

The Critical Need for Advanced Training in Electronic Records Use: Implications for Clinical Practice, Education, and the Advancement of Athletic Training

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Context: The effective use of electronic records (ie, electronic health records or electronic medical records) is essential to professional initiatives and the overall advancement of the athletic training profession. However, evidence suggests that comprehensive patient care documentation and widespread use of electronic records are still limited in athletic training. The lack of formal training and education for clinicians and students is often cited as a primary barrier to electronic record use. Other health care disciplines have used academic electronic health record (AEHR) systems to address these barriers with promising results.

Objectives: To identify common challenges associated with the effective use of electronic records in clinical practice, discuss how an AEHR system can address these challenges and encourage more effective use of electronic records, and describe strategies for deploying AEHRs in the athletic training profession.

Description: The AEHR is an electronic records system specifically designed for educational use to support simulation learning among all types of learners (eg, practicing clinicians, students). Mimicking the form and function of an electronic

health record, the AEHR offers various educational tasks, including patient care documentation projects, critical reviews of standardized patient cases, and assessments of patient care data for quality improvement efforts.

Clinical and Research Advantages: Recent evidence suggests that the use of an AEHR can improve knowledge and enhance skills. Specifically, AEHR use has been associated with enhanced attitudes toward electronic health record technology, increased informatics competencies, and improved documentation skills. Also, the use of an AEHR has been associated with improved critical thinking and decision-making skills. This tool appears to be valuable for health professions education, and athletic training stands to benefit from its use to better train and upskill clinicians and students alike for clinical practice. Although the implementation of an AEHR will require much time and large-scale coordinated efforts, it will be a worthy investment to address current challenges and advance the athletic training profession.

Key Words: health information technology, informatics, data, patient care documentation, core competencies

Key Points

- Challenges with patient care documentation and core competency implementation at the point of care and during clinical education suggest that targeted learning opportunities are required to better train and prepare health professions practitioners and students to use electronic records during clinical practice.
- An academic electronic health record (AEHR) is an educational tool that creates a simulated and safe environment in which to better train and upskill both clinicians and students for electronic records use during routine care.
- Benefits associated with AEHR use, such as enhanced attitudes toward technology, increased informatics competencies, and improved documentation skills, indicate that large-scale implementation of an AEHR may support initiatives essential to the advancement of athletic training, including health care economics, vitality of the profession, and health information technology.

Since the release of the Institute of Medicine's *Crossing the Quality Chasm*,¹ the use of health information technology has been a major focus of health professions education and clinical practice. The adoption of electronic record systems, including electronic health records (EHRs) and electronic medical records (EMRs), represents the large-scale push for health information technology. Early advocates of electronic records theorized that these systems would enhance the overall quality of patient care, and subsequent evidence supports these claims.^{2–4} Investigations of electronic record systems

suggested that the consistent use of electronic records was associated with improved communication, fewer medical errors, and enhanced overall quality of care.^{2–4} With these patient care benefits and the general call to provide patient care in a more digital environment, the routine use of electronic records has become a fundamental expectation of contemporary health care.

In line with global health care trends, initiatives to encourage the use of electronic records have also been prominent in athletic training. Over the last decade, the use of health information technology and health care informat-

Electronic Records Systems

Health Information Technology

Determining the effectiveness of standardized communication and/or electronic medical records in clinical practice

Generating, analyzing, and applying “big data” to inform clinical decisions Evaluating comprehensive point-of-care data that includes patient- and clinician-rated outcome measures



Vitality of the Profession

Determine the effectiveness of interprofessional practice



Health Economics

Improve medical documentation compliance and quality

Demonstrate return on investment, cost effectiveness, revenue generation associated with employing athletic trainers

Evaluate the ability to minimize health care costs for patients and maximize efficiency of patient care across the lifespan



Establish appropriate patient:practitioner ratios to ensure patient safety and high-quality care

Figure. The importance of electronic records for the Athletic Training Strategic Alliance's Prioritized Research Agenda.

ics has been identified as a core competency in professional education, postprofessional education, and residency training in athletic training.⁵⁻⁷ In addition, specific recommendations have been proposed to leverage patient data from electronic records in order to support clinical research at the point of care⁸ and improve the quality of patient care provided by athletic trainers (ATs).⁹ Similarly, in the recent release of the Athletic Training Strategic Alliance's Prioritized Research Agenda,¹⁰ which sought to “unify research with clinical practice to improve patient care and advance the profession,” the use of health information technology was identified as 1 of 5 primary areas of need, with electronic records playing an essential role in addressing this need (Figure). Furthermore, a closer assessment of the Prioritized Research Agenda reveals that data compiled from electronic records are crucial for addressing other areas of need, such as health care economics and the vitality of the athletic training profession (Figure). Taken together, these initiatives indicate that the use of electronic records is essential for not only the enhancement of athletic training clinical practice but also the overall advancement of the profession in the coming years.

To realize these professional aspirations, the athletic training profession must be able to demonstrate 1 crucial

element: the effective use of electronic records. Although *effective use* can be defined in a variety of ways, federal efforts¹¹ to deploy electronic records nationwide suggest effective use should include the (1) reliable and comprehensive patient care documentation of clinical data and (2) widespread use of electronic records by health care providers. Unfortunately, the evidence to date¹²⁻¹⁴ suggests that these 2 tenets are not being met in athletic training. For instance, comprehensive and high-quality patient care documentation was reported to be limited in athletic training clinical practice, and only 20% of practicing ATs were estimated as using electronic record systems for patient care documentation.¹⁴ Without the effective use of electronic records, the amount and quality of data needed to address areas of the Prioritized Research Agenda cannot be obtained, which will hinder efforts to advance the profession as a whole. Fortunately, these challenges are not unique to athletic training¹⁵⁻¹⁷ and, as a result, the profession stands to learn and benefit from strategies used by other health care disciplines.

One strategy implemented by other health care professions is the use of simulation-based record systems (also known as *academic electronic records* or *educational electronic record systems*), which are designed to provide focused education and targeted training for practicing

clinicians and students (ie, learners) alike.^{18,19} By enhancing exposure to, offering hands-on training for, and increasing practice trials using electronic records, other health care professions have been able to better prepare learners for a health information technology environment and improve the effective use of electronic records during routine patient care.¹⁹ Therefore, the purpose of our paper is to identify common challenges associated with the effective use of electronic records in clinical practice; discuss how a simulation-based, educational electronic records system can address these challenges and encourage more effective use of electronic records; and describe strategies for deploying such a system in the athletic training profession.

THE DIFFERENCE BETWEEN EHRS AND EMRS

Before exploring the simulation-based electronic records system, we should discuss the differences between EHRs and EMRs, as these terms are often used interchangeably in the health care community. For example, the 2020 “Standards for the Accreditation of Professional Athletic Training Programs” (2020 Standards)⁷ specified the use of an EHR, whereas the Athletic Training Strategic Alliance’s Prioritized Research Agenda¹⁰ identified the use of an EMR. By and large, EHRs and EMRs are similar in terms of features and functionality, and they have previously been compared.^{8,20} However, a major difference is that an EMR typically exists in a single clinical practice and does not interface or communicate with any other electronic records.^{8,20} In contrast, EHRs exist in a connected environment (eg, hospital networks with different departments, specialties, or both) that allows information to be more easily shared among clinicians (eg, physicians, physical therapists, occupational therapists), patients, and organizations.^{8,20}

For the purposes of this paper, we will be using the term *EHR* for several reasons. First, when it comes to form and function (ie, user interface), EHRs and EMRs are very similar, so professional efforts to improve the effective use of electronic records systems can be achieved using either an EHR or an EMR.^{8,20} Second, it would be wise to train and educate athletic training learners in an EHR environment because EHRs are identified in the 2020 Standards⁷ and represent the current direction of athletic training education. Also, because EHRs, by definition, provide interconnections with other clinicians, they support the development of additional core competencies, including interprofessional education and collaborative practice.^{8,20} Lastly, and perhaps more importantly, the global health care system has adopted the EHR as opposed to the EMR; this provides an incentive for the athletic training profession to align with its health care peers.²¹

THE CRITICAL NEED FOR ADVANCED EDUCATION AND TRAINING

Although the implementation of EHRs in the global health care system can be traced back to the 1960s, the modern deployment and use of EHRs are firmly grounded in the US government’s effort to establish a nationwide electronic records system through the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009.^{21,22} In brief, the HITECH Act encouraged hospitals and large medical groups to transition from paper-

based records to electronic records using monetary incentives.¹¹ However, although the HITECH Act triggered a marked increase in the installation of EHRs in the health care environment, the adoption and use of EHRs by providers at the point of care have been challenging.

Systematic reviews^{4,15–17} have indicated that although clinicians reported patient care benefits of increased accessibility to patient information, enhanced provider-patient communication, and improved decision making stemming from EHR use, they also described more time spent on patient care documentation, difficulty navigating the EHR, and a perceived decrease in overall efficiency. These challenges are due to several system-related barriers (eg, poorly designed EHR user interfaces, poor integration of EHR in the natural workflow)^{15–17}; in addition, clinicians frequently noted insufficient educational support,^{15–17} training,^{15–17} and technological skills as common barriers to the adoption and use of EHRs.^{15–17} These findings may suggest that clinicians are expected to “learn on the job,” even if they are technologically illiterate and ill prepared to do so. Previous initiatives launched by the nursing profession²³ emphasized that the lack of education and training of practicing clinicians can ultimately hinder the implementation and use of EHRs at the point of care. This topic area has not been well researched in athletic training, yet ATs may face similar challenges using electronic records at the point of care. Nottingham et al²⁴ found that the electronic record documentation behaviors of ATs were often shaped by the technological barriers they faced, in some instances forcing them to duplicate their patient care documentation efforts. Additionally, ATs have portrayed steep learning curves for electronic documentation due to the unique requirements and formats of electronic record systems at their place of employment.²⁵

A major challenge in training clinicians and students for the effective use of an EHR is that clinically based EHRs do not provide an appropriate platform for practicing and learning through trial and error. In health care education, students preparing for clinical practice are often restricted from accessing and using EHRs during their clinical experiences because of legal, privacy, and confidentiality concerns regarding patient data.²⁶ Although reasonable, these restrictions limit a learner’s overall exposure to, repetitions with, and familiarity with electronic records, resulting in less ability to develop sound clinical practice behaviors for EHR use.²⁶ Athletic training students experienced similar challenges of limited exposure and repetition of health information technology–related tasks during their athletic training clinical experiences.^{27,28} For example, although current evidence indicated that athletic training students perceived the use of health care informatics as important, they were less likely to implement these concepts than other core competencies during their clinical experiences.^{27,28} Furthermore, 58% of postprofessional students could not differentiate between an EMR and an EHR, and professional students reported the inclusion of professional behaviors related to health information technology in less than 5% of patient encounters documented during their athletic training clinical experiences.^{28,29} Taken together, these challenges at the point of care and during clinical education suggest that targeted learning opportunities are required to better train and prepare health profession practitioners and students to use EHRs during

Table 1. Addressing Professional Behaviors in the Health Information Technology Core Competency Through the Use of Academic Electronic Health Records (AEHRs)

Health Information Technology Professional Behavior	Examples of AEHR Training Assignments
Search, retrieve, and use information derived from online databases for clinical decision support	Use clinical decision support features embedded in AEHR
Maintain data privacy, protection, and security	Discuss importance of using unique password and log-in information Discuss other best practices for EHR use, including logging off when not active, multifactorial log-in Discuss Health Insurance Portability and Accountability Act regulations Use coding systems in AEHR to report diagnoses and treatments
Use medical classification systems (including International Classification of Disease codes) and terminology (including Current Procedural Terminology)	Communicate with patients and clinicians via email feature in HER
Use an EHR to document, communicate, and manage health-related information	Retrieve, review, and synthesize simulated patient record and plan course of treatment
Use an EHR to support decision making	Use standardized forms in AEHR to ensure high-quality patient documentation Use clinical decision support features to facilitate patient care and align with current best practices
Use an EHR to mitigate error	Download and analyze data from AEHR to identify potential practice gaps for quality improvement efforts
Use data to drive informed decisions	

Abbreviation: EHR, electronic health record.

clinical practice. To help address these challenges and better prepare clinicians for present-day patient care, health professions educators have encouraged the use of academic EHRs (AEHRs) for education and training purposes.

SIMULATED ELECTRONIC RECORDS SYSTEMS: SUPPORTING FOCUSED EDUCATIONAL INITIATIVES AND TARGETED TRAINING

The AEHR is an electronic record system specifically designed for educational use to support simulation learning.³⁰ Traditionally, AEHRs have been predominately used in professional education programs,^{26,30–32} but their design and purpose allow them to be used in other educational efforts for practicing clinicians, such as continuing education courses. In fact, the education and training of practicing clinicians is essential when initiating profession-wide efforts, such as promoting the widespread use of electronic records, as practicing clinicians make up the vast majority of the profession. For instance, in the nursing profession's "Technology Informatics Guiding Education Reform initiative,"²³ professional leaders emphasized the need to adequately support and prepare practicing clinicians for the use of health information technology, including electronic record systems.

From a design perspective, AEHRs look and feel like clinically based EHRs. They are equipped with components commonly found in EHRs, such as various patient care documentation forms (eg, evaluation, treatment, and discharge forms) and coding systems (eg, International Classification of Diseases, Current Procedural Terminology).¹⁹ In addition, the AEHR functions like a clinically based EHR, requiring the learner to log into the system using a unique username and password combination, save drafts of forms and return to complete them at a later time, print forms, and communicate with "patients" via secure email.^{18,19,33} In short, for all intents and purposes, the AEHR should look and feel just like a clinically based EHR. Although several commercially available, clinically based electronic records systems provide users with the ability to create demonstration or "educational" accounts to

enter mock data, what sets the AEHR apart is the variety of educational modules and tools that specifically support simulated learning opportunities.

For example, an effective AEHR for ATs and athletic training students should include a set of standardized patient cases.^{19,30} These patient cases are preloaded into the system, cannot be edited by learners, and should represent various injuries and conditions typically managed by ATs. Using standardized patient cases, instructors (ie, individuals overseeing the educational delivery via the AEHR) can offer a variety of assignments, present typical clinical findings related to injuries and conditions, ask learners (eg, practicing clinicians, athletic training students) to summarize patient cases to physicians, and audit patient care documentation notes. The passive component of standardized patient cases is essential, but the AEHR should also enable instructors and learners to create new records and simulated patient cases. The ability to create new cases allows the learner to practice documentation skills and offers both instructors and learners a mechanism for providing constructive feedback. The combination of form and function of the AEHR gives learners an opportunity to explore and navigate a fully functional system that reflects an environment they can expect to encounter during clinical practice.

In addition to standardized patient cases, AEHRs also include embedded assignments (eg, using patient data to assess patient and practice trends) and assessment tools (eg, patient care documentation auditing instruments) to support educational and training objectives. Combining clinical and educational aspects within a single AEHR system provides a lifelike virtual environment in which a learner can foster and develop many of the fundamental hands-on skills needed to efficiently use EHRs during patient care.^{19,30} If used effectively, the AEHR can promote development of the health information technology and health care informatics aspect of the health care core competencies (Table 1), which is much needed in the athletic training profession.

Recent evidence suggested that the use of an AEHR during professional education can improve knowledge and enhance skills. In a systematic review of the nursing

Table 2. The Use of Academic Electronic Health Records (AEHRs) to Support Other Core Competencies of Health Care

Core Competency	Professional Behavior	Examples of AEHR Training Tasks
Evidence-based practice	Use clinical decision support systems	Document a patient encounter that triggers pop-up windows embedded in the AEHR that include best-practice guidelines in real time (eg, ankle injury: Ottawa Ankle Rules). Have learner reflect on how the embedded clinical decision support window influenced the plan of action.
Interprofessional education and collaborative practice	Communicate and collaborate with other health care professionals on the management of a patient	Complete documentation for a patient with a concussion that requires management, coordination, and documentation from athletic trainer, team physician, neurologist, and school nurse.
Patient-centered care	Use patient-reported outcomes to inform clinical decisions	Review completed patient-reported outcome measures for a patient case to determine how patient perceptions of injury influence current treatment plan of action.
Professionalism	Handling of patient records	Engage in discussion of the security measures embedded in an AEHR to protect patient records, such as the use of a unique password, auto-log-off from system, and audit log of system.
Quality improvement	Extract, process, and analyze data to identify practice gaps in need of improvement	Use AEHR data from patient care documentation to determine if athletic trainers are using best-practice guidelines such as clinical prediction rules or recommendations from position statements.

literature,¹⁹ the use of an AEHR was associated with more positive attitudes toward EHR technology, enhanced informatics competencies, and improved patient care documentation skills. Furthermore, the use of an AEHR was also associated with improved critical thinking and decision-making skills. Students who used an AEHR seemed to possess a greater understanding of patient histories and health conditions and a greater ability to identify critical cues in patient cases.³⁴ Lastly, faculty felt that the AEHR was a valuable educational tool that helped overall student learning.³⁵ In short, AEHRs appear to be a valuable tool for health professions education, and the athletic training profession stands to benefit from AEHR use for better training and preparing both clinicians and students for clinical practice.

THE PROMISE OF AEHRs TO THE ATHLETIC TRAINING PROFESSION

Thus far, we have discussed ways an AEHR can be used to improve patient care documentation. However, the AEHR can be used for other initiatives that are also important to the athletic training profession. For instance, ways of addressing specific components of the 2020 Standards and core health care competencies are summarized in Table 2. Although we frame the benefits of an AEHR in terms of the accreditation standards, it is important to note that the profession should support and initiate the upskilling of practicing clinicians to these standards as well. Concepts such as the consideration of social determinants of health,^{36,37} the evaluation of mental wellness,³⁸ and the use of patient-reported outcome measures³⁹ during care are important to contemporary health care but relatively new to the profession. Thus, a meaningful percentage of practicing clinicians may not have been introduced to such concepts during their professional education. The use of an AEHR may facilitate the introduction of these concepts and demonstrate their applicability during patient care, which will benefit the profession on a larger scale.

In addition, the AEHR can be used to highlight other health care skills not typically emphasized in professional education. For example, as more states begin to accept billing for athletic training services, ATs should be familiar with the use of coding systems and reimbursement best

practices. Despite recent efforts^{40,41} to estimate the costs associated with services provided by ATs, cost estimates in the profession are generally absent, which can hinder efforts to demonstrate the value and worth of ATs. As with barriers related to effective EHR use, it is likely learners would benefit from increased exposure to and practice using coding systems and reimbursement best practices.

Furthermore, the use of a simulated system such as an AEHR can help educate and train all types of learners and better position the profession to accomplish large-scale goals. Let us consider a scenario in which the majority of ATs effectively use EHRs at the point of care, and those clinical data can be aggregated to support analyses. The profession can then begin to answer many of the questions that are vital to the advancement of athletic training but have historically been elusive because of the lack of high-quality data. These questions include assessing the effects of athletic training services on patient outcomes and determining the worth and value of the AT as a health care provider. By answering these questions on a large scale, we can advance the profession and improve its standing among our peers within the health care system.

CONCLUSIONS

The promise of an athletic training AEHR is clear, as it can provide better training for clinicians and students and help to address the needs of the profession. Moreover, as the effective and widespread use of electronic records is central to the overall advancement of the athletic training profession, a collective effort is needed to deploy such a tool across the profession.⁴² A centralized effort by the members of the Strategic Alliance (National Athletic Trainers' Association, National Athletic Trainers' Association Research & Education Foundation, Board of Certification, Commission on Accreditation of Athletic Training Education) and professional committees (eg, Athletic Training Research Agenda Committee, Council on Practice Advancement's Analytics and Outcomes subcommittee) can help drive these professional efforts.

On the local level, clinicians, educators, and researchers can help to design effective AEHRs for educational and training purposes. For example, clinicians can assist in identifying barriers and facilitators to EHR use that can be mimicked in the AEHR. Also, clinicians can use their

clinical expertise to develop meaningful and relevant standardized patient cases. Meanwhile, educators can aid in identifying and implementing effective pedagogical strategies in AEHR modules, align learning objectives with educational standards and professional competencies, and create engaging and effective learning experiences to support the training of all types of learners (eg, clinicians, athletic training students). Lastly, researchers can help by identifying methods for demonstrating the overall effectiveness of the AEHR and, more importantly, recommending changes to subsequent iterations of the AEHR to further improve effectiveness. In short, the successful implementation of an AEHR in the athletic training profession will require the support of multiple entities and the interdisciplinary collaboration of ATs with varied areas of expertise. Although this will require much time and effort, it will be a worthy investment to address current challenges facing the athletic training profession.

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