ATHLETIC TRAINING EDUCATION JOURNAL

www.natajournals.org
ISSN: 1947-380X
DOI: 10.4085/120281

COMMENTARY

On the Need to Move Toward an Evidence-Based Athletic Training (EBAT)

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Evidence-based practice (EBP) is now a well-known paradigm for the athletic training (AT) profession. The Commission on Accreditation of Athletic Training Education accredited programs have required EBP as an explicit focus for professional education, and researchers are gradually producing insightful and relevant evidence concerning the education and implementation of clinically based EBP in educational programs. Likewise, many clinicians are attempting to incorporate EBP into their daily practice in order to guide and enhance patient care, and the Board of Certification has mandated regular EBP education in order to maintain national certification status. Although there remains much work to be completed before AT can claim to be a health care profession that is saturated with EBP, there is growing evidence of positive momentum toward that goal. However, the extent of EBP implementation remains limited to clinically based, patient-oriented outcomes. To date, there is little suggestion that the profession of AT has used an evidence-based approach for other related aspects of its professional practice. To that point, a multifactorial and more comprehensive model for evidence-based AT (EBAT) is presented with the intent of better situating and centering the potentiality for a larger evidence-based culture to inform and guide the AT profession's 3 critical subcomponents practice, regulation, and education. We attempt here to expand upon the paradigm for EBP as a precondition for an overarching, more inclusive EBAT model. To do this, we will introduce and interconnect 2 other critical aspects of professional practice: evidence-based regulation and evidence-based education. Alongside EBP, both evidence-based regulation and education are fundamentally interrelated and vital components of an effective, comprehensive, and progressive evidence-based profession of AT, or EBAT.

Key Words: Evidence-based practice, athletic training, policy, regulation, education

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Full Citation:
Geisler PR, McKeon PO, Medina McKeon JM. On the need to move toward an Evidence-Based Athletic Training (EBAT). *Athl Train Educ J.* 2017;12(2):81–94.

On the Need to Move Toward an Evidence-Based Athletic Training (EBAT)

Paul R. Geisler, EdD, ATC; Patrick O. McKeon, PhD; Jennifer M. Medina McKeon, PhD

> *So education often develops and changes simply on the basis of new ideas promoted with missionary zeal, new theories with very little evidential basis and the social and political values of the moment. Very often, ideas which have no evidential basis become so ingrained by constant repetition and reassertion that the emperor's new clothes almost seem to be real.*[1(p553)]

As it is currently on the precipice of what may be considered as the most profound evolutionary step in how it educates its future practitioners, the profession of athletic training (AT) is at a critical juncture in its relatively young history. Most obvious is the imminent transformation to the master's degree as the professional requirement for program accreditation and ultimate certification eligibility. Connected to the degree transition and associated curricular transformations are several critical questions surrounding the future not only of its professional practice, but so too about the future utility of postprofessional residencies, clinical doctorate degrees (DAT), and even traditional terminal degrees (PhDs and EdDs) in AT. Further, numerous state AT associations are diligently working to establish, strengthen, or clarify their practice acts in order to better reflect current practice trends. In so doing, many state associations are battling other professional associations, governmental constraints, and public awareness for their rightful place at the regulatory table. Nationally, our profession is still working to secure the federal recognition it deserves as a legitimate, nontechnician health care profession, an initiative not yet achieved despite recent educational and professional advancements.

Given these interconnected challenges facing the profession, AT is now encumbered with the responsibility to make substantial and influential decisions regarding where the profession is going, and precisely how it plans on arriving there. Given the substantial stakes involved and the current evidence-based emphasis in our larger health care sphere, policymakers, regulators, and leaders in the AT profession have much to think about and act upon if constructive and meaningful progress is to be achieved. Just as an evidence-based clinician must do, the leadership in AT has a fiduciary responsibility to weigh all proposals and strategic initiatives being considered for implementation with a dose of guarded skepticism. After securing relevant evidence germane to either clinical or educational practice in AT, a thorough and critical appraisal should be completed in order to assess the strength and application of that evidence before decisions are made or specific courses of action chartered.

Likewise, when appraised evidence is found to be weak or lacking in conviction or relevance, these evidentiary gaps should serve as impetus for the production of focused and structured scholarly inquiry toward filling those knowledge gaps. Given the complex and interrelated challenges involved with professional education and practice in health care, perhaps now is the perfect occasion for AT to heed its own call for evidence-based practice (EBP)? Better yet, perhaps now is the time for AT to think about becoming a more authentic evidence-based profession by reconsidering what it means to actually be evidence based. Given the current state that AT now finds itself in as it transitions to a new degree scope, shape, and structure, now is the time to listen, to look, to speak, and mostly to think about what it should do and how it should do it. To borrow from Jönsson's analysis of professional activities and its association with time, the AT body would do well to embrace the discursive opportunities that patience bestows upon the reflective and communicative body: "Concentrated, inspired conversation is a widely undervalued source of new knowledge, new feelings, new impulses."[2(p52)]

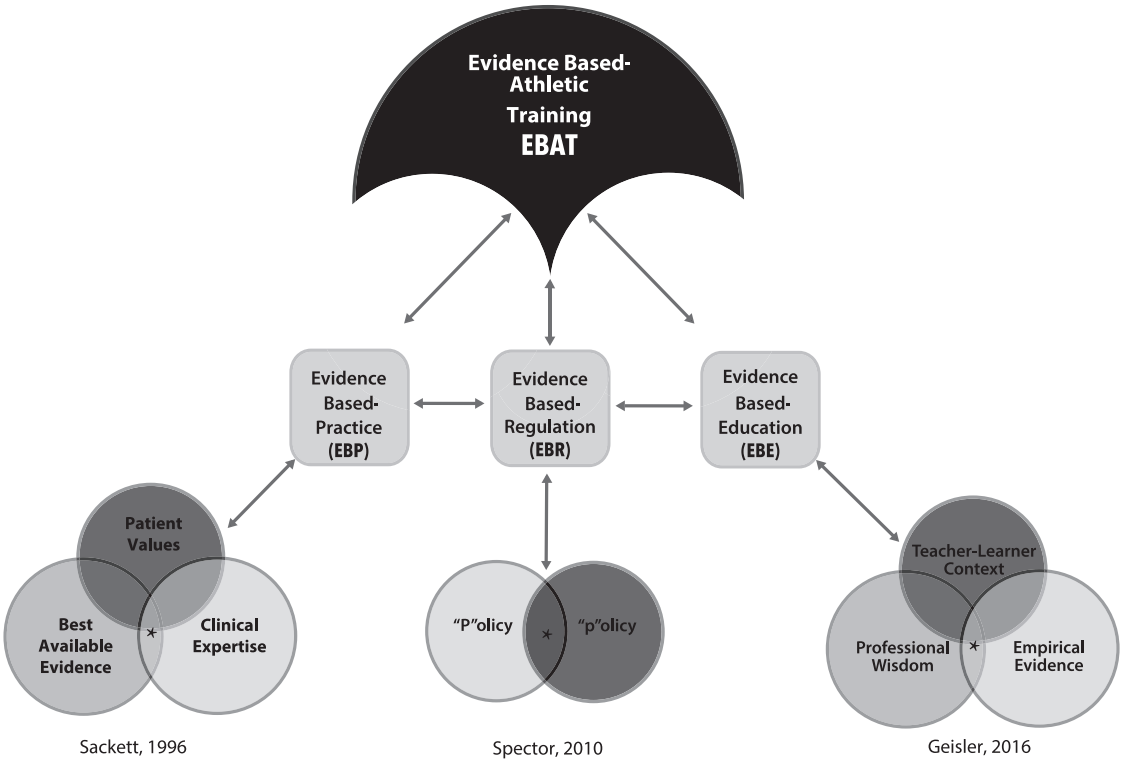
TOWARD AN EVIDENCE-BASED ATHLETIC TRAINING OR PROFESSION

The purpose herein is to introduce a multilevel model for an open, thoughtful, and guided endeavor for an evidence-based AT profession—*evidence-based AT* (EBAT). Evidence-based AT is a purposeful call that obliges practitioners, educators, administrators, and regulators in AT to reconsider their conception of EBP and to shift toward a more comprehensive approach to our practice, education, and professional design. We hereby challenge the AT profession to be more holistic, more self-critical, and more interconnected by adopting an EBAT tactic. Doing so requires for evidentiary practice to be at the core of all that AT does, not just select domains like clinical practice, and not at select and convenient moments in time.

Evidence-based AT urges all AT professionals to prioritize their ethical responsibility for securing, appraising, and generating evidence that is germane to all functional spheres of the profession. Conceptual guidance is perhaps necessary for addressing the critical educational and regulatory issues confronting the AT profession both today and in the future. The conceptual underpinnings and sentiment for EBAT are evident in medical educator Stewart Petersen's contention that "the evidence base is as important in educating new doctors as it is in assessing a new chemotherapy."[3(p1223)]

Figure 1 illustrates our EBAT paradigm and its primary subcomponents, each equally weighted and interrelated: *EBP*, *evidence-based regulation (EBR)*, and *evidence-based education (EBE)*. The tertiary level of EBAT (below EBP, EBR, and EBE) represents further operational subcomponents for each of the 3 primary levels, represented by familiar (EBP) and original (EBR and EBE) Venn diagrams. Inspired and adapted from an earlier model designed for evidence-based health care and its regulation, the proposed parachute model interconnects the 2 central tenets of any specialized profession (practice and education) with a dynamic and less considered third tenet, a fundamental keystone in the bigger model—regulation.[4] Spector's 2010 evidence-based regulatory model interrelated practice, policy, and education in a symbiotic design that underscored the systemic interdependence and critical reliance on feed forward and feedback loops between regulatory policies and practices that should both ideally be informed by evidence. In our self-tailored evidence-based model for the AT profession, we have expanded Spector's model in order to meet a different context and include the

Figure 1. Evidence-based athletic training. Adapted from Spector.[4]



larger scope of professional activity and responsibility specific to AT. In so doing, our model is analogous to and consistent with Spector's in that "all 3 realms inform each other and provide evidence for establishing health care policies," only in this case AT policies.[4(p30)]

WHAT DO WE MEAN BY EBP?

Most athletic trainers are certainly now aware of the 1992 triphasic model of Guyatt et al[5] for *evidence-based medicine* (EBM) consisting of judicious parts best available evidence, clinician expertise, and patient values, and subsequently made famous by Sackett's 3-circle diagram (see lower left, Figure 1). Developed by a large EBM working group of author-physicians mostly from Canada's McMaster University, the original model was an expansion upon earlier epidemiological work published by British physician Archie Cochrane in 1972[6] with the hopes of better grounding medical decision making by incorporating the best that medical research had to offer to clinical care, and to subsequently teach medical residents how to practice better by using an evidence-based perspective. When Sackett et al[7] published their oft-cited piece in the *British Medical Journal* better describing or operationalizing what EBM was and what it was not, the debate regarding levels or strength of evidence, the role of the clinician, and the impact that context had in decision making was on. Responding to early criticism that the nascent EBM paradigm was too rigid and too empirically based because it prioritized higher levels of evidence at the marginalization of others, and thus, it was too dismissive of clinician expertise and other forms of knowing regarding the clinical context and authentic patient centeredness, Sackett et al underwent great pains to better define what EBM was originally intended to be—a modest guide for incorporating scientific findings into daily practice, not a rigid, hierarchical, and autonomic decision-making device void of human interaction.

In responding to critics, Sackett et al clarified that EBM was intended to be a balanced, organic, and contextual integration of all 3 components that make up the famous Venn diagram. Further, the response from Sacket et al articulated that a quality of judgment that can only be acquired with advancing expertise and that a certain level of proficiency in doing so was required for any true evidence-based practitioner. As numerous others have done since,[6,8–11] Sackett et al articulated that expert clinicians routinely use a combination of internal (individual clinical expertise) and external evidence (from experimental research) in the context of compassionate respect for and incorporation of individual patient rights and preferences. Sackett et al were also clear to express that EBM was by no means intended to be restricted to high-powered, Level 1 evidence at the expense or exclusion of other levels of evidence. In fact, early amendments to EBM justly emphasized the very human nature of EBM. According to Sackett et al, effective and judicious EBM necessitates the procurement and wise use of the best external evidence for the clinical problem at hand, all in consideration of the particular context relevant to the patient, space, and time:

> *External evidence can inform, but can never replace, individual clinical expertise, and it is this expertise that decides whether the external evidence applies to the individual patient at all and, if so, how it should be integrated into a clinical decision.*[7(p71)]

In recent years, several scholars and educators in AT have taken up the EBM baton in order to provide structure and guidance for its implementation for both clinical practice and educational instruction (though, mostly for subsequent clinical practice).[12,13] Although Sackett et al attempted to

better situate the sticky and limited nature of external evidence by highlighting the role of the clinical expert and minimizing a blind allegiance to high-level research, they may have failed to capitalize on fully defining the flipside of external evidence—internal evidence.[7] McKeon and McKeon[11] have done just that for athletic trainers by elaborating further on the critical role that clinical expertise plays in the EBM model and by specifically positing clinician-knowledge production as internal evidence. The idea of *internal evidence* is simply this—an equal and contextually relevant component of the clinical encounter that better situates the subjective and experiential nature of and connection between patient-generated evidence and clinician expertise.[11] In so doing, the McKeon and McKeon's articulation of the organic dualism between internal and external evidence highlights the need for and role of advanced clinical reasoning and clinical expertise in the generation of other forms of knowing or evidence in the duties of clinical practice, a proposition that extends beyond the daily clinical decisions made by athletic trainers on behalf of their patients and into other realms of AT practice. For any medical or health care profession, the practice comprises far more than the day-to-day clinical services component; the complete practice of a profession also involves aspects of regulation, policy, and education.

EVIDENCE-BASED REGULATION: THE KEYSTONE THAT IS POLICY

In responding to the challenges facing the nursing profession in the early 21st century, including rising accounts of fraudulent education and disciplinary complaints against nurses, Spector gave notice that "boards must be aware of innovations that are ineffective," and further that "the time is ripe to focus on [EBR]."[4(p30)] Though there is no uniform definition for EBR, Spector's comprehensive review informs us that EBR relies on "high-quality information from a variety of sources in order to make decisions," and can both start and end with a simple question for policymakers that also rings true with AT clinicians engaged in EBP—what works?[4(p32)] In action, EBR requires policymakers and regulators to secure, appraise, and incorporate relevant evidence before, during, and after strategic planning or policy implementation. In the vein of the EBP model of Sackett et al, EBR is also considerate of and commensurate with varying levels of evidence (both internal and external, across the hierarchy of evidence), clinician (regulator) expertise, and patient (constituencies) values.[7] In considering Spector's EBR and its application to AT, perhaps we should consider 1 fundamental question pertaining to change and progress: "How might regulators use evidence when making decisions?"[7(p34)]

As depicted in our EBAT model (Figure 1), EBP, EBR, and EBE are inextricably linked; all are of equal importance and relevance, and all operate along a fluid, 2-way spectrum of interdependent and systems-based relationships. Like all dynamic systems, the smaller components of the larger system are interrelated, interdependent, and integrated components of the larger, more complex system. The behavior of any part of the system is both dependent upon the other parts and, in turn, directly impacts the behavior of the other component parts. Specifically, the subcomponents of the AT profession (practice, regulation, and education) are dynamically interconnected components of a larger, complex, fluid, and dynamic system, and true to systems theory thinking must be appreciated as an integrated whole.[15] Athletic training is indeed a complex system, and as such, dysfunction or inferior performance in any 1 subcomponent of the larger system will directly impact the subcomponents of the larger system, often in unpredictable or immeasurable manners.

Evidence-based regulation is the critical and determinate 2-way intermediary between practice and education in AT; changes in practice will effect education, and likewise, deficiencies or alterations in education will invariably impact professional practice. Connecting the 2 chaotic and fluid poles of practice and education lies policy, or the how and why of both doing and learning. From the perspective of practice regulation, AT has existing and emerging policies that drive several aspects of its clinical practice, including the many evidence- and consensus-based policies that direct standards of clinical care. Athletic training best practices are readily identified and available today; the role of preparticipation screening, the proper management of suspected cervical spine injuries, and the proper way to manage exertional hyperthermia are excellent examples. The National Athletic Trainers' Association (NATA) position and policy statements for clinical-patient care are based on the latest extrapolation of available evidence and expert opinion, thus (1) supporting one of the original intents of EBP and (2) serving as welcome information for education programs and practitioners. Clinically, these examples are outstanding representations of AT's maturation as a credible, evidence-based health care profession. These examples serve as evidentiary pillars of professional practice and competence in AT and serve as exceptional sources of internal (expert authors) and external (objective data) evidence designed to guide professional domains of practice.

Like all professional programs in health and medicine, AT has numerous regulatory bodies and mandated policies that exert considerable control over the professional body. For example, the Commission on the Accreditation of Athletic Training Education (CAATE) constructs, implements, and enforces policies intended to guide educational practices and ensure quality for all accredited educational programs; the NATA has a Code of Ethics to regulate professional and student practice; and the Board of Certification (BOC) publishes and adheres to numerous policies and regulations which dictate certification candidacy and the requirements for maintaining professional certification. Lastly, 48 states currently have specific practice acts to regulate the legal and ethical practice of athletic trainers in those states. In some areas in EBAT, the interconnected relationships and dynamics between practice, regulation, and education are indeed evidence-based. For example, extensive psychometric data is used to construct, assess, and validate the AT credentialing exam owned by the BOC, and role delineation studies have long been used to help structure and dictate required educational content in accredited educational programs. However, there are gaps that exist in these connections, as well.

In returning to Spector's rhetorical challenge ("How might regulators use evidence when making decisions?"), we might find potential inconsistencies in the application of an evidence-based approach by considering how evidence has been used in other domains or aspects of professional practice. For example, an ongoing debate in the profession centers

around the actual best evidence buttressing the master's degree requirement for AT.[16] Although the point of the current paper is not to reargue the 2013 decision by the NATA's Strategic Alliance, a brief commentary is warranted in order to better connect those events and actions to the concept of EBR. In particular, many AT professionals have questioned the objectivity, strength, or contextual relevance of much of the evidence presented to support the degree change proposal. For example, many educators took exception to the reporting of the differences in BOC examination pass discrepancies (". . . current professional masters programs are more likely to meet the passing rate standard and obtain high total scores than undergraduate programs"[16(p7)]) between the low number of entry-level master's degree programs and the much higher number of entry-level undergraduate degree programs. Although the external evidence (national data from the BOC) may support a slight advantage in first-time BOC pass rates, the internal evidence from dozens of undergraduate programs with first-time pass rates close to or equaling 100% would suggest that the issue is contextually dependent and not as objective or revealing as the degree paper indicates. On a more nuanced level, the frequency with which the degree white paper used hopeful, hypothetical, and possible verbs and adverbs to describe the potential benefits of the degree change was quite remarkable, given the relatively low level of objective evidence used to support the arguments contained within. As the master's degree is now a reality and the details for the transition emerge, the AT profession might do well to follow Harden's "Best Evidence Medical Education" (BEME) guide:

> *Best evidence medical education occurs when decisions relating to teaching are taken with due weight accorded to all valid relevant information. . . the approach described also has immediate relevance to the planner or educational administrator, and provides them with a powerful tool to move forward the [BEME] agenda.*[1(p561)]

What does current evidence say about best practices in health care education curriculum design, clinical education and supervision, the development of competency and expertise, or professional education outcomes? Is there strong evidence to suggest that requiring all professional knowledge to be taught at the graduate level will be superior to current mechanisms, whereby early exposure and progressive learning are hallmarks of professional education? Of what value is the surplus of internal data from high-performing undergraduate programs demonstrating excellent outcomes and professional success? Wherever possible, relevant, and contextually applicable, internal and external evidence should be secured, assessed, and consulted and done so in the same vein in which the profession operates on clinical levels. If relevant evidence on these complex and critical issues is unavailable, or if the evidence available (from other fields) is not malleable to the AT profession, open conversations with stakeholders and directed research should be initiated toward before broad-based or sweeping policies are implemented.

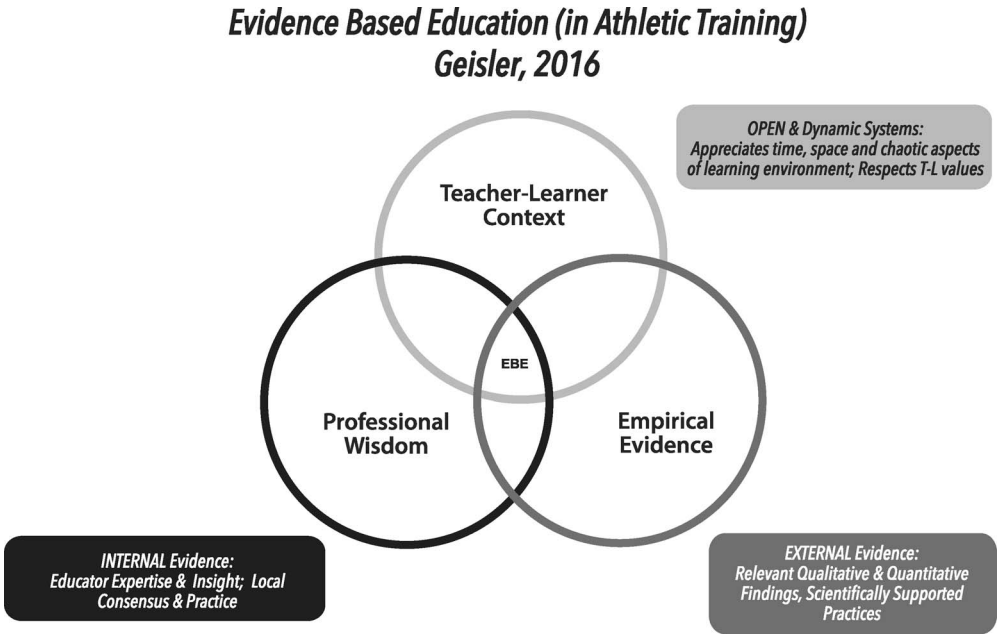
LOCAL AND GLOBAL REGULATION: BIG-P AND LITTLE-P POLICIES

Satterfield et al highlighted multiple levels of a *transdisciplinary EBP* in stating that EBP "seeks to increase the effectiveness and efficiency of policy,"[8(p385)] and in so doing entails both big-P policies and small-P policies. This includes formal laws, rules, and regulations (big P) and organizational guidelines, and social norms guiding behavior (small P). Within EBR (for AT), we can play with small and capital letters according to the precedent of Satterfield et al and the description of Harden et al[1] of BEME. Within EBR (for AT), we can apply the precedent of Satterfield et al and the description of Harden et al of BEME to AT. The big P represents the numerous policies, procedures, and rules induced by larger entities such as state regulatory boards, the NATA, the BOC, and the CAATE. Meanwhile, the little P represents smaller, personal, and more local regulations and policies, typically enforced at institutional, programmatic, and personal levels in which athletic trainers practice their craft as clinicians, administrators, and educators. This fundamental differentiation for the many big-P and small-P policy influences are together apt representations of the various external and internal factors that influence the many interrelated duties of our professional work, especially at the educational level.[8]

As the CAATE now owns and distributes both the required content (knowledge, skills, competencies, etc) and the directives (standards and guidelines) for all accredited institutions, it has clear and definitive regulatory control over the policies that govern and guide the educational apparatus. Given its critical and central position in the EBAT spectrum and utility in ensuring educational quality, the CAATE can be considered as a primary big-P regulator of both practice and education in AT. Given that CAATE accredited programs must soon develop essentially brand new undergraduate (preprofessional) and/or graduate (professional) degree curricula (for those transitioning to a 3:2 institutional model) in order to be compliant with the new standards, there are likely many more questions that need to be addressed than there are answers in existence. The following matters represent just a few of the significant policy-related and education-based items that fundamentally require a critically informed appraisal and an informed academic conversation:

1. Pedagogical and curricular design issues—what curricular design is more effective for AT education (a 2:3, 3:2, or 4:1 sequence)? Is there evidence to support the proposed 3:2 curricula as superior to other models? How might the required design impact teaching and learning or program outcomes? How might the proposed design impact individual programs' autonomy or stretch available resources? How will imposed designs affect past successes and accomplishments, supported by local or internal evidence?
2. Specific learning outcomes—toward what ends should AT design its curriculum; what are the precise learning and professional goals that should be targeted for a master's degree in AT? How do the master's AT degree outcomes differ from current bachelor's degree outcomes and measures?
3. Athletic training's professional scope of practice and body of knowledge—should we or can we expand what we actually do as professionals? If expanded via the new master's degree content requirements, what are the implications for professionals in practice, as well as the many AT educators charged with delivering the new material?
4. What are the pros and cons of competency-based education (CBE)? Is CBE the best way to produce

Figure 2. Evidence-based education (in athletic training; Geisler 2016).



professional expertise in AT; are there other models and modes? What does the evidence say about CBE, especially in AT? Given that current curriculum proposals are centered on content and not necessarily professional expertise, how are programs intended to design their program assessment?

5. Is there a role for entrustable professional activities and milestones in graduate AT education? They are used in graduate medical education to promote competence and autonomy; do they have potential utility in AT education?
6. What are the benefits and challenges of clinical supervisory polices? Is direct supervision the most effective way to develop future clinicians, or do other practices exist that better promote competence?
7. As clinical reasoning is a required cognitive skill set for health care practitioners (as part of a larger skill set of medical cognition), what are the evidence-based ways to develop advanced medically based thinking in AT?
8. How does AT education best develop clinical expertise in its future clinicians? What are the characteristics of expertise in health care providers, and how might this evidence inform what AT education does to promote clinical experts?

Policy (big P and small P) and regulation is a 2-way street, which must be informed by and informative to both education and practice. Therefore, big-P policy cannot exist in a vacuum, lest issues, such as those described above, arise and challenge the stability of the system it operates within. Many of these issues have already been studied by medical educators in respect to their respective domains and led to findings that have influenced or dictated educational policy and practice in the making of physicians. In 1999, both the *British Medical Journal* and *Medical Teacher* made just such a call, publishing 2 editorials that called for evidence-based medical education and publishing its first (of 43) BEME guide,[1,3,17] Given the obvious connections between many aspects of medical and AT practice (diagnostic and therapeutic reasoning, compassion, reflection, professional behaviors, clinical care, clinical competencies, expertise, etc), there are assuredly some contextually relevant evidence-based initiatives that AT can borrow or adapt from medicine.

EVIDENCE-BASED EDUCATION

Depicted in the lower right-hand corner of the EBAT graphic (Figure 1), the EBE component was informed by multiple sources, including the guide of Harden et al[1] for BEME, a speech-language pathology and audiology text on EBE,[18] and various sources from the larger field of education.[19–23] Close inspection of EBE (Figure 2) reveals the features specific to AT—a Venn diagram respectful of open systems theory (relative to education),[24] the critical and fluid interplay between internal and external evidence,[11] and the context-specific nature of EBE from health care and social science.[25] Evidenced-based education is as necessary to the professional education in AT as it is for any other educational endeavor, but it is also critical because of the immediate relationship and interdependence to both big-P policies and little-P policies by extension.

Because evidence production, interpretation, and application in the educational domain are somewhat different than more traditional scientific or clinically based evidence production, it is shaped by greater complexity, challenges, limitations, and uncertainty. Therefore, we cannot simply or naïvely adapt a standard EBP model to the educational domain and expect the same utilitarian effects.[1] Due to the multifactorial and more subjective nature of behavior, the human subject, and the mind, it is much more difficult to conduct randomized controlled studies in educational contexts. Appreciated as such, research findings from educational studies are inherently more difficult to apply outside of the context in which they were studied, especially when the data tend to be more qualitative in nature.[21] In light of these inherent challenges (subjectivity, context, etc), noted medical educator Geoff Norman[26] has recently argued that we must be skeptical of any grand narrative presented on behalf of medical education, wary of claims made on behalf of authority and truth regarding the right or proper way to educate. Accepting that

educational research inherently possesses greater levels of uncertainty and subjectivity simply indicates that there are multiple truths, countless objectivities, and numerous possibilities to consider and that context, time, and space must play greater roles in the interpretation of research findings from the educational world. Translating this sentiment to the work of professional health care educators, this means that scientific work in education has to be approached differently than the work used to generate EBM in order to use educational evidence as part of a larger EBP. Our EBE model is designed to respect and incorporate the more nuanced, contextual, and fluid nature of educational research and practice. As is presented, EBE in AT prioritizes the chaotic, systems-based, and human-centric nature of the educational relationship between educator and pupil both in content and architecture.

EVIDENCED-BASED EDUCATION IN HEALTH CARE FIELDS

The BEME guide of Harden et al[1] challenged readers to embrace educational research with the same vigor and intent as clinical science. The approach of Harden et al with the BEME was threefold: this publication (1) reviewed the fundamental differences between harder, objective research in the clinical sciences and the softer, more subjective nature of educational research; (2) defined the concept of BEME; and (3) offered specific guidelines for evaluating, grading, and implementing meaningful research findings. As part of this landmark paper, the authors introduced their own hierarchy of evidence ratings for evaluation purposes and highlighted a unique and multidimensional approach for grading evidence known as the *QUESTS Dimensions*. Consisting of 6 levels, the QUESTS dimensions highlight the various tensions and challenges associated with assessing educational research findings, including the quality, utility, extent, strength, target, and setting of the research findings being considered for implementation.

In the BEME of Harden et al, it is intended that "the culture or ethos is such that teachers are encouraged to question their practice, to look for the best evidence available, to relate the evidence to their own situation and to apply their professional judgment."[1(p555)] Evidence-based education for AT is intended to honor and inspire the ethos and spirit of the first BEME report by intentionally allowing for greater spaces and contexts to be at the center of scientific inquiry and application in AT.

The lower right circle of the EBE model, empirical evidence, is analogous to the original EBP inclusion of the best external evidence by Sackett et al,[7] and because it connects directly to the human aspect of education, to behavior, the mind, transformation, it is inclusive of both qualitative and quantitative findings regarding teaching, learning, curriculum design, assessment, and other complex aspects of professional education. The lower left circle, professional wisdom, is a combination of McKeon and McKeon's[11] notion of valuing the production and significance of internal evidence, the suggested ethos of Harden et al,[1] and the original EBM working group's emphasis on individual clinical expertise. Collectively, the delicate and contextually relevant interplay between professional wisdom and empirical evidence indicates that reflective, committed, experienced, and well-informed educators have a vital and local role in the educational processes of the system within which they work. As Harden et al put it, "relevant evidence, however, may not come from formal experimental or quasi-experimental research studies but from professional experience and professional judgment. In education, these may be important sources of evidence."[1(p556)]

The third and final circle labeled teacher-learner context is intentionally placed on top of our EBE model in order to prioritize the contextual, subjective, and idiosyncratic aspects integral in the ever-evolving and fluid teaching-learning relationship, including the myriad human dynamic factors that define the educational experience.[26] The often unpredictable nature, background, state, and abilities of the central players in education at any given time or space—the educators and the students—requires a prioritization of the human context and subjectivity.[18,20,21] Not intended to cover the mammoth collection of theoretical, anecdotal, or evidentiary information available on the many aspects of the educational endeavor and experience—teaching, learning, curriculum design, planning, evaluation, outcomes assessment, or effectiveness—our EBE model is intended to represent a parallel and contextually relevant model for AT educators to consider as a guiding principle for framing their work as educators, administrators, and preceptors.

EVIDENCE-BASED EDUCATION EXTENDS BEYOND THE CLASSROOM

In an opening editorial to the BEME piece of Harden et al[1] in *Medical Teacher*, Editor Ian Hart[17] made a concerted call for EBP to also be applied to the business of educating physicians. He recalled raising the question a year earlier at an international meeting as to why the medical education field had "never attempted to emulate something like the [EBM] approach now commonly advocated in medical practice."[17(p453)] To that end, he proposed a 2-pronged approach to EBE that, in his view, would improve both educational and patient-based outcomes because of the inherent interconnections between education and policy that drive medical education. Hart's[17] prescription for a best evidence approach to issues germane to medical education forces the educationalists to (a) comprehensively and critically appraise existing literature and to categorize the power of such evidence, and (b) to identify gaps and flaws in the existing literature and, in so doing, make specific calls for appropriately designed studies to generate evidence that may be capable of supporting educational practice and policy. The BEME piece of Harden et al reiterates Hart's challenge for filling evidentiary gaps and takes it one step further by admonishing those who may be resistant to be an evidence-based educator: "lack of evidence should not be used by teachers as an excuse for a failure to adopt an evidence-based approach to their teaching practice."[17(p554)]

The reality is that strong and reliable evidence in the educational realm does exist in many areas, both from within and beyond the AT body of knowledge. We just need to look and, more importantly, want to look. Athletic training educators do in fact know what works and what does not in the AT classroom, lab, or clinic. Excellent research has emerged from AT scholars concerning the role and measurement of clinical reasoning, the efficacy of using objective structured clinical exams to assess competence, and the barriers that obstruct the teaching of EBP (and ways to better teach EBP), amongst other areas of inquiry. However, there is much more to know and seek to know, and there is much more that is as of yet unknown as we move into the master's

degree era. For example, AT administrators and educators know very little about the impact that the direct supervision policy has had upon professional competence, the most effective ways to teach clinical reasoning in preprofessional students, or how the formal implementation of EBP may or may have not impacted our professional practice (to date).

LINKING EVIDENCE-BASED EDUCATION TO EVIDENCE-BASED ATHLETIC TRAINING WITH EVIDENCE-BASED REGULATION

Our intent is not to provide a comprehensive review or analysis of all empirical evidence in AT education, for there is a plethora of valuable information now available for interested minds. Rather, the point of EBAT is to highlight the many areas and issues that we have little evidence for or about and to appeal for more connections between evidence-based work and our educational mission when we do have evidence that will be of assistance, even if it is not from the world of AT. Evidence-based education is a critical and connected subcomponent of the larger concept of an EBAT and thus is centrally related to the idea of EBR (and policy) and, by extension, EBP. Evidence-based education explicitly calls for our AT educationalists (derived from *medical educationalists*, coined by Professor of Medical Education Stewart Peterson[3]) to inform not only our clinical practice by working to produce competent, entry-level clinicians, but also our educational policy that governs how we work, what we do that counts as work, and what we become as a profession. By extension, EBAT calls for all policymakers (regulators) to seek out and assess relevant evidence that may be capable of informing or constructing future education-based policies and regulations. As Hart expressed in his 1999 editorial (demanding an evidence-based medical education system), "it has to be better than making expensive decisions regarding new educational initiatives based solely on intuition and a warm fuzzy feeling that it seems like a good idea."[17(p453)]

As of this writing, the future accreditation standards and content for all professional master's degree programs have been proposed by the CAATE and are currently undergoing assessment, criticism, and editing by the professional body. In time, these working constructs will be fashioned into final documents that will authoritatively regulate the processes and procedures for all entry-level educational programs in the profession.[27,28] Given the complex task of scripting the new professional degree requirements and the educational content at the same time, and given the responsibilities and challenges associated with doing so in consideration of the profession's future position in the health care field, our EBAT model brings to light the necessity for directly linking EBR to EBE so that "good policy can be made from high quality information."[4(p33)] For policymakers and regulators involved in reshaping and redefining the educational processes and professional knowledge and skills for athletic trainers and AT educators alike, EBAT elucidates the fundamental and critical relationships between EBE and EBR that parallels the same interdependent nature found in other health care professions.[8]

PROPOSED POLICY CHANGES: IS RELEVANT EVIDENCE AVAILABLE?

The first iteration of the proposed accreditation standards for the master's degree in AT include among other things propositional policies (also known as standards) for (a) required basic science instruction in physics, chemistry, and biology; and (b) specific interprofessional education (IPE) across the curriculum, didactically and clinically.[28] On some levels and for proponents of these ideas, these proposed standards are somewhat logical, contain degrees of expert-based insight, and even have a bit of historical precedent and appeal from other health care education policies and practices. To be sure, both have some level of evidentiary support and precedence, and neither is outwardly counterintuitive for a professional health care degree intended to develop professional health care providers. The AT master's degree white paper articulated the theoretical basis for the inclusion of more basic sciences (citing a 1995 report from the Pew Health Professions Commission as the chief source of evidence to support the "need for more basic science education in AT programs"), although it did so in a somewhat hopeful and speculative manner by stating that it "should make it easier for students to connect new knowledge to current understanding, and then adapt this knowledge to specific clinical situations," and by providing a slight modicum of scholarly support for the contention.[16(p12)] In making the argument for IPE for graduate AT programs, the white paper declared that "professional education at the graduate level removes many barriers to IPE," and spent a majority of time and space addressing how much easier it will be to incorporate IPE programming at the graduate level, rather than presenting specific and contextually relevant evidence to support the need for and vision of IPE in graduate AT education.[16(p12)]

WHAT DOES THE EVIDENCE SAY ABOUT BASIC SCIENCE EDUCATION?

Requiring future athletic trainers to take more basic sciences in their early education is on some level evidence based (logical on the surface and with historical precedent), as this has been standard practice for many of our colleagues in medicine, physical therapy, and physician assistant education for up to a century. In medicine, it was the year 1910 when William Flexner borrowed from German medical education and the system already in place at Johns Hopkins University to scientifically reinvigorate the medical curriculum that still exists in large part today—2 years of foundational and isolated laboratory science, followed by clinical training.[29] As Sibbald and Neville adeptly summarize in their commentary on "100 years of basic science in medical education," the impetus for Flexner's curriculum was to "gain public trust through academic rigor," and for basic science to become "an aid to protect and preserve professional autonomy."[29(p136)] Duffy's more comprehensive review of Flexner's legacy reflected the alarms of infamous medical educator William Osler who was gravely concerned about further separating the "science from the patient," inciting Duffy to express concern over medicine "losing its soul at the same time its body is clothed in a luminous garment of scientific knowledge."[16(p275)] Clearly, current regulators in AT are of the belief that adding more science to the AT curriculum (precurriculum, actually) will add more rigor, increase professional credibility, and in turn, produce better clinicians, but will this be at the expense of "losing our professional soul?"

Despite the theoretical basis for the impression that more science equals better clinicians and a more rigorous, scientifically based profession, a review of a considerable and

growing body of medical education literature on the role of the basic sciences reveals that this curricular assumption may not be as clear cut and logical as originally purported. From an EBR, can AT policymakers confidently state that a mandate for additional basic science preparation in the preprofessional curriculum will significantly impact professional educational outcomes and the development of better athletic trainers? An evidence-based appraisal of the available evidence (from medicine) directly challenges those impressions, and for some scholars in AT education, the answer may indeed be surprising. Although there are indeed aspects of the physical and life sciences embedded in much of what athletic trainers (and physical therapists, medicine, etc) do clinically, we were unable to find even 1 study conducted in AT that provides evidentiary insight on the impacts of basic science education on educational or professional outcomes in AT. The same goes for physical therapy—despite the well-known tradition for physical therapy education programs to require anywhere between 24 and 30 credit hours of basic sciences in their prerequisite curricula, we could find no evidence as to the specific value or role of those classes in professional knowledge, competence, or expertise.

In medical education, numerous studies have already discovered that basic science education in undergraduate or preprofessional education of physicians is a mixed bag, at best.[30–37] In what may seem as counterintuitive to some, incredulous to others, basic science education has been found to impart a limited and varied impact on the clinical knowledge and competence of physicians because of both the nature and the nurture of its presentation and consumption. In short, a large portion of the content from the basic sciences is irrelevant to medical practice (content), rote memorization is often the mechanism by which medical students learn all of the basic science information which leads to poor retention and application, and much of the irrelevant components are generally not transferrable from one domain to the next (nurture) due to the manner and timing with which they are taught.[38] In fact, it has even been found that various stakeholders in medical education disagree on what is considered a basic science, where and how the social sciences fit, and whether or not communication skills are in fact more important than anatomy knowledge.[39] In other words, it takes much more than 2 years of Flexnerian exposure to scientific facts, figures, and rules to equate to that knowledge to clinical understanding, patient context, or professional expertise. Much as it was disproven by Thorndike in 1923 that a "mastery of Latin would automatically transfer to greater learning and abilities with all languages later in life," the paradigm suggesting that more science equals better physicians is being challenged by many medical educators for its veracity and objectivity.[40(p55)]

It has been repeatedly demonstrated in medical education that the *integration* and *transfer* of basic science principles and concepts into clinical contexts is far more important and meaningful than the ability to recall facts, figures, and laws that were learned in isolation years prior, out of context, and without connectivity to clinical knowledge.[30–42] What medical educators have found repeatedly is that they must often reteach the basic science facts that are indeed relevant to the medical knowledge at hand and that they must do so in much more enriched and meaningful manners—they must connect the relevant biosciences to the clinical sciences in order for it to be significant and, thus, of practical utility.[43–46] A very recent study published by Lisk et al[47] reveals both the meaning and applicability of such findings for AT with their exploration of cognitive integration of basic science with diagnostic reasoning in musculoskeletal conditions. In this clever study, the authors found that an intentional pedagogy that integrated the relevant musculoskeletal science with specific clinical conditions improved diagnostic reasoning, as compared to a method that only taught the clinical science components as injury schemas (diagnosis, signs, symptoms, etc). Regarding diagnostic reasoning, this evidence and the experience of effective educators demonstrates that integrating relevant basic science information with the clinical content allows students to construct *causal pathways* during clinical encounters, an experience thought to enhance retention. If medical educators are challenging the effectiveness of their institutionally housed basic science curriculum and realizing that the considerable devotion to and reliance upon the basic sciences has been misappropriated due to content and delivery issues, then what does that mean for AT education programs? What is the return on investment for AT education programs intent on sending students across campus to take basic science classes in physics, biology, and chemistry where transfer and integration are likely not occurring?

Renowned medical educator and scholar, Geoff Norman summarized the rather extensive research on basic sciences in medical education in stating that the transfer or encapsulation of knowledge is more important than full-fledged exposure to high credit loads in the sciences,[40] a position fully supported even by those who have studied the impact that anatomy education has upon the production of physicians.[41,48] In other words, the rigorous science component of the *1910 Flexner Report* was, despite its logical rationality, misguided and in time deemed ineffective for producing deep thinking and expert physicians, and in Norman's view, "It's about content, not classes" (written communication, 2016). Today, medical education is working in earnest to improve upon the impact and legacy that the science-dominated Flexner Report has had upon the methods and content of medical education in the Unites States for over a century.

Perhaps even more surprisingly, medical educators do not agree over the best quantity, timing, and delivery of what many consider to be the holy grail of physician training—the anatomical sciences.[42] Numerous studies have challenged the amount of anatomical science that physicians need to know,[41] how it should best be taught,[49] and how detailed it should be taught (and assessed) in medical students.[48,50] Coming to the conclusions that surgeons require a different mastery of anatomy than do nonsurgeons, that even a mastery level of anatomical recall does not last forever in even the brightest students, or that high level recall ability equates poorly with clinical relevance or expertise, many medical educators have used this paradigm-jarring evidence to aggressively look for effective ways to maximize the time and space they have in their curriculum (only 2 years long, didactically), their institutional resources (if cadaver dissection is not the most effective method, is it worth the cost and time?), and naturally, to maximize their learning outcomes by producing competent physicians.

If the available evidence from medical education is duly accessed and well appraised, the take home message for educators (EBE) and policymakers (EBR) in the AT profession should be clear and helpful components for an

Table. Harden's 6 QUEST Dimensions for Evaluating Evidence in Educational Practice[1]

1	Quality	How good is the evidence? What counts as evidence?
2	Utility	To what extent can the method be transferred and adopted without modification? Will adaptation affect the expected results, for better or worse?
3	Extent	What is the extent of the evidence? Is evidence based on single opinion/study or isolated example of an approach? On a consensus view, systematic review or meta-analysis?
4	Strength	Marginal statistical significance is more limiting and begs more caution in educational settings
5	Target	What is the target? What is being measured? Evidence validity? Similar sample sizes? What was measured—skill, knowledge, attitude, performance, behavior?
6	Setting	How close does the context or setting approximate the original? How relevant is the application to the desired setting or context? Educational phase? Cognitive maturity level of subjects? Similar healthcare profession? Subject demographics? Sociocultural differences?

evidence-guided path forward. There are component bits from the basic sciences germane to AT knowledge and practice, and though these knowledge fragments are indeed foundational to some of what we do as health care clinicians, the total amount of relevant knowledge from the basic sciences is likely much less than many believe. Further, the fraction of physics and chemistry knowledge that is relevant to the practice of AT is only useful to students if that knowledge is transferrable or encapsulated in manners that are meaningful and contextually relevant to the knowledge at hand (in AT). As Bandeira et al[39] suggested for medical educators, AT should shift the focus away from specific basic science disciplines and instead consider the fundamental and foundational knowledge that should and can be applied to the practice of AT with specific and focused integrative approaches.

For example, it is given that the electromagnetic spectrum is important to understanding certain aspects of therapeutic modality application and competence, but can a physics professor without a professional health care background or pedagogy ensure that AT students learn the relevant knowledge bits in a manner that means anything to the student when he/she takes his/her therapeutic modalities course a semester or 2 later, or does the AT professor have to (re)teach the relevant physics concepts so that they are meaningful in the context of AT application, or transferrable once the student is enrolled in the therapeutic modalities course? In our program, it is our clinically experienced educator that integrates, encapsulates, and transfers the relevant physics material with our AT students. The same goes for anatomy—how often do AT professors have to reteach large portions of anatomy and physiology throughout their curricula despite their students having already passed (typically) 8 credits of coursework in anatomy and physiology in the preprofessional phases? In our program, it is in the end all of our faculty who do the difficult but necessary work of transferring and integrating anatomy and physiology knowledge with injury and disease in clinical, patient-centered contexts. The job of the excellent educator in health care fields is often to do what should have or could have been done in the original exposures to the material—to transfer, to integrate, or to encapsulate the requisite basic science information and skills into meaningful and contextual AT specific knowledge and skills that will make sense and be retained during clinical and patient exposures.

WHAT DOES THE EVIDENCE SAY ABOUT IPE?

Regarding the proposed standard for IPE in future AT education, the conversation is a bit more complex and multifactorial. As of this writing, the proposed requirements for IPE and interprofessional practice (IPP) in AT education are listed in multiple standards across the 2 interdependent documents, in direct and indirect formats.[27,28] In the program standards document, Standard 14 addresses the didactic curriculum by calling for "planned IPE across the professional program," while Standard 22 focuses on the clinical component by requiring clinical education to be "planned to include exposure to and engagement in IPP on a planned and regular basis."[28(p7)] Additionally, standards 3, 5, 13, 16, 32, and 45 of the content document directly or effectively deal with aspects of either IPE or IPP in their language and intent.[27] In designing a curriculum to meet required standards, it is no small feat to incorporate and articulate 8 different standards constructed toward 1 goal or domain, especially when time and space are likely to be even more compressed. The desire to bring AT into the fold with other related health care fields can be understood from theoretical and practice perspectives, but perhaps there is reason for pause regarding how deep and how fast we wade into these waters.[51]

Clearly, IPE is a popular and worthwhile academic and professional conversation in health care education and practice today, including on some level the world of AT.[52,53] Given that the World Health Organization has called for all health care fields to embrace IPE and promote its foundational relations, IPP, or collaboration, IPE certainly has a legitimacy that demands attention and evocative thought. Beyond the logic presented and the precedence from related health care fields, EBR is obliged to ask if IPE is an evidence-supported initiative, or more directly if it is known to produce meaningful or constructive long-term changes in students or professionals? In other words, EBR would attempt to address the intended or expected outcomes of proposed IPE initiatives or practices, rather than merely relying upon what may be hoped for because of surface potential or logic. Amongst other things, IPE is commonly claimed to lead to improved patient outcomes and improved professional performance and communication,[52,53] but an effective and critical EBR-EBE dynamic wonders aloud if those claims can be validated in the context of real-time practice? More importantly, can any of those claims be justified or demonstrated in an AT context or setting? Would IPE implementation in AT hold up to a 6-dimension QUESTS (see the Table) assessment for quality, strength, setting, etc?

Despite the existence of a white paper calling for pronounced IPE programming in the AT domain[52] and a plethora of calls for IPE by various experts and credible sources, no outcome

studies demonstrating specific educational or professional outcomes in AT can be found at this juncture. Despite its current popularity and expert- and authority-driven message, limited evidence currently exists concerning the efficacy and impact of IPE in the larger health care spectrum beyond AT. Systematic and critical reviews of IPE efforts conducted across the health care education spectrum conveyed more weight to the considerable limitations, challenges, and institutional drains on IPE than to the actual, objective long-term outcomes with the efforts to address the World Health Organization's call for IPE for all health care fields.[54,55] In appraising the available literature on various IPE initiatives conducted in across health education programs, high-level evidence reports have found that IPE (a) is often well received by students, (b) changes short-term perceptions of other professional students, (c) is perceived to be of value by most participants who have experienced IPE as part of their formal training, and (d) requires clinical and experiential exercises in order to achieve any of the aforementioned positive outcomes.[54] Looking deeper, however, the majority of these positive IPE outcomes are not lasting—most outcomes were evaluated either in short-term assessments (by design) or were found to waiver sharply over time.[56,57]

An assessment of IPE evidence reveals that its integration into formal academic programs induces numerous challenges and pressures at programmatic and institutional levels, including the significant increases in (a) time, (b) energy, (c) faculty training, (d) faculty cooperation and enthusiasm, (e) administrative support, (f) money, and (g) curriculum flexibility and space.[54,56–60] Also, IPE efforts designed around classroom exposure or experiences were generally found to not have significant impacts on measurable or meaningful outcomes, such as professional behavior or communication, and more than a few studies found that attitudes and perceptions amongst the various professional bodies (of students) and faculty represented actually became worse in that power barriers and stereotypes were reinforced.[54,61,62] Given that the intended and speculated outcomes for IPE are still unclear and largely unsubstantiated,[60,63] that a working definition or understanding of interprofessional competency is still being debated by many in the field,[60] that significant human and material resources are significant needs for an IPE curriculum,[58] that clinical/experiential-based efforts are required to achieve short-lived, but positive change,[55] and that AT policymakers have yet to articulate an actual and definable or measurable professional outcome for an IPE initiative,[52,53] it would appear that an evidence-informed platform for IPE is not yet available for AT educators or policymakers to rely upon (at least not a clear roadmap).

To be clear, IPE is not void of theoretical or practical merit or precedence, and we wish not to diminish the need for effective communication across the spectrum of care or for collaborative care that leads to safe and effective patient outcomes. Interprofessional practice and care is, on some level, important for all health care providers, including athletic trainers; therefore, our students need to know their role and how to perform their role in interprofessional contexts and situations. It is important to take note of AT's particular history, utility, and professional position when considering what to do next as a result of future policy implementations. It can be argued that athletic trainers have been practicing IPP for decades by working under the supervision of physicians (in most states) and alongside and in communication with other physicians, physical therapists, nutritionists, psychologists, and other health care providers in the daily process of patient care. In so doing, AT students have been exposed and immersed in IPE for decades as part of the existing educational model, whereby effective cross communication and practice is already being modeled as part of regular clinical experiences and education. If one accepts our history and professional context, what then is our specific role in the future of IPE? What more or how differently do we need to educate students concerning how to practice with other health care professionals? Does the available evidence on IPE support the need for 8 different standards, across both the didactic and experiential components of our new master's degree programs in order to do what our profession has historically done?

INCORPORATE OR IGNORE THE EVIDENCE?

At this critical juncture in the history of AT, the dearth of quality and contextually relevant evidence from within the profession combined with an apparent lack of appraisal of related evidence from other health care fields should provide considerable pause for concerned AT educators and administrators empowered to deliver our professional body of knowledge in the coming years. We challenge the current mindset and impending process, not because having AT students take more classes in the hard sciences or having some modicum of IPE are inherently bad ideas, or not that they are without some to-be-determined value for AT education or practice. Rather, we question because, beyond expert opinion, theoretical allure, or axiomatic practice, there is not yet sufficient or compelling evidence available to support the viewpoints or rationale behind the some of the proposed policies. More directly, many of the new policy proposals fall far short of suggesting that implementation and adherence will produce (more) evidence-informed, expert clinicians, and any hoped-for gains in those arenas may be directly offset by the considerable investment in time, resources, and energy required for implementation.

In simple terms, there is not yet credible evidence in many areas to support the considerable investment (new policies, new structure) required for compliance, in hopes that it will produce the desired returns for the effort (improved professionals). The cost-benefit analysis for this model is lacking information or evidence to produce a predictable or credible outcome. At a minimum, policymakers and regulators sensitive to and respectful of EBAT should seek out and assess or generate credible and relevant evidence for addressing serious proposals or standards being considered for adoption. Whether we are talking about IPE, clinical supervision, competency-based education, clinical reasoning, reflective practice, curriculum design and structure, the development of empathy, sociocultural competency, contributors to lifelong learning, or any other attribute attributed to the development of clinical expertise in health care before regulation becomes fixed, we should at least try our best to track down and consult the evidence that is available.

TOWARD AN EVIDENCE-BASED PROFESSION: NOW IS THE TIME FOR EVIDENCE-BASED ATHLETIC TRAINING

In 2009, Satterfield et al[8] published an enlightening piece that reviewed the history of the genesis of EBM, discerned EBM

from EBP, highlighted the early limitations and criticisms of EBM, and reviewed the history of EBP in nursing, psychology, social work, and public health. Of keen interest for AT should be the fact that, in addition to medicine, nursing, psychology (practice in psychology), social work (social work practice), and public health, all had their own evidence-based acronyms, complete with explicit professional histories, including the various evolutionary cycles and iterations that each EBP model has undergone over the years since EBM was formally introduced in 1992.[5] Glaringly omitted from this review was any mention of AT, a profession that has been a profession since 1950, yet has no evidence-based history or acronym to call its own. The intention for Satterfield et al was to present a harmonized and ecological model for a transdisciplinary EBP that is inclusive of a common language and an enriched clinical decision and policy decision-making structure. One particular emphasis in the model of Satterfield et al was to reposition best evidence available by better situating client characteristics and preferences into the organic equation and to embrace the myriad material factors associated with the varied availability of resources, the intent being to recenter shared decision making in more meaningful and contextually specific manners for a greater number of health care professions—not just in clinical care aspects, but so too in related aspects of policy and larger decision-making challenges. This point is in fact evident in the 1996 retort by Sackett et al[7] to the original 1992 model for EBP, but perhaps not as recognizably applicable to professional education or policy issues. We have attempted to rectify these oversights in EBAT, as stakeholder expertise, perspective, and context have been placed front and center of all things education, and thus too in policy formation and regulation. It is thus our position that EBR is critical for a body of professionals inherently interested in, and engaged in the processes of contributing to other aspects of professional practice.

Satterfield et al[8] were intent on presenting a discourse that highlighted the environmental and organizational context that surrounds health care in order to underscore the very real point that each field and even specific settings within each field have constraints placed upon them that will in certain situations impact or effect how evidence can or cannot be used to make decisions. Insightfully, their model actualizes the many broad contextual factors that typically serve as boundaries, but can also reveal opportunities and openings for even the most well-intentioned evidence-based practitioners. What both the transdisciplinary model of Satterfield et al and EBAT intend is a prioritization of the numerous constraints related to economic, organizational, social, cultural, personnel, and political agencies and exigencies that, if not accounted for, can negatively affect or constrain professional practice. Contrarily, if these various affects can be accounted for and appreciated a priori, perhaps more reasonable and strategic opportunities can be realized that will chart a more predictable and desirable future.

Integrating the various aspects and challenges associated with clinical practice with those that align with other practice aspects of the profession best represents the core principles of EBAT. Considered together, and not as separate and unrelated components, EBAT holds the potential to deliver and shape a more collective evidence-based profession, one that has been reconceptualized by including aspects relative to our regulation and education. As Figure 1 depicts, a medicohealth care profession intent on being full-fledged consumers and producers of EBP cannot operate independent of policy, nor of the educational system and apparatus that effectively and functionally drive its larger practice. If AT is to achieve professional legitimacy in both clinical health care and academic domains, it cannot reasonably be comfortable with policies dictated by axiomatic principles, or by hoping that ideas alone will prove effective as strategic lynchpins. To this point, our opening quote is perhaps the most salient as it cautions us all of "new ideas promoted with missionary zeal, new theories with very little evidential basis and the social and political values of the moment."[1(p553)] Evidence-based AT intends just that; it opens up discursive spaces and provides an academic blueprint for moving forward with rational, critical, and multifactorial approaches to solving problems and proposing evidence-informed directions forward for AT.

In referring to the complete system of the profession of medicine (education, regulation, and practice), Batalden and Conway unknowingly and simultaneously described AT's current juxtaposition in writing, "Every system is perfectly designed to get the results it gets."[64] In other words, the system of AT will get what it is designed to get in the future, pending of course what it actually designs for itself (to get). If the system of AT fails to take the opportunity to self-engineer its collective future, it will get what it deserves, what it was designed to get. On the other hand, if the system becomes more proactive and more deliberate by better articulating what it wants to get, it has the opportunity to design the results that it prioritizes and values and that hold promise for reaching those goals. That design (process) can either be predicated from axiomatic principles and hopeful ideologies and theories, or it can be engineered by strong, relevant, and contextually sound evidence—the essence of EBP.[64] For many in the profession, the primary take-home message from the master's degree transition movement was that we needed to improve the competence of our future professionals, we needed to produce better professionals. Toward that end, the master's degree was put forth at the desired and apt mechanism to reach that target outcome. Given that collective professional goal, what is then the best way to get there?

In connecting the mission of education with the mission of professional practice, physician-researcher-educator Nigel Oswald[65] underscores a very telling and insightful message for the AT profession. In addressing his colleagues in medical education, Oswald unknowingly addresses AT's desire for a more prominent seat at the health care table for greater credibility in and amongst our health care colleagues that challenge our legitimacy and authenticity. That is, the onus is on us; the responsibility is on athletic trainers to prove that we can deliver quality patient care. For many health care professionals, this is an obvious and customary testament, but Oswald extends the argument further by highlighting the interdependent nature of education and practice: "When we are able to firmly connect innovation and quality in education with better outcomes for patients, then we shall be taken seriously."[65(p470)]

In 1999, Oswald felt that medical education was still a long way from being able to objectively address this issue, to link better physician education with better patient outcomes. Athletic training is currently at this nexus in its professional history; it has before it the opportunity to address this

fundamental linkage between education and patient care with strategic implementation of evidence-informed policies and practices designed to enhance the competency of its future professionals. How will AT proceed toward those goals?

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