinicians need to confront every day in their practice: diagnosis, intervention, and prognosis. Clinicians of tomorrow, our students, need to be educated in practical strategies that will assist them in the critical appraisal of the data as they apply and pertain to the clinical decisions that they need to make. That is why evidence-based practice is crucial to the future flourishing of the rehabilitation professions.

Definition

What is evidence-based practice? The guru of evidence-based practice is David Sackett and he brought this into the area of medicine a long time ago. He basically defined evidence-based practice in medicine as the conscientious, the explicit, and the judicious use of current best evidence in making decisions about the care of individual patients. That part of the definition, current best evidence, is really critical. Sackett is not talking about an ideal state where we know everything we need to know about the evidence that might have bearing on the care of an individual patient. He is talking about using current best evidence which means it is a dynamic, changing phenomenon. As we learn more, the

evidence is going to change because it is dynamic and changing. Sackett says that is what evidence-based medicine is learning about how to critically evaluate and use current best evidence to make decisions about the care of our individual patients.

Sackett has taken a very structured approach to applying current best evidence. It is not just "read the literature, try to keep up with the literature, and try to use that in making better clinical decisions." He takes a very structured, organized, systematic approach with very real skills. He teaches physicians how to use this approach to evaluate evidence and how to determine the extent to which that evidence should be applied to clinical care. That is something I work on a great deal with students. I teach a course to PT graduate students and I try to teach them the skills they need to evaluate critically the literature in their field so that they can determine whether or not it applies to the care of their patients. That is what Sackett means by evidence-based practice.

From his point of view, there are different bases that we use in making clinical decisions all the time. Sackett is arguing that evidence should be a primary basis for making clinical decisions. Sackett contends that the basis for a decision is evidence, that there are markers and very definite measuring devices that are used to help us evaluate markers. He also argues that there are very real markers on which we need to base our decisions. One example would be the randomized trial but there are many other kinds of methodological markers that would determine the quality of the evidence and its relevance to our practice.

The measuring device to use in determining whether or not markers are relevant to our practice would be things like odds ratios, various statistical tools, and meta analysis, which is a statistical tool that is extremely useful in helping clinicians summarize and catalog across different studies the relevance of findings to a particular clinical research question.

It is important to realize that in our fields, evidence is not the only basis for decision making. Eminence, for example, is a very common basis for making clinical decisions in the rehab fields and in the health care fields. The marker when you are making a decision based on eminence, for example, is the radiance of the white hair. In all of our field we have very eminent colleagues who for years have been making their case and pushing their products. They are very successful. There is also decision making based on vehemence. Level of stridency is an important marker and the measuring device is, of course, the audiometer. (This comes from an article written by Isaacs and Fitzgerald in the British Medical Journal in 1999 and they mention other markers and measuring devices.)

Evidence-based practice means integrating individual clinical expertise with the best available clinical evidence from systematic research. Some people have criticized evidence-based practice as a cookbook approach to practice. They say we should not throw out our individual clinical expertise and clinical judgment. Evidence-based practice is trying integrate your clinical expertise, your clinical experience, your clinical skills with the best available evidence that is drawn from our literature. Individual clinical expertise is the proficiency and judgment clinicians acquire and bring to the bedside from their clinical experience and their years of clinical practice. In the rehab field and in health professions, that is a real strength. I am not denigrating that strength. I am arguing we need to build on that strength and integrate that strength more effectively with the best available literature in our field.

Uses of Evidence-Based Practice

Intervention

When I say, the best available literature, what usually comes to people's mind is literature and research evidence that focuses on issues of efficacy, effectiveness and safety—in other words outcome. Usually what people think

about when we talk about systematic evidence that we can integrate with our clinical expertise is outcomes: efficacy, effectiveness, and safety of clinical interventions. I agree that is an important and a fundamental part of evidence-based practice. We need to know how to evaluate systematically outcomes research and judge the extent to which it applies to our clinical context.

Assessment

Evidence-based practice is much broader than just outcomes research or research that bears on questions of efficacy, effectiveness, and safety. We are also talking about using the best available clinical evidence to determine the accuracy and precision of our diagnostic tests. In all of our fields we rely on diagnostic protocols and diagnostic tools to guide our clinical interventions and there are systematic ways available to evaluate the accuracy, the precision, and the quality of those diagnostic tests. However, we do not always apply critical evaluation techniques to our diagnostic tools. We use them out of tradition because that is what is available. Researchers are not publishing evidence that helps us determine the extent to which these tools are precise and accurate and up to the task that we are using them for. That is all part of evidence-based practice—to help clinicians to know which diagnostic protocols and which diagnostic tools are useful.

Prognosis

The third area is prognosis. Medicine has done a much better job than the rehab fields in launching studies that give us good prognostic information on homogeneous groups of patients. This research has direct relevance to the practice of medicine and is extremely helpful in deciding where to focus limited resources. We need to do the same in the rehabilitation field.

Issues and Challenges

Developing Researchers

How do we create more scientific evidence? It does not just mean throwing more money at the problem. It is not that simple. If we are not careful where we invest our capital, we are not going to make the kind of progress that we need to make. Before you can do anything else in advancing evidence-based practice, you have to really address this issue. Many of our researchers do not have the breadth and the depth of skills they need to do this kind of research. Many have been trained in areas other than applied health services research. They have then tried to apply their skills learned in lab-based research into the clinic and into clinical applied research. Many skills are different and the translation does not work very well. This is a very challenging, different kind of research than a lot of the health professionals have been trained to do in the past.

Now I want to talk about the different kinds of skills that our researchers need because many of us operate doctoral and post doctoral programs. First, the question I ask you: "Do the clinical researchers that you are turning out in CD/CS have the kind of methodological skills that they need to conduct high quality, fundable, clinical outcomes, clinical effectiveness research? "

I tell you unequivocally that there are piles of money out there for this kind of research today. I know you are sitting there saying: "All right, where is it?" There is more money available for doing this kind of research today than any other time in my career and I have been doing research in this area for over 20 years. Society cares and is beginning to invest money into this kind of research.

Unfortunately, many of our researchers are not competitive. They come to me and they do not have the skills, the methodological background, to be competitive on a national stage. Therefore, they do not get funded. This is a

critical issue we have to solve. We have to create a cadre of researchers who can get funded because this is expensive research. You cannot do this kind of research on the side when you are running a clinical practice. I have worked with clinicians for twenty years who have tried to do that and, although they are well intentioned, it does not work. This is expensive, difficult, challenging research and it takes money to do it. You cannot do it off the backs of busy clinicians and busy academicians. If that is the approach we continue to try to take, we will fail.

We need to recruit people, to train them, to mentor them, and to make sure that they have the methodological skills to match their theoretical skills. If they do, then they will be competitive. We will give them some seed money, we will position them, and they will be able to get at the monies that are available. I know. I have seen it work. I have seen it done over the past 20 some years so I am absolutely convinced that this strategy will work.

Methodological Skills

Outcome Assessment. At baseline we have to be able to measure very carefully the kinds of outcomes we are trying to achieve. That means we need to understand the kinds of outcomes we are trying to achieve. I know it sounds obvious but I have worked with dozens of clinical colleagues over the years. They come to me and their first question is what instrument should I use? They want to grab an instrument and go out and use it. They do not think through carefully what outcomes they are really trying to achieve. This is a prescription for disaster. We have to be able to measure our treatment. Again, I know it sounds simple but I cannot tell you how many clinical studies I have seen published where the intervention is defined as speech therapy or physical therapy. Can you imagine reading in the medical literature an intervention that was defined as surgery? or medicine? No one would ever publish that. Pick of your journals up and take a look at some of the outcome studies being done and published today in our fields. That is the way we are defining our treatment. No wonder we are having trouble pushing this field forward. We cannot measure the

kinds of interventions we are trying to evaluate. If you cannot measure outcomes, forget it. You cannot do this kind of research.

Case mix adjustment. Case mix adjustment is concerned with the co-morbidities, the severity, the duration, previous episodes, treatment history, the techniques of taking background factors into consideration, and using them to adjust analyses. We need to know which adjustments are most appropriate for a specific research application. We have to be able to measure client factors to adjust and compare apples to apples in this kind of research. Most evidence-based practice studies involve using multiple clinics and not all clinics attract patients with the same backgrounds and levels of severity and backgrounds. Many case adjustment techniques have been developed in medicine. However, we have not evaluated the extent to which they are applicable in the rehab context. Where they are not applicable, we need to develop better case mix approaches that will work for our research practice.

Management of environmental factors. In my field of physical therapy we love to ignore the environment. It is either not measurable or not relevant. These are measures that are distinct from the measures of outcomes; they are not confounded with outcome. What I have found in my own work is a lot of the existing measures of environment often take into account the outcome in the measure. Therefore, if I am using them in a study trying to look at a treatment impact on outcome it is not useful. I am talking not only about physical but social environment. We know that social environment is many times even more important than physical environment.

Quasi-experimental design/experimental design. When I came through my rehab training program, quasi-experimental designs were not even mentioned. They were considered sub-scientific approaches. When I went to graduate school in public health, I become acquainted with the whole world of

quasi-experimental design so I could make informed judgments about their applicability to important questions in rehab. Epidemiology has been flourishing for decades and decades using quasi-experimental designs. Yes, quasi-experimental designs have problems, but they are extremely relevant and we need to make sure our researchers have skill in using these designs. The experimental designs are critically important but the non-experimental designs are very useful in moving this work forward as well.

Sampling and recruitment. Sampling is very challenging in applied research: it is different from lab-based research. Do our researchers know anything about sampling theory? Do they take courses in sampling theory? Do you know when we can use probability approaches to sampling? Do we have skills in identifying, enrolling, and retaining subjects in these studies? The dropout rates in these studies are horrendous. In other areas of the health professions, we have developed good techniques for sampling and retaining people. Do our researchers have these skills? Do we know how to train data collectors so that our assessments are reliable and valid? Do we know how to maintain and document quality control in the field in busy clinical settings so that the design we set up is, in fact, implemented? These are learnable skills. Do our researchers have those skills? Do we know how to do data management and do we know how to put together and analyze complex data sets? These are not simple, straightforward data sets. So we need skills in data management and data manipulation.

Multivariate analysis. Researchers who come out of our programs today who are not well grounded in multivariate analysis techniques are not adequately prepared to do this kind of research. They will never be successful in getting the kinds of grants without strong multivariate skills.

Outcomes. Do you currently have the techniques to look at the key outcomes in communications disorders? I see people pick an outcome measure

that goes after a legitimate outcome but many times, it is not the outcome the treatment is trying to influence. There is a mismatch between the treatment outcome and the measured outcome. I do not care how good the treatment is, nor how good the outcome measurement is; it will not show improvement. You have match and really carefully analyze the outcomes.

Treatment effects. Do we know how to measure treatment effects? I am talking about type, frequency, intensity, as well as amount of treatment. We need to specify the treatment so we know when we are reading across articles that we have the same or different interventions. As long as we keep defining our treatments by our professional backgrounds, it will be hopeless because we will be continually comparing apples and oranges and it will be a quagmire. We need to be able to measure type, frequency, intensity, and amount.

If you agree with my argument that evidence-based practice is important to the rehabilitation field, then my position is that without researchers who have these skills, we are going to be hard pressed to make progress in evidence-based practice. I am not saying that lab based research and researchers are not important and valuable. I accept the importance of the kind of work many of our academics have done traditionally. It is extremely important and it sheds tremendous light on clinical research. We need both. We need skills in both. In my experience in the rehab field, we have more skills in the lab based, more theoretical work than we do in the applied work. There is a mismatch which is why I am emphasizing the applied area. We need to carefully think about what it is we are trying to do. If our goal is to improve evidence-based practice, then we cannot do it without doing this kind of research.

Critical Evaluation of Diagnostic Tools

Let me very briefly talk about the critical evaluation of diagnostic tools. The Byrd Balance Test is a simple diagnostic approach that is used often in gerontology in deciding which older people are at higher risk for falls and,

therefore, which should receive some form of intervention. How do you decide whether the Byrd Balance Test, or any other diagnostic tool, is useful? This particular test involves 14 tasks, each one is graded on a 5 point scale. A score of less than 45 has been designed to identify those who are at high risk for a fall. So how well does it predict falls? There was a recent article where the authors did a careful analysis of this question looking at the literature as well as doing their own study. You evaluate how well a test predicts by looking at several factors. I am only going to look at three: sensitivity, specificity, and positive likelihood ratio.

Sensitivity. How often does the Byrd predict the fall, if a fall has actually occurred? The authors submitted the tool to this test and they discovered 64% sensitivity. Sixty-four percent of the time, if you get a positive Byrd that means the person is at high risk to fall. Thirty-six percent of the time it is a false positive.

Specificity. How often, if you get a negative Byrd, can you predict that someone will not be prone to falling? The Byrd is highly specific-- 90%. If you get a negative Byrd, you can be quite confident that this person is at low risk for having a fall.

Positive likelihood ratio. How much does a positive Byrd raise or lower the pre-test probability of a fall? How much more accurate are you going to be as a clinician at estimating risk on the basis of the Byrd score? The authors predicted that clinicians are a little over 6 times more likely to predict that someone will be a faller rather than a non-faller based on the information from the Byrd. (This was Ridalin Stratford published in Physical Therapy in 1999.)

The Byrd test is not a key test in Communication Disorders but it illustrates the kind of data we need to help us decide what diagnostic tools are most useful. To evaluate diagnostic tools, we know the sensitivity and the specificity of our diagnostic tools. How many of our clinical diagnostic tests have been critically

evaluated in this way? In our academic programs, when we to introduce our students to diagnostic tests, we need to introduce them to the skills of determining which ones are useful and which ones are not. The decisions should be based on science and not on what we have traditionally felt to be the case.

Keeping Researchers in the Field

My questions to you:

- Are our doctoral programs effective in turning out these kinds of researchers?
- Do we have sufficient post-doctoral programs to nurture these people?

In the medical field, if you are going to be a credible researcher you have to do a post-doc. I have been shocked in rehab how uncommon that continues to be. Our doctoral students come out, they take mainline faculty positions, they get buried in teaching and other responsibilities, and they have trouble getting their research off the ground. We need high quality post-doctoral opportunities to nurture people and then we need to make sure we have sufficient career paths for these people to continue to stay in clinical research.

In my field of Physical Therapy in the last 10 - 15 years, I have seen some of the best researchers get sucked into other positions, predominately administrative positions. In my field, there are much better career paths in administration than in research. I ask you to evaluate your field. Do you have the career paths to keep our best, most talented people doing research? If we do not develop these kinds of paths then it is going to be difficult to develop the cadre of skilled applied researchers. It is necessary as a first step. Many of you are the ones who have authority and power. We must address this issue if we're going to make progress.

Creating a Culture of Evidence-Based Practice.

If we do all I have asked us to do and have not created a culture among our clinicians in which they demand and know how to use evidence, we will be in trouble. The question is “Will clinicians practice using the evidence if it is available?” Our current interest in this research is driven by external factors; it is not internal. We are being forced into exploring evidence and this is helping us go in the right direction. However, unless we internalize evidence-based practice and it becomes part of our culture, it is not going to take root in the long haul and it is not going to be effective.

How do we produce clinicians who are skilled in evidence-based practice and who demand this kind of research? If our clinicians demanded this kind of research, then it will be easy to produce it. How do we create the demand? I want to talk about our professional education curricula, modeling, and mentoring by our clinical instructors, continuing professional education, as well as our professional organizations. I am on shaky ground here because I do not know your field but at least I can raise some issues. In terms of our educational curricula: “Are our faculties prepared to teach evidence based practice skills? “ If no, we are in trouble. We can not turn out clinicians who are skilled in evidence based practice, if we do not have teachers who can teach it. We know that in other areas. Do we have the skills in our faculty to teach these evidence-based practice skills? Are evidence-based practice skills part of the list of competencies and curriculum objectives?

Clinical instructors are crucial. Do clinicians who work with our students have easy access to our literature? Do they have access to the latest literature? Do the clinicians who work with our students have evidence-based practice skills so they are modeling it to our students? I know there is a lag between classroom and what they do in the clinic.

Is continuing education evidence-based or eminence and vehemence-based? In physical therapy, it is not very evidence-based. Continuing education workshops are traditional, anecdotal and the physical therapists flock to them. There is no science behind them. What is the case in your field? Are clinicians critical consumers of contemporary continuing education? What can we do to make them become more critical consumers?

In our professional organizations, are we supporting evidence-based practice? Are we investing in clinical research? Are we investing in developing in the kinds of researchers we talk about? Are we active in our professional organizations? The political part will be crucial, if we want to move in this direction. It is much easier for a political organization to work on short term priorities that have a quick and visible return than to focus on long term priorities. I have found professional organization very reluctant to invest in long term objectives. I talk with professional organizations all the time and they want immediacy. When you talk in terms of years, they are not interested. They want weeks and months and that is not possible when you are talking about research.

Facilitating Evidence-Based Practice

What kind of research infrastructure would be necessary to foster innovative evidence-based approaches? How do we develop an incubator to develop this evidence-based culture that I am advocating? How do we achieve that? I advocate that in the rehab fields we take a top down approach. I know this is controversial in some quarters but I make no apology for it. I think top down, when applied appropriately, can be very effective. I am talking about creating Centers of Excellence that will foster the development, the testing, the implementation, and dissemination of information within our fields. It is an elitist approach, and I admit it. Some argue that you spread money around and give everyone a little bit. I argue that strategy will not move us where we need to go. I have seen in medicine where they have focused their monies in Centers of Excellence. They do not spread it around to everyone; not everyone gets the

same amount. They put the money where they think the talent is, where they get the most payoff for their investment. It works. We should be doing the same thing. The faculties of major research universities in medicine produce a constant stream of data, both in support of practice as well as in the development of new treatment and preventative approaches.

Now in contrast, what proportion of your major programs are located in major research universities? In PT in the 1970s about half of all the academic programs were located in the major research universities. In 1999, 18% were located in major research universities. We have proliferated a bunch of small programs all around the country to produce a lot of clinicians because we came through an era of high demand for our services. We have spread our resources very thinly and weakened our ability to do the work I am advocating. To the extent we fail to nurture and support educational programs in research universities, we are going to hinder our ability to take these professions to new heights. I am not saying that we should do this to the exclusion of non-research universities. I am talking about focusing our efforts and resources so we can blend together our academic faculties and our clinical faculties. To enhance the evidence-based foundation, we need an infrastructure that facilitates the development and implementation of evidence based practice.

I advocate concentrations of talent and resources in research universities across the United States, not to the exclusion of the others, but to create, nurture, and fund Centers of Excellence that will be closely connected to clinical centers. You cannot develop innovation in clinical practice in isolation from clinicians. I have been shocked by the separation between clinical centers and academic faculties. That is a bad trend. We need new idea development that is based on theory; we need testing and implementation of new ideas. These Centers of Excellence will become the sites of tomorrow's clinical scholars and clinical scientists.

The Center of Excellence will become the incubator where programs create the next generation of applied scientists. We are trying to do that at Boston University. One of the ways in which I have been trying to do that is by creating a Center of Rehabilitation Effectiveness. This center is where I have been trying to focus our energy and attract resources for evidence-based practice. We are working with clinicians. We are offering national workshops for clinicians to teach them how to take outcome data and turn them into management data that will influence their practice. We also have a post-doctoral program in rehabilitation health services research. We have 3-4 fellows a year working for 2 years on developing their research. We are trying to integrate evidence-based practice into the curriculum.

We are recognizing the need to help faculty develop skills in teaching evidence-based practice. For the first time this summer, we are offering a summer institute for faculty across the rehab professions: medicine, nursing, speech, audiology, psychology, pt, ot. We are bringing faculty to Boston for 2 days. Our goal is to help rehab faculty develop the skills to teach evidence-based practice. We are going to do that by doing specific presentations. Dr. Gallagher will be one of our plenary speakers. Workshops will focus on curricula design, cases, and clinical education strategies that participants as well as workshop leaders will be coming to share with each other. Participants will bring some of the models to share.

The message I want to leave you with is: Yes, we have a lot to do at the dawn of this new century. It is going to be fundamentally important that we develop this cadre of researchers who do this kind of work. Equally as important we need to develop a culture within our field that will demand it and will use it. I think we need to move off of defensive and toward an era of innovation to improve what it is we do in our respective fields and the center of excellence approach is one strategy I offer for at least your consideration and debate.

Thank you very much.