HOD ACTION: Council on Medical Education Report 4 adopted and the remainder of the report filed.

REPORT 4 OF THE COUNCIL ON MEDICAL EDUCATION (A-18)
Evaluation of Clinical Documentation Training
(Reference Committee C)

EXECUTIVE SUMMARY

Widespread concern exists related to the quality of clinical documentation training provided to medical students and residents. American Medical Association (AMA) Policy D-295.314, "Study of Current Trends in Clinical Documentation," consequently directs our AMA to "study the effectiveness of current graduate and undergraduate education training processes on clinical documentation." A primary concern is that many medical students lack sufficient access to their training institution's electronic health record (EHR) system. Although the medical education community agrees that it is essential that students become familiar with clinical documentation and the EHR, some institutions restrict access to the EHR because of potential legal liability related to the risk of errors made by students' ability to copy and paste notes. Residents generally have adequate access to their institution's EHR, although there remain concerns about the adequacy of the clinical documentation training they receive. There are also concerns about the effects of the EHR on student- or resident-patient relationships, in that students or residents may be more engaged with the chart and computer than with the patient. In addition, students may receive poor role modeling from faculty, as well as from the entire care team, on appropriate use of and best practices for EHRs.

This report describes:

- Literature concerning the quality of clinical documentation and effects on patient care and safety, as well as reimbursement;
- Training and evaluation of training in incorporating the EHR into the physician/patient encounter in undergraduate and graduate medical education;
- Training and assessment of training of clinical documentation accuracy in undergraduate and graduate medical education; and
- Relevant work of the Accelerating Change in Medical Education Consortium.

A literature review on training for incorporation of the EHR into the physician/patient encounter and of the accuracy of clinical documentation in the EHR reveals that few published research studies are constructed to provide a useful evaluation of training results. Fewer studies provide a reflection upon the value and effectiveness of the training provided. It therefore is difficult to provide a conclusive summary of the most effective manner in which to train medical students and residents on the EHR. Confounding and uncontrollable circumstances are always a risk in evaluation of educational programs occurring in natural settings. Additionally, as many institutions and medical schools use their own clinical documentation systems or have modified an "off-the-shelf" system, results can be hard to generalize to other settings.

This report includes recommendations to encourage EHR training that includes feedback on the value and effectiveness of the training and that is demonstrated to be useful in clinical practice. In addition, the report recommends that professional development resources be made available to faculty to assure appropriate modeling of EHR use during physician/patient interactions.

HOD ACTION: Council on Medical Education Report 4 adopted and the remainder of the report filed.

REPORT OF THE COUNCIL ON MEDICAL EDUCATION

CME Report 4-A-18

Subject: Evaluation of Clinical Documentation Training

Presented by: Lynne Kirk, MD, Chair

Referred to: Reference Committee C
(Sherri S. Baker, MD, Chair)

INTRODUCTION

American Medical Association (AMA) Policy D-295.314, "Study of Current Trends in Clinical Documentation," directs our AMA to "study the effectiveness of current graduate and undergraduate education training processes on clinical documentation."

This policy stemmed from Resolution 702-A-16, introduced by the Medical Student Section. Testimony before Reference Committee C during the Annual 2016 Meeting of the AMA House of Delegates highlighted the unprepared state of many medical school graduates for effective clinical note-taking, which could result in inaccurate notes and potentially negative patient outcomes. This report, which is in response to Policy D-295.314, will: 1) describe concerns about quality in clinical documentation and effects on patient care and safety, as well as reimbursement; 2) describe training and evaluation of training in incorporating the electronic health record into the physician/patient encounter in undergraduate and graduate medical education; 3) describe training and assessment of training of clinical documentation accuracy in undergraduate and graduate medical education; and 4) summarize relevant work of the Accelerating Change in Medical Education Consortium.

BACKGROUND

Concerns about clinical documentation proficiency of medical students and residents

There has been widespread concern about the quality of clinical documentation of physicians, focusing on the training provided medical students and residents. A primary concern is that many medical students lack sufficient access to their training institution's electronic health record (EHR) system. (Note: Much of the literature uses either the term electronic medical record or electronic health record. This report will use the term EHR for both terms.)

Medical students' inconsistent access to the EHR can result in students graduating without well-developed skills, forcing first-year residents to spend time familiarizing themselves with the EHR while they are learning to care for patients for the first time without direct supervision.[1] Although the medical education community agrees that it is essential for students to become familiar with documentation and the EHR, some institutions restrict access to the EHR because of potential legal liability related to the risk of errors made by students' ability to copy and paste notes in the EHR. In addition, the Centers for Medicare & Medicaid Services (CMS) has rules regarding the use of student documentation to support billing for services which, if not followed, can add potential legal liability.

To prevent institutions from running afoul of CMS rules, the Association of American Medical Colleges has recommended that EHR systems include rigorous controls to safeguard physicians from inadvertently copy/pasting a note created by a medical student, which would have been out of compliance with CMS payment regulations. Until recently, if a student documented an evaluation and management service (E/M), the teaching physician had to verify and re-document the physical examination and the medical decision-making activities of the services. The physician could only refer to a student's documentation related to the review of system and/or past/family and/or social history.[2] Beginning in March 2018, CMS "allows the teaching physician to verify in the medical record any student documentation of components of E/M services, rather than re-documenting the work." As CMS notes, however, "the teaching physician must verify in the medical record all student documentation or findings, including history, physical exam and/or medical decision making. The teaching physician must personally perform (or re-perform) the physical exam and medical decision making activities of the E/M service being billed, but may verify any student documentation of them in the medical record, rather than re-documenting this work."[3] While this update in policy may encourage some medical schools and clinical teaching sites to allow more medical students to access the EHR, institutions are advised, as a best practice, to "[i]nvest in provider education to create high-quality documentation with EHR tools."[4]

Students' use of copy and paste functions (CPF) in the EHR is widespread and has raised concerns about potential lapses in patient quality of care and medical ethics. Third-year medical students at one medical school were surveyed about their use of CPF in the EHR, as well as observations of other professionals using CPF. All students frequently used the EHR for documenting their patient notes. Although very few (10 percent) believed it acceptable to copy and paste from other providers' notes, 83 percent believed it acceptable to copy and paste from their own notes, 22 percent have copied from residents' notes, and 13 percent have copied from attendings' notes. Although using CPF is a common practice, 46 percent believed that notes written using CPF are less accurate than notes written without it, and 45 percent believed that CPF causes problems in patient care. Only 42 percent of students were aware of their school's policy concerning copy and paste (students are prohibited from copying others' notes, but are permitted to copy their own note from a previous day if it is altered to reflect the patient's current condition).[5]

Besides concerns about inappropriate use of CPF in the EHR by medical students, clerkship directors worry about the effect of the EHR on student-patient relationships, in that students are more engaged with the chart and computer than with the patient. In addition, students are receiving poor role modeling from faculty, as well as from the whole care team, on appropriate use of and best practices for EHRs.[6]

Similar concerns are also relevant when reviewing residents' use of the EHR. In a survey at a large integrated health system, program directors were questioned about their confidence in their first-year residents' abilities to perform 13 core entrustable professional activities (EPAs) six months into their first year of training. Overall, 62 percent of their residents were assessed. Confidence in the residents' ability to perform the activities without supervision ranged from 38 percent to 98 percent. Sixty-nine percent of first-year residents were considered to be able to perform EPA 4, "Enter and discuss orders and prescriptions," without supervision, while 98 percent were considered able to document a clinical encounter in the patient record without supervision.[7]

Although residents have been found to make fewer errors than attending physicians in the EHR, at least at the time of transition from paper to electronic documentation,[8] other research has pointed out the need for education in clinical documentation and coding practices for residents. A retrospective chart review in 2014 of surgery residents at one institution found 28 percent of the

reviewed charts had inaccuracies in one or more of the following categories: admission diagnoses, surgical diagnoses, in-hospital complications, or comorbidities. The average reimbursement of the charts with inaccuracies was $7,849 compared to $8,418 for the corrected versions, a 12.4 percent difference. The authors suggest that hospitals may incur significant loss in revenue due to errors in clinical documentation by residents and that educational training for surgical residents in clinical documentation and hospital-specific coding practices could prove financially advantageous.[9]

Published literature describing training in clinical documentation accuracy in the EHR and the use of the EHR and computers during the physician/patient encounter is relatively rare, especially given the concerns that clinical documentation inaccuracy and poor physician/patient interactions can affect patient care and safety.

TRAINING IN AND ASSESSMENT OF THE EHR IN THE PHYSICIAN/PATIENT ENCOUNTER

In 2012, the Alliance for Clinical Education, a consortium of clerkship directors across clinical disciplines, published guidelines for medical student documentation in the EHR.[10] These guidelines note the importance of students becoming competent in EHR use prior to graduation and acknowledged that such education is infrequent. The final guideline states that medical schools should develop competencies for charting in the EHR and state how these competencies would be evaluated. The guidelines lay out opportunities for EHR training throughout the curriculum, providing a framework for institutions developing such curriculum for their students. Wald and colleagues have also outlined curriculum objectives that could be incorporated into EHR training in undergraduate medical education.[11]

In 2014, Hersh and colleagues outlined competencies across the content of clinical informatics for medical education. These included several competencies related to EHR use, which they have begun implementing for their students at Oregon Health & Science University School of Medicine (OHSU), a member of the Accelerating Change in Medical Education Consortium.[12]

Overall, in both undergraduate and graduate medical education, there is broad support for increased education and training in the use of the EHR. Several expert groups have recommended specific objectives and competencies for such curricula. However, there are fewer reports of implementation of these curricula and assessment of their outcomes. Few studies have been conducted to examine the effectiveness of training in the use of the EHR in encounters between medical students/residents and patients. Often studies in educational environments lack the ability to control confounding factors; enroll enough participants; and include objective, third-party observers.

Assessment of training provided for medical students

OHSU has been one of the leaders in introducing medical students to the EHR as part of an objective structured clinical examination (OSCE). During the OSCE, the student interacts with a standardized patient (SP) and accesses a simulated EHR. The student's performance is evaluated by a faculty member either in the room or behind a two-way mirror. The EHR-OSCE assesses EHR skills rather than medical knowledge, which include not only what information is placed into the EHR but also the positioning of the computer/monitor throughout the examination.

The University of Texas Health Science Center at San Antonio (UTHSCSA) has adopted the OHSU EHR-OSCE. Although not designed to evaluate the effectiveness of EHR training, a paper comparing the performance of students of the two schools suggests that some differences in performance may be the result of the timing of the training. Students from UTHSCSA had better overall performance compared to OHSU students. In particular, UTHSCSA students' performance improved over the course of the year, while OHSU students' EHR skills failed to improve as the year progressed. UTHSCSA students received didactic EHR training in the weeks immediately preceding the OSCE, while OHSU students received training up to 14 months prior to the OSCE. The authors of the study suggest that this intervening period at OHSU caused EHR skills to atrophy and also increased students' exposure to negative role-modeling while observing clinicians using the EHR.[13]

Han, Waters, and Loop designed a study to measure the effectiveness of an online self-study module for medical students and other health care professionals.[14] The module includes sections on education, computer placement, and provider-patient interactions in the presence of the EHR. The module emphasizes the potential of using the computer as a visual aid in patient education, along with appropriate placement of the computer to promote a positive open triadic position, and presents methods to maximize the provider-patient relationship while involving the patient in the EHR process. The researchers were able to use SP encounter videos of medical students before the introduction of the module into the second year curriculum as a pre-test and compared SP videos of students who completed the module. In addition, SP evaluations of the encounters were compared, and students were also reevaluated three months later. Students who had taken the module demonstrated better EHR communication skills compared to the pre-module students, SPs' evaluations were more positive, and three months later students had retained their skills.[14]

Educators at the University of Arizona College of Medicine - Phoenix assessed whether EHR ergonomics training enhances students' ability to use the EHR during SP encounters. They compared the performance of students in three groups, all of whom took a pre-survey on computer use: 1) students who received two hours of basic EHR training and had no EHR available during SP encounters; 2) students who received the EHR training and were expected to use the EHR available during SP encounters; and 3) students who received the EHR training, were expected to use the EHR during SP encounters and received additional ergonomic training. Ergonomic assessment data were collected from students, faculty, and SPs in each session. A post-survey was administered to all students, and data were compared across all three groups to assess the impact of EHR use and ergonomic training. The results revealed a significant positive effect for the third group, in that EHR use improved with EHR ergonomic training—specifically, those who had the ergonomic training felt that they were able to use the EHR more effectively to engage with the patient, better articulate the benefits of using the EHR, better address patient concerns, more appropriately position the EHR device, and more effectively integrate the EHR into the patient encounter.[15]

Assessment of training provided for residents

Fogarty, Winters, and Farah developed a workshop conducted with 139 residents and faculty supervisors on the challenges and opportunities of working with the EHR in practice, covering the introduction of patient-centered behaviors and presenting videos demonstrating common behaviors and improvements. Possibly exemplifying the difficulty of conducting research into educational innovations, only 39 of the 139 participants completed both the baseline and post-intervention assessment.[16]

In another study, a standardized, streamlined note template was added to the EHR at a free-standing children's hospital. Comparing the notes written in the EHR with the template to notes written during the same time period a year earlier, notes using the template were statistically shorter and trainees finished their notes later in the day, although there were no differences in the total amount of time to write notes (238 vs. 225 minutes, p=.32). Overall, the standardized note template was well-received by residents, despite some ambivalence about EHR functionality. As another possible example of the difficulty of research in these settings, the authors point to an unexpected confounder of the study, i.e., more notes were written post-template implementation. This likely reflects an increase in the patient census and accompanying number of notes to be written without an increase in resident coverage.[17]

Other research looked at a family medicine residency program that developed a longitudinal primary care medical home (PCMH) case-based EHR curriculum. The EHR training was grounded in clinical cases, including a step-by-step breakdown of the PCMH clinic visit, and delivered throughout the three-year residency program; residents were scheduled for a three-hour training session each trimester, with an EHR self-assessment of six core skills taken at the end of each session. Researchers compared the self-assessments of residents who attended more training (eight or more sessions, average=nine) to those who attended fewer than eight (averaging 5.3 sessions). The results showed that low-exposed residents improved the most over time, and high-exposed residents reported overall higher post-test scores at training completion.[18]

In another study at a family medicine residency program, 36 residents volunteered for random assignment into either a simulation-based training program or a lecture-based training group, which covered tips on using the EHR (such as "reserve templates for documentation," "tell your patients what you're doing while you're doing it," "look at your patients," etc.). The study included a pre-test simulation of six SPs, a post-test simulation of another six SPs, and evaluation by physician observers and by SPs. No difference was found between the two groups. Both groups had improved in their use of the EHR as evaluated by physician observers and SPs, and the residents rated themselves as more competent in the post-training phase. The authors of the study postulate that the six pre-test simulated encounters provided a major training effect for volunteers motivated to learn. [19]

TRAINING IN AND ASSESSMENT OF CLINICAL DOCUMENTATION ACCURACY

Assessment of training provided for medical students

Although there are studies documenting students' use of the EHR and assessing accuracy, assessment of the training provided students is lacking or at least not available in the published literature. One study did make an interesting comparison of the level of accuracy in the EHR performance of 222 third-year medical students during their internal medicine clerkships and subsequent performance on their end-of-clerkship professionalism assessments versus their end-of-year gateway OSCE clinical skills scores for communication and history taking. Overall, 31 percent of students had one error in the EHR, and 13.5 percent had two to six errors. Most errors were in structured data entry. Error rate was correlated with poor performance as assessed at the end of clerkship. However, there was no assessment of the method by which the students learn the EHR, which was 15 online tutorials completed over 71 minutes.[20]

One study underscores the ability of medical students to accurately use the EHR in that it describes students as credentialed trainers at one academic health center that underwent a transition from one EHR system to another. Six selected medical students went through a six-week course that

included instruction on adult learning theory, change management, and conflict resolution. They were assessed through written and oral examinations with the EHR vendor and institutional training leaders. The students then trained over 1,000 providers during a two-month time period. The trainers were given extremely high marks on the post-training survey, averaging 3.93 on a 4-point Likert scale for both mastery of material and communication skills (4 being excellent, 1 being poor). The authors noted that the institution saved considerable money using in-house trainers while providing the students a valuable financial and career opportunity.[21]

Assessment of training provided for residents

Researchers at OHSU assessed the 1.5-day training on its EHR system that internal medicine residents receive at the beginning of residency. Training included instruction on real-world task completion relevant to interns' clinical practice. One month after this training, interns participated in a dedicated exercise to test their ability to perform a set of 28 defined EHR use-related competencies with the OHSU simulation version of the EHR. All interns were found to have missed at least one safety issue, and overall there was wide variation in the amount and quality of data imported to generate notes. The researchers concluded that the results highlight the inadequacies of standard EHR training in the setting of advanced EHR use for data acquisition and documentation and noted that simulation may also help inform EHR redesign by reflecting accurate use patterns.[22]

An example of the difficulty of performing educational evaluation research in real-world settings is demonstrated by a study that attempted to compare the effect of two different interventions on the quality of EHR clinical documentation of internal medicine residents at two medical schools. The educational quality improvement intervention project did not improve the quality of clinical documentation. The authors noted that they were not able to combine the scores of residents at the two schools, leading to small sample sizes, and that one rater scored documentation much higher than other raters. Calibration did not occur beforehand.[23]

Although another study at OHSU was designed to assess whether EHR simulation improves EHR use in an ICU by comparing residents who went through the simulation once to those who participated twice, what occurred between the two sessions may account for much of the improvement found. Specifically, after residents were given the EHR of a case study:

> Participants … presented the case to a member of the study team and were graded on the number of patient safety issues identified. After the exercise, every participant underwent an immediate, standardized debriefing session on action items missed and received suggestions to improve their skills for EHR use. Beginning with the laboratory data, participants were shown the important trends in renal function and blood counts, as well as a tutorial regarding the graphing functions available. From there, assessment and evaluation of the medication administration report was completed, with discussion of appropriate dosing of medications and finding therapeutic drug monitoring assessments. This would be followed by reviewing vital signs, beginning with the most commonly used screen to assess vitals and using two other screens that display the same information in different contexts. Participants were shown possible customizability options and graphing functions within the vital signs pages as well as specific information found only in these screens. Next, participants would review ventilator data and discuss lung protective and low tidal volume ventilation, as well as how to assess appropriateness of an individual patient's ventilator settings. Volume status and intake/output reports were then viewed and specific issues surrounding volume status in ARDS were

discussed. Finally, participants were given time to ask questions, re-review any functions of the EHR, and discuss any concerns regarding participation in the simulation exercise.[24]

Not surprisingly, given the thoroughness of the debriefing session, residents who then were presented a second case study, one to four weeks later, improved their rate of overall recognition of patient safety issues compared to the first case study (39.9 percent vs. 63.4 percent).

In another study, researchers designed an intervention bundle to improve pediatric resident progress notes written in an EHR and to establish the reliability of an audit tool used to evaluate notes (which is not typical of much of this type of research). The bundle consisted of establishing note-writing guidelines, developing a note template, and educating residents about the guidelines and using the template. The residents received classroom teaching about best practices and instruction in use of the template. Raters were trained to score notes through practice sessions during which they all scored the same note and compared findings. Overall, improvement was mixed, with reduced vital sign clutter and other visual clutter within the note, but no significant reduction in input/output clutter, lab clutter, or inclusion of the medication list.[25]

Noting that much of clinical documentation training for medical students, residents, and practicing physicians lacks key constructs in self-efficacy, namely, vicarious learning (peer demonstration) and mastery (practice), researchers devised a study to improve clinical documentation quality that compared two different models of training.[26] One model, provided to internal medicine residents, used two components of self-efficacy: 1) social persuasion, e.g., emphasizing the importance of complete and accurate documentation for patient welfare and providing feedback to participants based on performance on a clinical documentation quality pretest as well as participation in the training session and 2) psychological/emotional states, e.g., discussing frustrations physicians have complying with increasing regulation, the monetary impact of incomplete or inaccurate documentation, and time management issues, as well as providing dinner as part of the training. The other model, administered to another group of residents, included two additional components of self-efficacy: 3) vicarious experience, e.g., video recordings of physicians discussing documentation, including solutions to problems, examples of good documentation shared, and experiences of documentation during the first training session (the pretest) were shared and discussed during the second session and 4) mastery experience, e.g., each participant had the opportunity to accurately and correctly document diagnoses in five problem areas from 10 sample records. This study used sophisticated data analysis and concluded that training using all four components of self-efficacy showed substantially greater positive impact on improved clinical documentation and self-efficacy compared to the two-component training. This study was not using, it appears, an EHR as part of the training, but the training model could be modified to those systems and likely is currently in use.

WORK OF THE ACCELERATING CHANGE IN MEDICAL EDUCATION CONSORTIUM

To help fill gaps in medical education and as part of its larger strategic focus to improve the nation's health, the AMA launched the "Accelerating Change in Medical Education" initiative in 2013. After awarding initial grants to 11 medical schools from across the country, the AMA brought these schools together to form the AMA Accelerating Change in Medical Education Consortium—a unique, innovative collaborative that allowed for the sharing and dissemination of groundbreaking ideas and projects. In 2016 the AMA awarded grants to another 21 schools. Today, the 32-member consortium, which represents almost one-fifth of allopathic and osteopathic medical schools, is delivering forward-thinking educational experiences to approximately 19,000 medical students—students who will provide care to a potential 33 million patients annually. As

consortium members continue to implement bold ideas and demonstrate a deep commitment to creating the medical schools of the future, their solutions are being disseminated to the greater academic community. These pioneering efforts are facilitating the widespread adoption of new ideas. A number of schools in the consortium have taken the lead in finding new and inventive approaches to instructing students on the use of EHRs.

New York University School of Medicine (NYU), for example, has recently fully integrated teaching note-writing into its pre-clerkship "doctoring" course. What had initially been taught at the end of the course is now taught alongside other subjects, e.g., communication skills, cultural competency, clinical reasoning, and so forth. During the first week of school, first-year students begin writing notes with actual patients. At the end of each clerkship, clinical note-writing is now included in the OSCE. Although there has been no formal evaluation, integration of note-writing into the pre-clerkship syllabus has enhanced note-writing performance in the clerkship phase of training and on the comprehensive clinical skills exam at the end of clerkships. (Ruth Crowe, MD, PhD, assistant professor, NYU Department of Medicine, personal communication).

Recognizing that many medical students are starting residency without the experience of working effectively with EHRs, the Indiana University School of Medicine and the Regenstrief Institute (RI) developed the Regenstrief EHR Clinical Learning Platform as part of the AMA's "Accelerating Change in Medical Education" initiative. This virtual EHR was developed to ensure medical students and other health care trainees gain real-world experience using EHRs during their training. It includes over 11,000 real, pseudonymized patient records. Learners can search and access patient data, document patient encounters, enter individual/unique actions, see actions entered across practice settings, receive alerts, place orders, and pull logs and reports.[27]

The platform is currently in use in six medical schools/medical education programs. Schools are able to control the type of content students can access, as well as how students use the information in the platform. Some schools grade students on their ability to use the system. Although the platform was not designed to instruct students on how to write a patient note, correct documentation can be taught depending upon how a particular course adopts the platform into its curriculum. The RI team is evaluating machine learning and natural language understanding technology for the evaluation of student documentation. The first phase of this study employs supervised machine learning techniques to hopefully classify notes into good, bad, and mediocre sets. If this first phase is successful, the intent of subsequent studies will be to create automated and meaningful student documentation evaluation. (Blaine Takesue, MD, Research Scientist, Regenstrief Institute, and assistant professor of clinical informatics, Indiana University School of Medicine, personal communication)

RELEVANT AMA POLICY

Policy H-310.953, "Practice Options and Skills Curriculum for Residents," directs our AMA to "assist medical societies and residency programs in the development of model curricula for resident physicians and those entering practice regarding practice options and management skills, including information on CPT and ICD coding."

Policy H-315.969, "Medical Student Access to Electronic Health Records," states that our AMA: "(1) recognizes the educational benefits of medical student access to electronic health record (EHR) systems as part of their clinical training; (2) encourages medical schools, teaching hospitals, and physicians practices used for clinical education to utilize clinical information systems that permit students to both read and enter information into the EHR, as an important part of the patient

care team contributing clinically relevant information; (3) encourages research on and the dissemination of available information about ways to overcome barriers and facilitate appropriate medical student access to EHRs and advocate to the Electronic Health Record Vendors Association that all Electronic Health Record vendors incorporate appropriate medical student access to EHRs; (4) supports medical student acquisition of hands-on experience in documenting patient encounters and entering clinical orders into patients' electronic health records (EHRs), with appropriate supervision, as was the case with paper charting; (5) (A) will research the key elements recommended for an educational Electronic Health Record (EHR) platform; and (B) based on the research--including the outcomes from the Accelerating Change in Medical Education initiatives to integrate EHR-based instruction and assessment into undergraduate medical education--determine the characteristics of an ideal software system that should be incorporated for use in clinical settings at medical schools and teaching hospitals that offer EHR educational programs; (6) encourage efforts to incorporate EHR training into undergraduate medical education, including the technical and ethical aspects of their use, under the appropriate level of supervision; and (7) will work with the Liaison Committee for Medical Education (LCME), AOA Commission on Osteopathic College Accreditation (COCA) and the Accreditation Council for Graduate Medical Education (ACGME) to encourage the nation's medical schools and residency and fellowship training programs to teach students and trainees effective methods of utilizing electronic devices in the exam room and at the bedside to enhance rather than impede the physician-patient relationship and improve patient care."

SUMMARY AND RECOMMENDATIONS

A review of the published literature on training in incorporating the EHR into the physician/patient encounter, and in the accuracy of clinical documentation in the EHR, reveals that few published research studies are constructed so that they can provide a useful evaluation of the results of the training. Fewer studies provide a reflection upon the value and effectiveness of the training provided. Assessments and comparisons are made and likely future revisions are planned for the training programs, but that is not shared. It is therefore difficult to provide a conclusive summary of the most effective manner in which to train medical students and residents on the EHR. Confounding and uncontrollable circumstances are always a risk in evaluation of educational programs in the "real world." In addition, as many institutions and medical schools use their own clinical documentation systems or have modified an "off-the-shelf" system, results can be hard to generalize to other settings.

Some general observations can be made, however:

1. Any training should provide students, residents, and physicians with institutional policy regarding copy and paste functions or any other functions that have local guidelines.

2. Ergonomic training in the use and placement of a computer during the physician/patient encounter can be effective and should not be neglected.

3. Basic study methodology should always be considered: Use theory to develop hypotheses, guide the research, and organize the data analysis. Timing can affect evaluation results; without practice, newly acquired skills will atrophy. Pre-test sessions are a form of training—the more provided, the greater the risk in seeing no differences between study groups. Small sample sizes and poor training of evaluators can lead to inconclusive findings. Incentives should be designed to reduce drop out of

learners for post-training assessment. Employing only one measure of evaluation is inadequate. Evaluation should include more than trainees' self-assessment; standardized patients and trained observers should also provide feedback. Expect volunteers in studies to be motivated to learn, whether in the control or intervention group. Be prepared to use post-hoc study controls, in case uncontrollable extraneous events affect results.

4. Studies utilizing simulation, OSCEs, standardized patients, one-on-one training, and a more "hands on" approach as part of the intervention generally appear to have better results. While peer instruction is important, the more opportunities trainees have to use the system themselves and receive immediate feedback, the better.

5. Publishing information on what does not work is just as helpful as providing information on what does work. Programs should use study results to "close the loop," i.e., act on the results and make ongoing improvements.

The Council on Medical Education therefore recommends the following recommendations be adopted and the remainder of this report be filed.

1. That Policy D-295.314, "Study of Current Trends in Clinical Documentation," be rescinded, as having been fulfilled by this report. (Rescind HOD Policy)

2. That our American Medical Association (AMA) encourage medical schools and residency programs to design clinical documentation and electronic health records (EHR) training that provides evaluative feedback regarding the value and effectiveness of the training, and, where necessary, make modifications to improve the training. (Directive to Take Action)

3. That our AMA encourage medical schools and residency programs to provide clinical documentation and EHR training that can be evaluated and demonstrated as useful in clinical practice. (Directive to Take Action)

4. That our AMA encourage medical schools and residency programs to provide EHR professional development resources for faculty to assure appropriate modeling of EHR use during physician/patient interactions. (Directive to Take Action)

Fiscal Note: $1,000.

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