

Barriers to Medical Students' Electronic Health Record Access Can Impede Their Preparedness for Practice

Catherine M. Welcher, William Hersh, MD, Blaine Takesue, MD, Victoria Stagg Elliott, MA, and Richard E. Hawkins, MD

Abstract

Medical students need hands-on experience documenting clinical encounters as well as entering orders to prepare for residency and become competent physicians. In the era of paper medical records, students consistently acquired experience writing notes and entering orders as part of their clinical experience. Over the past decade, however, patient records have transitioned from paper to electronic form. This change has had the unintended consequence of limiting medical students' access

to patient records. This restriction has meant that many students leave medical school without the appropriate medical record skills for transitioning to residency.

In this article, the authors explore medical students' current access to electronic health records (EHRs) as well as policy proposals from medical societies, innovative models implemented at some U.S. medical schools, and other possible solutions to ensure that students have sufficient

experiential learning opportunities with EHRs in clinical settings. They also contend that competence in the use of EHRs is necessary for students to become physicians who can harness the full potential of these tools rather than physicians for whom EHRs hinder excellent patient care. Finally, the authors argue that meaningful experiences using EHRs should be consistently incorporated into medical school curricula and that EHR-related skills should be rigorously assessed with other clinical skills.

Medical educators recognize that electronic health record (EHR) proficiency is a skill required for students to succeed after medical school.¹ The Association of American Medical Colleges (AAMC), which identified critical competencies to guide curriculum development, included student EHR proficiency as one such competency—medical students should “use information technology to optimize learning and care.”² This competency is linked to 1 of the 13 AAMC Core Entrustable Professional Activities for Entering Residency, which students might be expected to perform, without direct supervision, on the first day of residency, regardless of specialty choice.² Additionally, the United States Medical Licensing Examination Step 2 Clinical Skills exam requires that students be able to write notes in an electronic form.³

Please see the end of this article for information about the authors.

Correspondence should be addressed to Catherine M. Welcher, Medical Education Outcomes, American Medical Association, AMA Plaza, 330 N. Wabash Ave., Suite 39300, Chicago, IL 60611-5885; telephone: (312) 464-4552; e-mail: Catherine.Welcher@ama-assn.org; Twitter: @AmerMedicalAssn.

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Some have argued that the optimal integration of the EHR into patient care should start with medical students.⁴ Although students at many academic institutions view patient data, much as they did in the paper chart era, they are no longer consistently allowed to write notes or enter orders, even with supervision.⁵ This shift in students' responsibilities has deprived them of the hands-on practice they need to acquire the EHR skills and familiarity with these systems to optimally begin their residency training.

In this article, we explore medical students' current access to EHRs as well as policy proposals from medical societies, innovative models implemented at some U.S. medical schools, and other possible solutions to ensure that students have sufficient experiential learning opportunities with EHRs in clinical settings. We believe EHR proficiency is vital for students to become physicians who use this tool to provide excellent patient care.

Students' Access to EHRs

Surveys conducted by the Liaison Committee on Medical Education (LCME) during the 2011–2012, 2013–2014, and 2015–2016 academic years

showed that almost all U.S. medical schools accredited by the LCME (130/134 [97%] in 2011–2012; 137/140 [98%] in 2013–2014; and 137/142 [96%] in 2015–2016) allowed students some access to EHRs at clinical training sites but that access was inconsistent (see Tables 1 and 2). The level of access varied widely across institutions and health care settings with a significant percentage only allowing students to read the record, not enter or modify information (data unpublished).

A 2012 survey of clerkship directors by the Alliance for Clinical Education and the University of Michigan Medical School also showed the limited scope of EHR use by students. The survey indicated that 32% of clerkship directors allowed students to view the patient record only; 41% allowed students to view the patient record and write notes; and 27% allowed students to view the patient record, write notes, and enter orders to be cosigned.⁶

Implications of Students' Inconsistent Access to EHRs

Medical students need full EHR access to learn how to elicit medical histories while electronically recording important findings, retrieving critical information

Table 1

Medical Students' Access to Electronic Health Records During the 2011–2012 and 2013–2014 Academic Years, by Institution Type^a

Institution type	2011–2012			2013–2014		
	Read-only access, no. (%)	Information entry and/or modification access, no. (%)	Total no. of institutions	Read-only access, no. (%)	Information entry and/or modification access, no. (%)	Total no. of institutions
Nonhospital ambulatory care center	29 (30.2)	67 (69.8)	96	42 (32.8)	86 (67.2)	128
University-owned hospital	20 (22.5)	69 (77.5)	89	16 (15.7)	86 (84.3)	102
Veterans Affairs hospital	20 (18.3)	89 (81.7)	109	25 (21.6)	91 (78.4)	116
Other	41 (33.1)	83 (66.9)	124	47 (30.3)	108 (69.7)	155

^aThe same questions were asked on the Liaison Committee on Medical Education 2011–2012 and 2013–2014 surveys. Questions were changed on the 2015–2016 survey.

embedded in the EHR, using EHR-associated decision-making tools, communicating with other providers, and providing management plans.^{7–9} Inconsistent EHR access means that some students finish medical school lacking core skills in patient charting as well as skills specific to EHR use such as locating and interpreting lab results found in patients' records.⁵

Limited EHR access during medical school results in many first-year residents spending significant time early in their training familiarizing themselves with the EHR while learning to care for patients without direct supervision.¹⁰ A recent study of internal medicine interns at Oregon Health & Science University found that, three months after beginning residency, which included 1.5 days of training in using the institution's EHR, interns used an array of processes of

widely varying quality to generate patient notes and import relevant data to the EHR.¹¹ This variety was associated with a significant number of health care quality and patient safety issues, including the elimination of active medical problems from the day's prior notes, inadvertent discontinuation of medications on admission, and poor recognition of the issues that required information from a prior discharge summary.¹¹ This study also showed that only 45% of interns recognized that the microorganism causing the patient's infection was resistant to the prescribed antibiotics.¹¹

While access to patients' clinical data in the EHR can prompt medical students to use their clinical reasoning skills in real time, concerns have been raised about the potential adverse impacts of this practice on students' learning. For

example, using electronic templates as prompts may reduce students' ability to acquire basic history-taking and physical exam skills. It is critical that students be taught to use the EHR carefully; to avoid compromising their ability to actively engage in, synthesize, and document the patient encounter; and to ensure proper and ethical use of the copy and paste features.¹²

Some institutions have implemented simulated EHR training for medical students who do not have consistent access to EHRs in clinical settings. Educational simulations without prior EHR training help students develop EHR competence.¹³ However, this model may not be sufficient to fill the gap created by inconsistencies in students' EHR access in clinical settings. For example, students in third-year family medicine rotations at Oregon Health & Science University and the University of Texas Health Science Center had their EHR-related skills assessed by an objective structured clinical examination. These students performed well in EHR-related communication tasks, such as maintaining eye contact and stopping all computer work when the patient expressed worry.⁵ However, students at both institutions were deficient in EHR data management, including in medical history review, medication reconciliation, and allergy reconciliation.⁵ Some students' EHR skills did not improve as the year progressed, suggesting that they did not gain the EHR training and experience they needed in their clinics and hospitals, most likely because of a lack of consistent policies granting them access to the EHRs for writing notes and entering orders.⁵

Table 2

Medical Students' Access to Electronic Health Records During the 2015–2016 Academic Year^a

Questions	No. of schools answering yes	No. of schools answering no
Does each student have the opportunity to enter or modify data in an electronic health record system used for patient care during one or more required clinical clerkships?	137	5
Of the schools that said yes to the first question, do students have the opportunity to write in the actual patient record (not just a section of the record for medical student use) at one or more clinical sites used for required clinical clerkships?	114	23
Of the schools that said yes to the first question, do students have no opportunity to write in the actual patient record during required clinical clerkships?	22	115

^aThe same questions were asked on the Liaison Committee on Medical Education 2011–2012 and 2013–2014 surveys. Questions were changed on the 2015–2016 survey.

Other benefits to EHR access for students include exposure to the larger health care delivery system; the concept of systems-based practice, which encompasses cost-effective care for patients; and tools enabling health care team members to identify patient care goals for documenting and monitoring progress using a shared care plan.¹⁴ EHRs also act as a tool for faculty to offer constructive feedback and supervise students' performance during clerkships. Feedback and guidance from faculty enable students to focus on patients instead of the EHR and to enter data correctly to avoid EHR errors.⁵

Barriers to Students' Full Access to EHRs

Access to health information, including data in EHR systems in hospitals, ambulatory care centers, and other academic institutions, is appropriately regulated by laws, including the Health Insurance Portability and Accountability Act (HIPAA). However, HIPAA does not restrict team members involved in patient care, including medical students, from accessing medical records. An overly rigid interpretation of the law in many clinical, academic, and community environments, though, has resulted in unnecessary restrictions in students' access.¹⁵ Institutions also tend to restrict students' access to EHRs because of the potential legal liability related to the risk of medical and billing errors being made because of students' ability to copy and paste notes.^{16,17}

In the late 1990s, the medical record shifted from a document primarily intended to communicate health issues and care plans among physicians and other clinicians to one that also had to support billing processes. Linking medical record documentation to billing meant that payers took a greater interest in how medical students' notes were used, if at all.¹⁸ For instance, the Centers for Medicare & Medicaid Services (CMS) has strict rules about how student documentation can be used to support billable services. Only a medical student's documentation of a review of systems and past family and social history can support billing. Inappropriate use of students' documentation to support a bill to Medicare could lead to allegations of False Claims Act violations.¹⁹

Logistical and structural issues are also significant barriers to medical students' EHR use. One study found that academic institutions used more than 80 different EHR systems.⁶ In addition, 785 different EHR vendors participated in federal incentive programs, offering EHR systems for office-based health care settings. A total of 177 systems were available for hospital settings.²⁰ Although fewer than 5 proprietary systems accounted for the majority of the market share in both hospital and medical group settings, during their four years of training, students most likely will be exposed to many more EHR systems.²¹ Each EHR and user interface has its own strengths and weaknesses in terms of data recognition and processing.¹³

Medical students rotate through numerous health care facilities and so have to learn different EHR systems. Some clerkships, such as obstetrics–gynecology, present unique learning challenges because multiple EHR systems are used across the relevant health care settings, including the operating room, emergency department, inpatient wards, ambulatory clinics, labor and delivery, high-risk antepartum services, and intensive care units.²² Cost and time become barriers as institutions are reluctant to provide resources for proper student training and for the implementation of appropriate student authorizations in each system.²³

Advantages and Disadvantages of Students Scribing Notes

Medical students do act as scribes in clinical settings, recording information in the EHR that has been supplied by a resident or attending physician. This practice is valuable to students' education and to the health system, but it is distinct from students writing notes as part of a clinical, educational experience. Scribing allows students to obtain firsthand knowledge of a wide array of clinical medicine topics. It strengthens their medical knowledge, clinical decision making, patient interaction, and bedside manner. Scribing with an EHR system may put students ahead of their peers in some areas of medical education, but it is not a replacement for learning charting and documentation with consistent EHR access.²⁴

Clinicians should be able to easily distinguish between a note that was scribed by a student as verbally instructed

by a provider and one written by a student as part of the educational experience. Otherwise, students should be required to clearly indicate when they are acting as scribes rather than clinicians in training.¹⁹

Policy Proposals Regarding Students' Use of EHRs

In response to requests from medical students and an increasing recognition that consistent training in EHR use is needed, medical societies and educators have recently issued policy recommendations on students' access to EHRs.

This article is based, in part, on a June 2015 American Medical Association (AMA) Council on Medical Education report.²⁵ The AMA argued that EHRs provide opportunities to improve patient care as well as increase the accuracy of communications, and they support efforts to incorporate EHR training into undergraduate medical education. AMA policy states that, as the first step toward residency and beyond, medical students need to (1) acquire the necessary hands-on experience, without compromising patient care or safety; (2) enter and discuss orders and prescriptions; and (3) document a clinical encounter in the medical record without direct supervision.²⁵

The Association of Professors of Gynecology and Obstetrics Undergraduate Medical Education Committee published a review of best practices regarding the incorporation of the EHR into undergraduate medical education, which recognized the unique circumstances of obstetrics–gynecology clerkships and suggested solutions for overcoming the obstacles students and educators may encounter.²²

The Society of Teachers of Family Medicine (STFM) issued preceptor guidelines and a position statement to address the challenges associated with affording medical students access to EHRs.²⁶ The preceptor guidelines stated that students must have their own unique log-in and password to chart on behalf of the preceptor and contribute meaningful data to the EHR with the inclusion of a student note. All notes are to be reviewed, edited, and signed by the supervising physician, with appropriate instructive

feedback given to the students on their work. The position statement emphasized the importance of allowing students to use the EHR in all settings. STFM also stated that medical students should be counted in institutional and vendor EHR support fees, so student training can be provided and information technology support can include students.²⁷

The Alliance for Clinical Education developed a set of guidelines for educators to establish expectations of medical students' documentation in EHRs. They recommend that "medical schools develop a clear set of competencies related to student documentation in the EHR which medical students must achieve prior to graduation in order to ensure they are ready for clinical practice."²⁸

Innovative Models to Train Students in EHR Use

Medical schools are seeking to address the need for students to receive training in EHR use and clinical informatics, but these efforts are not widespread and have their challenges. Such innovative curricula include those launched by members of the AMA's Accelerating Change in Medical Education Consortium of 32 medical schools. Currently, each of these schools has an EHR system in place at the students' primary clinical sites with some ability for students to write notes.²⁹ Additionally, the consortium's recent work includes investigating the tools necessary to create a robust virtual health care learning system, including EHRs designed exclusively for teaching.²⁹

For example, the Regenstrief Institute in association with Indiana University School of Medicine developed a virtual health care system and the Regenstrief EHR Clinical Learning Platform, a teaching EHR. Students use deidentified and misidentified patient data to practice writing orders, entering notes, reviewing data, and creating a plan of care. In addition, the curriculum at New York University School of Medicine includes a virtual patient panel with deidentified patient data. Third-year students write notes and have mobile access to the EHR system; fourth-year students can write notes and enter orders requiring cosignature. Next, medical students at Oregon Health & Science University

receive clinical informatics instruction from the start of medical school. They also are issued a log-in to the institutional EHR on the first day of school, and all cases in the case-based curriculum are delivered via the EHR. Curricular activities are designed to develop proper skills in medication reconciliation, order entry, chart maintenance, and evidence-based chronic disease management.¹ The training also includes the use of EHR-based simulation.

At Vanderbilt University School of Medicine, students write notes that are displayed in their patients' medical records. The entire patient note is then copied automatically to a secure server housing the student's personal electronic portfolio. Faculty members evaluate these notes and assess students' documentation and reasoning skills. Finally, Warren Alpert Medical School of Brown University developed a longitudinal EHR curriculum within its clinical doctoring course series. The program also includes resources to help students learn the costs of different tests, the effectiveness of those tests in discriminating between two diseases, and the advantages of using one test over another. The program uses mock data with which students can practice.

Several medical schools added to the AMA consortium in 2016 have begun to adopt the EHR systems designed for teaching by the original members of the consortium. Medical schools that are not part of the consortium also have contacted member schools about adopting their systems.²⁹

Additional Solutions to Expanding Students' Access to EHRs

While policy proposals from medical societies and innovative training models designed to teach informatics skills are important, additional solutions are needed at the regulatory and institutional levels to reduce the barriers to students' access to EHRs. For example, institutions should devise carefully considered policies regarding the placement of students' notes that, while compliant with federal and payer regulations, balance the critical need for patient privacy, liability concerns, and the need for medical students to become facile with EHRs.^{30,31} These strategies should address both students' needs and CMS

billing rules. The American College of Physicians is leading a collaborative effort seeking a change in CMS's 2008 EHR documentation requirements that would allow teaching physicians to refer to a student's documentation of history and physical examination findings or medical decision making in his or her personal note documenting evaluation and management services.³²

The national move toward interoperability of systems—that is, systems that have the ability to exchange data, interpret those shared data, and present the data in more consistent ways to the user—is expected to improve physicians' EHR experience. Interoperability may make it easier for medical students to quickly adapt to new systems in different health care settings, as well as provide a mechanism to identify, track, and monitor authorship in the EHR.³³ Other templates and safeguards that comply with institutional policies also should be implemented in the EHR.³⁴

In addition, academic institutions should consider implementing more robust training for medical students, residents, and faculty on the correct use of students' documentation.¹⁶ Demonstrating skillful use of the EHR also will require its own distinct entrustable professional activity measuring EHR proficiency as a key discrete activity within the use of information technology (i.e., "document a clinical encounter in the medical record").^{4,14}

Conclusions

The implementation of EHRs provides opportunities to improve patient care and increase the accuracy of communications, but, with the transition from paper records to electronic ones, medical students' ability to write notes and enter orders has become inconsistent. The academic community needs to be aware of this shift and explore possible solutions. For more than 30 years, there has been a call for informatics training from the academic informatics community.³⁵ As a first step toward residency and beyond, students need hands-on EHR experience to learn how to enter and discuss orders and prescriptions and document a clinical encounter in a patient's medical record without direct supervision.¹⁹ Limiting students' access to EHRs interferes with

their acquisition of patient charting and testing/medication-ordering skills as well as with their understanding of clinical informatics.

Most academic institutions have a few department champions who advocate for students' EHR access. These champions can represent students' interests and show that each of the aforementioned barriers can be overcome safely and legally. Ensuring that students are being trained to properly use the EHR system by clinical educators will prevent them from having to learn these skills on their own and from creating shortcuts to develop coherent clinical narratives about a patient's history or physical that may not be compliant with regulations and hospital rules and ultimately could impact patient care. Some academic institutions are developing innovative EHR systems for the educational setting. In addition to ensuring medical students' access to EHRs in clinical settings, extending these innovations to all medical school teaching sites and to other medical schools is an important next step. EHR best practices and strategies to overcome barriers to students' use also should be shared among learning consortiums.

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C.M. Welcher is senior policy analyst, Medical Education Outcomes, American Medical Association, Chicago, Illinois.

W. Hersh is professor and chair, Department of Medical Informatics and Clinical Epidemiology, Oregon Health & Science University, Portland, Oregon.

B. Takesue is assistant professor of clinical medicine, Department of Medicine, Indiana University School of Medicine, Indianapolis, Indiana.

V.S. Elliott is technical writer, Medical Education Outcomes, American Medical Association, Chicago, Illinois.

R.E. Hawkins is vice president, Medical Education Outcomes, American Medical Association, Chicago, Illinois.

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