

SPECIAL ARTICLES

White Paper on Best Evidence Pharmacy Education (BEPE)

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Objectives. In 2001–02, the task force on Best Evidence Pharmacy Education (BEPE) was established within the American Association of Colleges of Pharmacy Council of Faculties (AACP COF). The charge of this task force was 2-fold: (1) scan the external environment and introduce how evidence-based methodologies are being used by other educators to make curriculum and instructional decisions, and (2) recommend whether AACP and/or COF would benefit from involvement with the Best Evidence Medical Education group.

Methods. After an initial report at the 2002 AACP Annual Meeting, the task force continued its work into 2002–03 academic year and drafted a white paper on BEPE. This paper includes background on evidence-based education, pros and cons of BEPE for academic pharmacy, and recommendations to the academy for further progress in this area.

Results. Information from the White Paper described above, as well as future directions for the task force, are presented.

Implications. BEPE is a rational approach for the examination of curricular and programmatic decisions as well as a means to enhance collaborations of academic pharmacy with the educational goals of the other health care professions.

Keywords: Best Evidence Pharmacy Education (BEPE), curriculum, evidence-based education

INTRODUCTION

The underpinnings of academic knowledge are facts, truth, and the use of the scientific method for discovery. But before knowledge becomes “knowledge,” it is first known as evidence: “an outward sign; something that furnishes proof.”¹ Evidence becomes knowledge when it is widely accepted as truth and integrated into everyday life. The use of “evidence” in routine decision making is most likely an unconscious habit that occurs in the psyche of humans and most animals. However, the systematic use of evidence in medical decision making was first noted in the mid-19th century.² The movement toward evidence-based decision making (EBDM) in medicine gained momentum in the 1980s when Sackett applied the principle to his teachings of medical students in the context of clinical problem solving.³ Since that time, the “evidence-based movement” has progressed most notably in health care but has also been seen in areas such as economics, public policy,

and education.⁴⁻⁶

The vast majority of pharmacy educators are scientists, clinicians, or both. Practicing scientists and clinicians base their work on current evidence and knowledge of their fields to direct their research and patient care. However, this judicious use of evidence does not necessarily permeate the faculty member’s educational practices. Evidence may be used in the content of what we teach, but not necessarily how we teach, or in our educational programs at large. This anomaly has been discussed recently by several members of the academy and has stimulated some inquiry on the part of the American Association of Colleges of Pharmacy Council of Faculties (AACP COF).⁷⁻⁹

In her chairmanship of the 2001–2002 AACP COF, Diane Beck created the Task Force on Best Evidence Pharmacy Education (BEPE) to: (1) scan the external environment and introduce how evidence-based methodologies are being used by other educators to make curriculum and teaching decisions, and (2) recommend whether AACP and/or the COF would benefit from involvement with the Best Evidence Medical Education (BEME) Collaborative Group.⁸ The Task Force worked

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on these charges, prepared a brief report of its work, and facilitated a discussion on the topic at the COF Business Meeting at the 2002 AACP Annual Meeting. Peggy Piascik, 2002–2003 COF Chair, continued the Task Force and charged it with:

1. Preparing a White Paper including an overview of the topic of evidence-based education, recommendations to the COF to promote greater attention to the QUESTS (quality, utility, extent, strength, target group, and setting) of current and future research or scholarly works pertaining to instructional approaches and other aspects of pharmacy education, and critiques of the pros and cons of employing evidence-based approaches in pharmacy education, and
2. Recommending or planning a special session for the 2003 annual meeting if appropriate.¹⁰

This paper fulfills the first of these charges and provides additional background on the evidence-based movement, reviews the work of the Task Force to date, and thoroughly addresses the notion of *best evidence pharmacy education*. This paper is organized in an “inverted pyramid” format: the concept of evidence-based decision making is first discussed, followed by its specific application in evidence-based medicine (EBM) and other evidence-based practice. The paper goes on to describe how these concepts relate to evidence-based education, and provides examples of the Best Evidence Medical Education initiative. Analogies are then drawn to Best Evidence Pharmacy Education. A glossary of terms is included in Appendix 1.

BACKGROUND

Simply put, evidence-based decision making is the gathering and critical assessment of relevant information before taking action. Contrary to what some might suggest, it is not impersonal. It does not ignore individual values, interests, and judgments. Nor is it free of the influence of external pressures and conditions. As one government organization described it, evidence-based decision making is “simply getting the best information in place so that people can make the best decision which is consistent with their values and circumstances.”¹¹ In the healthcare setting, EBDM has been defined as “the systematic application of the best available evidence to the evaluation of options and to decision making in clinical, management and policy settings.”¹¹ Upon reflection, the term “evidence-based decision making” may seem to contain a built-in redundancy and may tempt some to ask, “why all the fuss? After all, are not all decisions, especially the important ones in health care, made on the basis of evidence?” Apparently not – a point dramatically illustrated in the 1999 report from the Institute of Medicine on patient safety.¹² And, what

is particularly troubling is not the decisions made in the absence of evidence, but those for which there is information available but not used.¹³ The net result is not only preventable harm to patients but also wasted resources.

Evidence-based decision making translates into evidence-based practice in applied disciplines. Trinder and Reynolds claimed that in the past, professionals rarely drew upon research findings to determine or guide their actions, but instead relied on knowledge gained during primary training, prejudice and opinion, outcomes of previous cases, fads and fashions, and advice of senior and not so senior colleagues.¹⁴ They went on to say that much of the research available in certain disciplines is methodologically weak, and that practitioners suffer from the inability to keep up with the continuing global output of research findings. Practitioners may also lack the skills or means to be able to distinguish between rigorous and useful research and poor and unreliable research.

A 2003 Institute of Medicine report, *Health Professions Education: A Bridge to Quality*, recommends that “All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice [emphasis added], quality improvement approaches, and informatics.”¹⁵ They defined the core competencies embedded in this recommendation and described current educational activities (or lack thereof) facilitating the achievement of them. One of the competencies, “employ evidence-based practice – integrate best research with clinical expertise and patient values for optimum care, and participate in learning and research activities to the extent feasible,”¹⁵ is discussed as being necessary to develop life-long learning skills, yet not adequately addressed in most health professions’ curricula.

Evidence-based practice has its roots in medicine and its application becomes evidenced-based medicine. As noted previously, the philosophical origins of EBM can be found in mid-19th century Europe, but it is only in the last 20 years that it has gained worldwide prominence. EBM “is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients. The practice of EBM means integrating individual clinical expertise with the best available external clinical evidence from systematic research”² and is built upon a solid foundation composed of clinical judgment, clinical experience, and the “art” of patient care. Furthermore, it requires a certain level of competence in the critical appraisal of literature and the application of clinical epidemiology.

The movement toward evidence-based practice in medicine permeated medical education in the late 1990s with the formation of the Best Evidence Medical Edu-

Table 1. Illustrations of EBM questions*

Clinical Question Related to:	Examples:
Therapy	“Among patients with NIDDM who are having MI’s, does tight control of their blood sugar reduce their risk of dying?”
Diagnosis	“Is serum ferritin really the best way to determine iron deficiency in a 70-year-old man (MI 3 years previous) who is complaining of fatigue?”
Prognosis	“What is the survival time and the quality of life after the onset of congestive heart failure?”
Harm	“What is the association between air pollution and mortality in Canada’s major cities?”
Overviews	“What is the relationship between cholesterol levels and mortality?”
Guidelines	“What are the current practice guidelines for stroke prevention?”
Economic Evaluations	“What are the most cost effective mechanisms of reducing coronary risk factors in primary care?”
Decision analysis	“In a woman with microinvasive squamous cell carcinoma of the cervix who wishes to start a family, what is the best treatment option?”

*Examples adapted from “Educational Scenarios for Teaching EBM in Primary Care”
<http://www.minervation.com/cebm2/docs/scenarios/gp.html> Accessed July 9, 2003.

education Collaboration. BEME is defined as “the implementation, by teachers in their practice, of methods and approaches to education based on the best evidence available.”¹⁶ Medical educators in Canada and the United Kingdom have published about the need to use evidence when making decisions about medical education, similar to physicians using evidence to make clinical decisions.¹⁷⁻¹⁹ Several of these authors and others convened in the summer and winters of 1999 to further explore these ideas and formalize their efforts. To describe the practice of BEME in the context of opinion-based teaching vs evidence-based teaching, Hart and colleagues described a continuum between these latter 2 concepts: 100% opinion-based education, where no useful evidence is available (or available but unused) to 100% evidence-based teaching where decisions can be (and are) made on the basis of detailed evidence.²⁰ They go on to say that “in BEME, teachers make decisions about their teaching practice on the best evidence that is available at whichever point they find themselves on the continuum.”^{20(p554-5)}

BEME discussions have resulted in an international collaboration of a multitude of investigators conducting systematic reviews of related literature to determine what works and what does not with regard to medical education.²¹ Concurrently with the BEME movement, the Campbell Collaboration, a sibling organization to the Cochrane Collaboration, was created to “prepare, maintain and disseminate systematic reviews of studies of interventions. . . in the social, behavioral and educational arenas.”²² Both BEME and Campbell exist to promote quality evidence by which educators, among others, can make better decisions in their practices. Al-

though the BEPE Task Force is still in an exploratory mode of learning about the evidence-based movement and how it applies to pharmacy education, it seems plausible that it can learn from and possibly model itself after these efforts in order to aid the academy in improving its practice.

When the BEPE Task Force began its deliberations in early 2002, it first explored definitions of the construct and discussed how others in the pharmacy academy might better understand the topic. The Task Force identified 4 areas upon which to focus its efforts:

1. Evidence-based decision making and its teaching
2. Using evidence in the content of teaching
3. Using evidence in the process of teaching
4. Relationship of BEPE to the scholarship of teaching

These 4 areas were explored by members of the Task Force and discussed at the 2002 AACP COF Business Meeting.²³ They are further described below.

Evidence-Based Decision Making and Its Teaching

Since the evidence-based movement is becoming the standard of practice in several professions and disciplines, the teaching of evidence-based decision making has made its way into these professions’ educational programs, such as that of medicine, dentistry, and pharmacy. Before it can be taught, however, evidence-based practice must first be defined. In medicine, Rosenberg and Donald outlined evidence-based medicine as proceeding in the following 4 steps²⁴:

1. Select specific clinic questions from patient’s specific problem(s) (refer to Table 1 for examples of the type of questions),

2. Search the literature or databases for relevant clinical information,
3. Appraise the evidence for validity and usefulness to the patient and practice,
4. Implement useful findings in everyday practice.

Sackett and colleagues illustrate the application of this approach by providing numerous examples of how EBM can be taught at the bedside, in clinics or in a large classroom in their text, "Evidence-based medicine: how to practice and teach EBM."²⁵ They also included examples of the most frequent mistakes made when teaching EBM and provided an extensive list of tips for teaching EBM in clinical teams and other small groups.

Most "evidence-based practice" in pharmacy education comes in the form of biostatistics, pharmacotherapeutics, drug information, and literature evaluation courses. These courses are extremely important in helping future pharmacists understand how to use evidence in practice. It is unknown, however, how well these courses help our graduates apply evidence in their daily practice routines. Bond's book, *Evidence-based Pharmacy*, describes "the extended role of community pharmacists in primary healthcare and presents robust evidence for health benefits from such pharmacy interventions."²⁶ It does not, however, teach pharmacy students or pharmacists how to apply evidence-based practice into the practice of pharmacy. There is a need in pharmacy education for a quality and applicable textbook about using evidence in pharmacy practice. At the very least, pharmacy educators should role model evidence-based decision making, most notably in experiential teaching and learning.

Using Evidence in the Content of Teaching

A first criterion for BEPE should be that the content of pharmacy curricula should be evidence-based. Professors have the responsibility to "profess" opinions, but these opinions should be based on the best available evidence. In one of the recent AACP Excellence Series papers, Kennedy and colleagues stated: "Given the fact that research utilizes an evidence-based approach and incorporates a self-directed learning style, it is not unreasonable to expect that individuals involved in research can help integrate these approaches into an educational paradigm. . . ."^{27(p13)} This might seem self-evident, but it may, in fact, be difficult to establish evidence for what is being taught. There is often a dearth of knowledge, or randomized controlled trials may be absent. In many areas data are qualitative rather than quantitative. Thus, in preparation to enhance learning, it may be difficult to establish a reliable source of information.

To illustrate an evidence-based content example,

consider pharmacotherapeutic recommendations for use of hormonal replacement therapy (HRT). Until recently, it was probably reasonable to conclude that most pharmacy curricula taught that HRT was a rational approach to treating post-menopausal signs and symptoms, and that it helped to prevent osteoporosis and cardiovascular problems that increase after menopause. While some epidemiological studies indicated that there were possible adverse effects associated with HRT, the potential benefits seemed to outweigh these adverse effects. Even the most recent edition of one of the most popular therapeutics books concluded that HRT was probably appropriate therapy for many, if not most, post-menopausal women.²⁸ Although this understanding was evidence-based and there was general agreement that HRT was beneficial, longitudinal and well-controlled large clinical studies to affirm this conclusion had not been completed until the Women's Health Initiative studies began to be published in early 2003.²⁹ Unfortunately, very different conclusions were reached in these latter studies, and as a result, many clinicians now accept that HRT is inappropriate for many, if not most, postmenopausal women.

Although the HRT example demonstrated a lack of long-term evidence on which to base therapeutic decisions, there are other examples that demonstrate the lag time of applying research to clinical practice. Consider the example of bacteria-induced peptic ulcers. It took nearly 30 years for medical practice to accept the supporting evidence for this pathology; now it is well accepted and antibiotic therapy is an important component of ulcer treatment.³⁰

How does a faculty member incorporate evidence-based content into his/her teaching? Sackett et al suggested an approach that encompasses the following principles²⁵:

1. Become a self-directed, lifelong learner. No researcher would advance far in his/her field if (s)he failed to keep up with the current literature. Likewise, to advance within the field of learning it is necessary to keep current with related literature.
2. Seek and apply summaries generated by others. Just as the research effort grows and advances through multiple laboratories working on different parts of a project, so multiple educators contribute to BEPE.
3. Accept evidence-based protocols from colleagues. Research is a collaborative effort; so is education.

To achieve the first recommendation, one needs to search for the best evidence. Good evidence can be found in several the following reliable sources:

1. Accepted, standard, up-to-date textbooks. How-

ever, it should be recognized that even the most current textbook is likely to be out-of-date on some topics, as was noted above with HRT. The timeframe involved in compiling and publishing textbooks will always result in a significant delay.

2. Critical reviews of the literature. The emphases here are on critical and unbiased. Worthy reviews should present a balanced view of the topic and evidence-based conclusions.
3. Meta-analysis. There are increasing numbers of scientists who perform meta-analyses on primary literature. Meta-analysis is a sophisticated statistical analysis that combines data from multiple studies to generate conclusions. In many cases this analysis can result in adequate sample size even when the primary sources had insufficient numbers to draw conclusions.
4. Databases that categorize primary literature. Groups such as the Cochrane Collaboration analyze the existing literature to draw conclusions on specific therapeutic problems.
5. Asking colleagues. According to Sackett, this is one of the more frequently used methods, but also one of the more unreliable methods.²⁵ Is your colleague's opinion based on evidence or on the PHOG approach (prejudices, hunches, opinions, guesses)?

In addition to PHOG, there are other potential pitfalls when identifying evidence, some of which are related to the perceived value of teaching in relation to the research and service aspects of academic careers. Determining evidence-based content is time consuming and detracts from research and practice, yet it is generally the latter 2 tasks that merit promotion and tenure. Standards and criteria for teaching are not well established, and may be nonexistent at the university level. Few pharmacy educators have ever had formal instruction on how to teach. Graduate programs and postdoctoral training and fellowship programs provide training in how to survey the research literature but generally do not offer similar training in how to survey educational literature.

Finally, as with academic research, the content of academic teaching must be continually reviewed. New approaches and advances in therapy need to be incorporated into curricula as they occur. The old paradigm of a professor who has used the same lecture notes for 20 or 30 years is no longer tenable. As new or even corroborative evidence becomes available, it needs to be incorporated into the learning experience. Using findings from research adds "flavor to the classroom, ensuring that knowledge gains are based on a scientific foundation."^{27(p.3)}

Using Evidence in the Process of Teaching

While the emphasis of evidence-based medicine is the use of systematic reviews of medical literature in selecting treatment options for patients, the focus of best evidence education is the integration of individual expertise with the best available external evidence obtained through a systematic search in order to implement effective instruction. Greenhalgh and colleagues illustrated the need for this difference in an article describing their attempt to use the principles of EBM in the development of an online program for a master of science in primary health care.³¹ They found several issues that limited the transferability of the EBM method to educational applications. The most important issue they identified was the need for practical wisdom rather than the reliance on evidence from educational research.

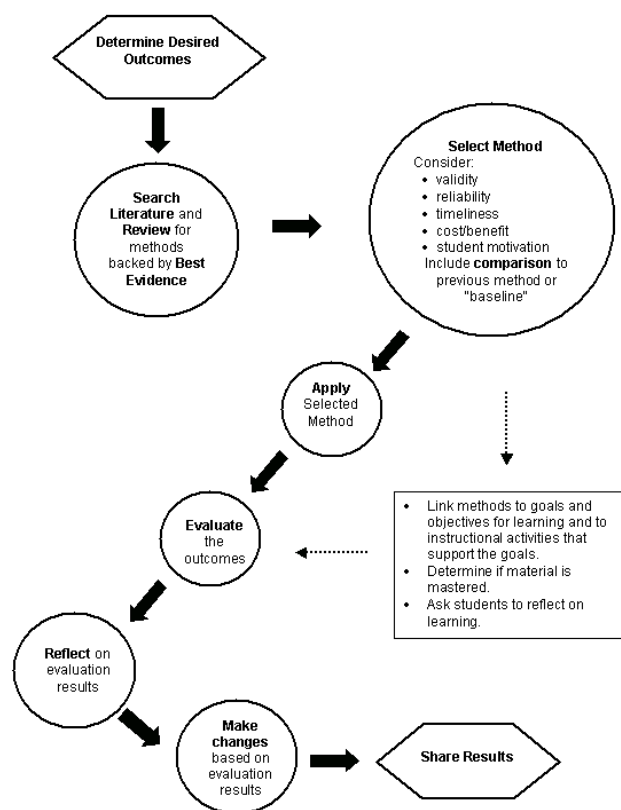


Figure 1. Application of Best Evidence approach to process of teaching

In the process of educating pharmacy students, the application of BEPE could involve an individual student, a course, or a program curriculum. The steps to applying BEPE to the process of teaching are diagrammed in Figure 1 and bear some resemblance to the 5 steps provided by Straus and Sackett for the practice of EBM.³² In the critical first step, the instructor must clearly articulate the desired educational outcome. This is not unlike the first step in research where the refinement of the research question is the initial activity.

Table 2. Journals to Search Manually for Sources of Best Evidence Methods

Title
Academic Medicine
Advances in Health Sciences Education
Assessment & Evaluation in Higher Education
British Medical Journal
Education for Health
Focus on Health Professional Education
Health Education Research
Journal of Interprofessional Care
Medical Education
Medical Teacher
Postgraduate Medical Journal
Teaching and Learning in Medicine

The second step would involve searching the literature for published information on the topic. This could include both the content topic and instructional methods of how to best teach the topic or develop certain skills in learners. The BEME Collaboration has published a guide for systematically searching for evidence that provides information on sources as well as tips on constructing the search.^{33,34} Both electronic and manual searches should be conducted. Examples of electronic databases to include in the search are Medline, ERIC (Educational Resources Information Center), PsycINFO, and International Pharmaceutical Abstracts. While electronic searches are fast and cover a large amount of material, the search terms used may not be those listed by the desired documents. In addition, the current electronic databases do not routinely include articles on educational strategies in the health professions.³³ Table 2 provides a list of journals to consider in the manual search. Internet sources containing reports on educational strategies should be incorporated in the search. A list of selected sites is included in Table 3.

A structured approach should be used in the review of publications. The British Medical Journal created a set of guidelines to evaluate educational interventions for publication.³⁵ Sections 2 through 4 of those guidelines could be used as the framework for a systematic review of the literature on the selected topic. Another

option is the QUESTS approach which was outlined in BEME Guide No. 1 and is described in Table 4.²⁰ It has been suggested that rating scales rather than dichotomous responses be used in the review process.³⁶

Another potential source of information could be methods used successfully by the instructor or colleagues in the past. In their commentary related to the online project, Greenhalgh et al concluded that in the educational setting one needs to be aware of the value of a wide range of evidence, from experimental to experiential, and know how to use each in its appropriate context.³¹ Hammersley has stated that professional experience should be analyzed as 3 areas: the sources, the relations, and the functions of the particular beliefs.³⁷ Keep in mind potential transferability of techniques; while the original application may not have been in pharmacy education or even a health-related field, the techniques may still be of value.

The third step would be the selection of the educational method, with a plan for application and means of evaluation. The educational method applied may be a hybrid of previous methods used by the instructor or colleagues and methods reported in the literature. Important factors to consider in this step include validity, reliability, timeliness, cost/benefit, and student motivation. The method should then be linked to goals and objectives for learning and to the instructional activities supporting the goals. In addition, a means to determine if the students master the material should be developed, and a process to allow students to reflect on their learning after using the method should be planned.

In the fourth step, the selected method and the associated evaluation would be applied to the course, curriculum, or individual student (as in the experiential setting). The fifth step follows with the evaluation of the student outcomes and the process. It is critical to have a means of outcome evaluation planned in advance that will compare previous methods or "baseline" with the new method. After the evaluation is the point for instructor reflection where the following questions could be asked:

Table 3. Web Sites With Information on the Evaluation of Educational Methods

Organization	Web Site Address
Association for Medical Education in Europe	www.amee.org
Best Evidence Medical Education Collaboration	www.bemecollaboration.org
Centre for Health Informatics and Multiprofessional Education	www.chime.ucl.ac.uk
<i>Education-line</i>	www.leeds.ac.uk/educol/
Institute for International Medical Education	www.iime.org
Learning and Teaching Support Network - Centre for Health Sciences and Practice	www.health.ltsn.ac.uk
Campbell Collaboration*	www.campbellcollaboration.org
What Works Clearinghouse*	http://w-w-c.org/

*currently has limited information related to higher education

Table 4. QUESTS Method for Evaluating Evidence in Educational Practice

Letter	Meaning
Q	Quality of the evidence from a design standpoint
U	Utility or the degree a method can be transferred and adopted
E	Extent or amount of evidence
S	Strength of the evidence statistically
T	Target or question addressed and how it was measured
S	Setting of the evidence in both context and population

- Was the desired outcome addressed by the new method? The mark may have been missed.
- Did the method of measurement measure the desired outcome? The mark may have been hit but it could not be measured accurately.
- Was the means of evaluation limited to one method? It hit the mark for the instructor but not for the students. Or hit the mark for one group of students but not another.

Future applications may require changes based on the evaluation results and reflection. Over time there may be a need to fine tune with small adjustments and of course to reevaluate. The final step in the sequence is the sharing of the experience with others.

Relationship of BEPE to the Scholarship of Teaching

Education scholar and current AACP President-elect JoLaine Draugalis has compared the differences between effective teaching, scholarly teaching, and the scholarship of teaching (and learning). One of her “take home” messages was “the scholarship of teaching is not synonymous with educational research or high quality

teaching.”³⁸ Based on the work of Glassick and colleagues “Scholarship Assessed: Evaluation of the Professoriate,” Draugalis described 6 standards of scholarly work as they apply to teaching: (1) clear goals, (2) adequate preparation, (3) appropriate methods, (4) significant results, (5) effective presentation, and (6) reflective critique. She further delineated the meaning of these standards by posing questions to assess whether the standard had been achieved. In essence, the scholarship of teaching is a scholarly, “scientific” approach to one’s teaching.

Mennin and McGrew explored the relationship between this notion of the scholarship of teaching and BEME. They applied the 6 standards of the scholarship of teaching to BEME and concluded the following: “BEME provides a systematic approach to the application and integration of evidence about teaching . . . and is therefore central to scholarship in teaching.”³⁹ (Table 5) Pharmacy education can adopt this same model for its own use to elucidate the relationship between scholarship of teaching and BEPE.

The use of evidence, whether in the content of one’s teaching and/or the process by which the content or skills are being taught, is an element of being a scholarly teacher. Evidence can be used to meet 4 of the 6 criteria: adequate preparation, appropriate methods, effective presentation and reflective critique. Ultimately, more “scholarly” teachers use evidence to enhance and improve their teaching.

A brief report of the 4 themes described above was distributed by the Task Force to those who were interested at the 2002 AACP COF Business Meeting. A lively discussion with attendees ensued regarding their ideas and further recommendations for the Task Force.

Table 5. Mennin and McGrew’s Application of Six Criteria for Scholarship in Teaching and Best-Evidence Medical Education³⁹

Criteria	Scholarship in teaching	Best evidence medical education
<i>Clear goals</i>	Clear, achievable measurable objectives	What is the target? What is being measured?
<i>Adequate preparation</i>	Up-to-date knowledge; identification and organization of an appropriate quantity and level of material specific to objectives	Find and evaluate the evidence for teaching methods How strong is the evidence?
<i>Appropriate methods</i>	Selection of appropriate teaching method(s) to effectively meet defined objectives; selection of appropriate methods to assess outcomes	Decisions about teaching practice based on best evidence To what extent can the methods be adopted? How close does the context or setting approximate?
<i>Significant results</i>	Measures of quality/effectiveness of presentation; demonstration of learners’ accomplishment of objectives	What is the extent of the evidence? How valid is the evidence? What is the effect of adaptation of the methods?
<i>Effective communication</i>	Making results/process available to colleagues	To what extent can the methods be transferred and adopted?
<i>Reflective critique</i>	Critical analysis of teaching activity that results in changes to improve	Teachers question their practice How good is the evidence/

Some of those recommendations included the following:

- Publish a bibliography
- Create guidelines for new faculty on conducting educational research: design, data collection, presentation, and publication
- Plan a Teacher's Seminar on the topic and discuss good and bad evidence
- Explore recent assessment projects by ACPE and AACP
- Include library scientists on the Task Force

Of these, the Task Force determined that the references for this paper serve as an initial bibliography, and additional representatives from the library sciences were invited to join the Task Force. The idea for a teachers' seminar on BEPE was put forth to AACP leadership. The task force plans to continue a probe of the membership for more ideas about how to initiate BEPE in the academy. Future ideas are also discussed at the conclusion of this paper.

ADVANTAGES AND DISADVANTAGES OF BEPE

Like any new idea, a thoughtful discussion of its advantages and disadvantages must occur before implementation. This section elucidates some of the pros and cons of BEPE in order to determine necessary recommendations for the academy.

In a recent American Educational Research Association (AERA) Distinguished Lecture, Robert Slavin speculated about the broad and enormous impact that rigorous educational research could have on the education enterprise:

This process could create the kind of progressive, systematic improvement over time that has characterized successful parts of our economy and society throughout the 20th century, in fields such as medicine, agriculture, transportation and technology. In each of these fields, processes of development, rigorous evaluation, and dissemination have produced a pace of innovation and improvement that is unprecedented in history. . . . These innovations have transformed the world. Yet education failed to embrace this dynamic, and as a result, education moves from fad to fad. Educational practice does change over time, but the change process more resembles the pendulum swings of taste, characteristic of art or fashion (think hemlines), rather than the progressive movements characteristic of science and technology. . . .^{40(p16)}

Slavin goes on to say, "The most important reason for the extraordinary advances in medicine, agriculture, and other fields is the acceptance of evidence as the basis for practice [emphasis added]. . . no physician would dream of ignoring the findings of rigorous research."^{40(p16)}

Although Slavin's message was directed at K-12

education, it is just as applicable to pharmacy education and other areas of higher and professions' education. For example, if there was a larger quantity of higher-quality evidence about curriculum design, admissions criteria and processes, and instructional methods that enhance learning, pharmacy educators could make objective decisions about these areas in their programs and individual classrooms. Basing their "practice" on evidence should bring about more successes and fewer failures, and greater confidence that they are doing "the right" thing with regard to their educational programs and individual instruction. Ultimately, evidence-based practice in pharmacy education would lead to improved student learning outcomes and positive change in the professional practice of pharmacy. A welcome side effect of this effort would be increased activity and acceptance of scholarship in education as a viable and important discipline.

Although the benefits of BEPE could be profound, the use of evidence in pharmacy education has its own set of challenges. First, is it known whether high quality educational research exists in the pharmacy academy? The AACP Rufus A. Lyman Award is a testament that indeed it does exist, but the award is given for one research project per year. With this in mind, where can additional evidence be found? Education, similar to medicine, is an extremely broad discipline; how can one find appropriate and quality evidence needed to make necessary decisions? What key words might one use to search? Which journals hold authors to the highest standards? Are there review articles that summarize or collate numerous individual studies? Are there national panels that also serve in this capacity and recommend guidelines for educational practice?

Even if the evidence were easy to find, how many pharmacy educators have a strong enough background in educational research to conduct a proper critique of the evidence? And since the current state of practice does not usually include a review of the literature prior to making changes to, or implementing, a program or course, who will actually take the time to review and use the evidence in practice? Once the evidence is found, unless the study population is strikingly similar to one's own population, how can we be assured that if similar "interventions" were implemented they would achieve similar results? A "one-size-fits-all" approach may not be successful. Related to these concerns, how many pharmacy educators would be able to conduct evaluations of their own educational practices and "interventions," let alone conduct the larger-scale studies needed to increase the pool of evidence from which to draw?

Lastly, where will funding for educational research in pharmacy come from? Slavin discussed the lack of

funding for educational research, but claimed that educators can do more to conduct rigorous, substantial studies that would capture the attention of policymakers so that funding would eventually be increased, similar to what has happened in other disciplines like medicine and agriculture.⁴⁰ He cited the latest governmental policies of “education reform” regarding the use of evidence in K-12 research and the large sums of money that are being offered to groups that use quality evidence as the basis for their programs. This is an example of a snowball effect: a few projects costing a few dollars eventually lead to additional, larger projects that take more resources to conduct successfully.

The challenges questioned and described above serve as the basis for recommendations for the pharmacy academy.

RECOMMENDATIONS TO THE ACADEMY ABOUT BEPE

AACP should embrace the movement toward best evidence pharmacy education and make it a key strategic priority upon which to focus initiatives. The process of internalizing the routine use of evidence in all aspects of pharmacy education will take more than just a paper or a few workshops. A cultural change needs to take place in which it is unconscious, expected, and valued that schools and individual faculty use evidence in the educational process just as they would in research or practice. Nonetheless, most broad-sweeping, high impact, life-changing efforts do not start out that way; they start with good ideas and committed individuals who are willing to dig in, take risks, and proceed with “baby steps” that lead to cultural change.

Educate the Educators

First and foremost, there is a need to educate the academy about evidence-based education and how it can apply to pharmacy. The Task Force’s discussion of the topic at the 2002 AACP COF Business Meeting started this conversation and this paper helps to continue it. However, AACP and other organizations to which pharmacy faculty members belong can develop programming and materials to move BEPE to higher levels. Examples of this are:

- Conduct special sessions and workshops to teach faculty members how to critique and conduct educational research, including the presentation and publication of their efforts. An example of this was a program on the scholarship of teaching at the 2002 Spring Meeting of the American College of Clinical Pharmacy.⁴¹
- Plan Teacher’s Seminars and/or AACP Institutes on BEPE
- Publish a series of papers in AJPE on “how to’s”

regarding the scholarship of teaching and educational research

Individual schools could mirror some of these efforts at the institutional or departmental level.

Cultural Change

Once the “education process” about evidence-based education has begun, a cultural change is underway. To continue to add momentum to this change, AACP should do the following:

- Encourage the Council of Deans and Council of Faculties to strongly emphasize to their members the importance and value of educational evidence and its use within programs and classrooms (including graduate education!)
- Develop rewards and recognition for those programs and individuals exemplifying the scholarship of teaching and the use of evidence-based education. The Innovations in Teaching Competition is an example of this.
- Analyze and encourage the development of school-specific specialists, centers, or departments in pharmacy education, similar to the model of medical education specialists and departments in schools of medicine
- Identify and develop funding sources to encourage individuals as well as collaborative groups to conduct educational research
- Continue and broaden the work of the Task Force to an association-wide effort, such as the creation of a special interest group (SIG)
- Utilize expertise within and outside of AACP to accomplish these efforts, such as the Association for Medical Education in Europe, the Carnegie Scholars Program, the University of California San Francisco Center for the Health Professions, and the Federation of Associations of the Schools of the Health Professions (FASHP)

The American Council on Pharmaceutical Education (ACPE) can also aid in the employment of evidence-based education by holding pharmacy schools accountable for using evidence in their decision making. Similar to “governmental policies demanding solid evidence of effectiveness behind programs and practices in our [K-12] schools. . .”^{40(p20)} ACPE should hold pharmacy schools to high standards with regard to the use of evidence in the design, implementation, and evaluation of their educational efforts. Slavin described a classification scheme used by the American Institutes of Research when it categorized education reform programs based on the quality of evidence used to support the program: strong evidence of effectiveness; promising marginal, mixed, weak, or no effects; or no research.⁴⁰ ACPE could “grade” pharmacy schools during accreditation visits on

the use of evidence in their programs or create new standards that would encourage schools to incorporate evidence into their day-to-day processes. Individual schools should make strides toward creating a culture in which the scholarship of teaching and educational research is learned, practiced, and valued. This could demand major changes in the traditional paradigms of some institutions. In the Kennedy et al AACP Excellence paper, "Developing and Sustaining a Culture of Scholarship," the authors stated:

The difficulty of measuring and rewarding teaching is complicated by the fact that most faculty received little or no formal training on the methods of teaching in their postgraduate programs. . . . Since they are not trained in the actual mechanics of teaching, it is often not practiced as a scholarly activity, but rather as a duty. . . . Those who are interested in the scholarship of teaching often receive little institutional support or reward and thus abandon the effort before dissemination in a peer-reviewed manner. . . . This contributes to the devaluation of teaching in the P&T process. Clearly P&T Committees should not merely reward the act of teaching, but rather they should recognize and value teaching that advances knowledge, stimulates active student learning, and develops lifelong learning skills in students. . . .^{27(p.10)}

The authors go on to recommend that colleges, professional societies, and accrediting bodies need to create rewards and incentives for faculty members engaged in the scholarship of teaching, as well as in other types of scholarship.

Individual faculty members should continue to develop their own scholarship of teaching and educational research efforts. Thankfully, the AACP, the *American Journal of Pharmaceutical Education*, and the *Journal of Pharmacy Teaching*, among others, provide excellent venues in which to showcase and publish individuals' efforts in the area of educational innovation in pharmacy. Those who feel inadequate in their abilities should collaborate with those with more expertise, both in and outside of their departments and schools. Individual faculty members can become members of the American Educational Research Association and dialog with others in the Education in the Professions division of the organization. The following are examples of areas in which evidence is sorely needed in pharmacy education and in which individuals can focus their efforts:

- Students
 - o Recruitment
 - o Admissions
 - o Didactic instruction: programs, courses, methods
 - o Experiential instruction
 - o Extracurricular activities
 - o Academic progression, graduation requirements

- o School-wide policies and codes
- o Outcomes assessment
- Faculty
 - o Recruitment
 - o Development
 - o Retention
- Administration
 - o Recruitment
 - o Development
 - o Retention
 - o School structures, organization, programs, policies

Model BEPE after BEME and Consensus Panels

On a larger scale, AACP and the BEPE Task Force should spearhead an effort to analyze the work of BEME and determine whether it is in the pharmacy academy's best interest to undertake our own efforts or perhaps better to join forces with the BEME Collaboration. The essence of BEME is that international groups of medical education investigators have organized and collaborated to identify research questions (such as what features or aspects of high fidelity simulations lead to the most effective learning, and what is the predictive value of assessments for school performance and future practice), and conduct systematic reviews of the literature to answer those questions. Additionally, there is an ongoing survey on the BEME Web site that requests topic areas to analyze, how educational evidence is used, and whether the responder would like more information or training about retrieving evidence.⁴² It seems obvious that the pharmacy education community could certainly benefit from not only BEME study results, but also from results of review studies conducted on the pharmacy education literature. One drawback of BEME-type systematic literature reviews is their extensive cost and resource intensiveness. It would behoove pharmacy education leaders to undertake a critical analysis of this kind of an approach to identifying best evidence before investing valuable resources to do so.

A similar effort could be initiated with the creation of consensus panels of experts. Slavin remarked about the impact of the National Reading Council and National Reading Panel on K-12 education, which "produced remarkable consensus on the state of the evidence."^{40(p19)} He went on to say, "Consensus panels of this kind, with deep and talented staff support, should be in continual operation on a broad range of policy-relevant questions so that practitioners and policymakers can cut through all the competing claims and isolated research findings to get to the big picture findings that methodologically sophisticated researchers agree represent the evidence fairly and completely."^{40(p19)} Although pharmacy education is an extremely small and

narrow subset of the education enterprise, it seems reasonable that the use of consensus panels or collaborative study review groups would help the evidenced-based education movement progress in academic pharmacy.

CONCLUSIONS

Although the challenges facing widespread implementation of Best Evidence Pharmacy Education are numerous and seemingly enormous, they can be overcome with agreement in the Academy that change is critical and necessary. On an intuitive level, as scientists and clinicians, we should embrace and demand the use of evidence in the other aspect of our jobs: teaching. Ignorance about how to do this can be overcome with education and open minds. Pharmacy should join in this movement while others in general and medical education are doing so; we can learn and make progress together. While the pharmacy academy may not yet embark on large-scale projects similar to those of the BEME group, it can certainly encourage and strongly suggest that evidence-based decision making should become a habit with all faculty members, regardless of conducting research, caring for patients, or teaching a class. Only with widespread and collective approaches can we realize the progression, development, and evidence-based impact of academic practice.

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REFERENCES

1. *Merriam-Webster's Collegiate Dictionary*, 10th ed. Springfield, Mass: Merriam-Webster Inc; 1997:402.
2. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ*. 1996;312:71-72.
3. Beck DE. Pharmacy educators: can an evidence-based approach make your instruction better tomorrow than today? *Am J Pharm Educ*. 2002;66:87-88.
4. EvidenceNetwork Web site. Available at: <http://www.evidencenet.org/home.asp>. Accessed July 8, 2003.
5. Evidence-based Education. Student Achievement and School Accountability Office, Office of Elementary and Secondary Education, US Dept. of Education Web site. Available at: <http://www.ed.gov/offices/OESE/SASA/eb/>. Accessed July 8, 2003.
6. Institute for Evidence-Based Decision-Making in Education Web site. Available at: <http://main.nc.us/edie/>. Accessed July 8, 2003.
7. Purkerson Hammer D. 2001 Rufus A. Lyman Award personal statement, AACP Banquet Program, Toronto, Ontario, CA. July 10, 2001.
8. Beck DE. Pharmacy educators: how can we be better tomorrow

- than we are today? *Am J Pharm Educ*. 2001;65:423-424.
9. Piascik P. What if we approached our teaching like we approach our research? *Am J Pharm Educ*. 2001;66:461-462.
10. Task Force on Best Evidence Pharmacy Education. 2002-03 AACP Council of Faculties Committee Charges. AACP Web site. Available at: <http://www.aacp.org/site/tertiary.asp?TRACKID=&VID=2&CID=57&DID=4738>. Accessed July 14, 2003.
11. Canada Health Action. Building the Legacy. Synthesis Reports and Issue Papers. Minister of Public Works and Government Services, Ottawa, Calif; 1997.
12. Kohn LT, Corrigan JM, Donaldson MS, eds. To Err is human: Building a Safer Health System. Washington: National Academy Press; 1999.
13. Robert G. Evans, as quoted in Canada Health Action: Building the Legacy. Synthesis Reports and Issue Papers. Minister of Public Works and Government Services, Ottawa, Calif; 1997.
14. Trinder L, Reynolds S, eds. Evidence-based Practice. London: Blackwell Publishing; 2000.
15. Greiner AC, Knebel E, eds. Health Professions Education: A Bridge to Quality. Committee on the Health Professions Education Summit, Institute of Medicine; Washington, DC: National Academies Press; 2003:45-6. Available also at: <http://books.nap.edu/books/0309087236/html/index.html>. Accessed July 14, 2003.
16. Best Evidence Medical Education (BEME). report of meeting – 3-5 December 1999, London, UK. *Med Teach*. 2000;22:242-245.
17. Harden RM. Editorial. *Med Teach*. 1998;20:501-502.
18. Petersen S. Time for evidence based medical education: tomorrow's doctors need informed educators not amateur tutors. *BMJ*. 1999;318:1223-1224.
19. Hart I. Best Evidence Medical Education (BEME). *Med Teach*. 1999;21:453-454.
20. Harden RM, Grant J, Buckley G, Hart IR. BEME Guide No 1. *Best Evidence Medical Education*. *Med Teach*. 1999;21:553-562.
21. Best Evidence Medical Education Web site. Available at: <http://www.bemecollaboration.org/>. Accessed July 15, 2003.
22. Campbell Collaboration Web site. Available at: <http://www.campbellcollaboration.org/index.html>. Accessed July 8, 2003.
23. Beck DE. Chair report for the Council of Faculties. *Am J Pharm Educ*. 2002;66(W Suppl): 35S-36S.
24. Rosenberg W, Donald A. Evidence-based medicine: an approach to clinical problem-solving. *BMJ*. 1995;310:1122-1126.
25. Sackett DL, Straus SE, Richardson WS, Rosenberg W, Haynes RB. Evidence-based medicine: how to practice and teach EBM. 2nd ed. Edinburgh: Churchill Livingstone; 2000.
26. Bond C, ed. Evidence-based Pharmacy. 1st ed. London: Pharmaceutical Press; 2000. Description available at: http://www.pharmpress.com/shop/mainframe2.asp?http://www.pharmpress.com/shop/product_display.asp?msessid=U5XBT2DQVUAR9L29ECCQ9LIDLX1DAE187&SiteLanguage=ENG&PageType=cat&productid=0853694362&productname=Evidence%2Dbased+Pharmacy. Accessed July 14, 2003.
27. Kennedy RH, Gubbins PO, Luer M, Reddy IK, Light KE. Developing and sustaining a culture of scholarship. *Am J Pharm Educ*. 2002;67; Article 92. Available at: <http://www.ajpe.org/aj6703/aj670392/aj670392.pdf>. Accessed October 27, 2003.
28. Kalantaridou S, Davis S, Calis K. Hormone Replacement Therapy. in Pharmacotherapy. A Pathophysiological Approach. 5th ed. DiPiro et al, eds. Stamford: Appleton and Lange; 2002:1491-1510.
29. Writing Group for the Women's Health Initiative. Risks and Benefits of Estrogen Plus Progestin in Healthy Postmenopausal Women. *J Am Med Assoc*. 2002;288:321-33. Summary available at: <http://jama.ama-assn.org/cgi/content/short/288/3/321>. Accessed November 1, 2003.
30. Berardi R. Peptic Ulcer Disease in Pharmacotherapy. A Pathophysiological Approach. 5th ed. DiPiro et al, eds. Stamford, Conn: Appleton and Lange; 2002:611-6.
31. Greenhalgh T, Toon P, Russell J, Wong G, Plumb L, Macfarlane F. Transferability of principles of evidence based medicine to improve educational quality: systematic review and case study of an

- online course in primary health care. *BMJ*. 2003;326:142-145.
32. Straus SE, Sackett DL. Using research findings in clinical practice. *BMJ*. 1998;317:339-342.
33. Haig A, Dozier M. BEME Guide No 3: Systematic searching for evidence in medical education - Part 1: Sources of information. *Med Teach*. 2003;25:352-363.
34. Haig A, Dozier M. BEME Guide No 3: Systematic searching for evidence in medical education - Part 2: Constructing searches. *Med Teach*. 2003;25:463-484.
35. Educational Group for Guidelines on Evaluation. Guidelines for evaluating papers on educational interventions. *BMJ*. 1999;318:1265-1267.
36. Norman GR. Reflections on BEME. *Med Teach*. 2000;22:141-144.
37. Hammersley M. Some questions about evidence-based practice in education. Paper presented at the Annual Conference of the British Educational Research Association, September 2001. Education-line. www.leeds.ac.uk/educol/documents/00001819.htm. Accessed June 3, 2003.
38. Draugalis JR. Career management and personal development: the scholarship of teaching as career development. *Am J Pharm Educ*. 1999;63:359-363.
39. Mennin SP, McGrew MC. Scholarship in teaching and best evidence medical education: synergy for teaching and learning. *Med Teach*. 2000;22:468-471.
40. Slavin RE. Evidence-based education policies: transforming educational practice and research. *Ed Res*. October 2002:15-21.
41. The Scholarship of Teaching in Pharmaceutical Education. 2002 Spring Practice and Research Forum, American College of Clinical Pharmacy, Savannah, GA, April 8, 2003. Program available at: <http://www.accp.com/02spring.htm#schedule>. Accessed July 14, 2003.
42. BEME survey. Available at: <http://www.bemecollaboration.org/survey.htm>. Accessed July 15, 2003.

Appendix 1. Glossary of terms commonly used in best evidence pharmacy education

GLOSSARY

Evidence-based decision-making (EBDM)

Systematic application of the best available evidence to the evaluation of options and to decision making in a variety of settings.

Evidence-based medicine (EBM)

Conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.

Evidence-based education (EBE)

Integration of individual expertise with the best available external evidence obtained through a systematic search in order to implement effective instruction.

Best Evidence Medical Education (BEME)

Implementation, by teachers in their practice, of methods and approaches to education based on the best evidence available.

Best Evidence Pharmacy Education (BEPE)

Implementation, by pharmacy teachers in their practice, of methods and approaches to pharmacy education based on the best evidence available.