WHY RESIDENCY PROGRAMS SHOULD NOT IGNORE THE ELECTRONIC HEALTH RECORD AFTER ADOPTION

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Abstract

During residency training, one of the tools residents learn to use is the electronic health record (EHR). The EHR contains up-to-date medical data that are crucial to the care of the patient; thus the provider must know what is pertinent, where to locate it, and how to efficiently document the data for ongoing communication of patient care. Because institutions may have different EHR vendors, EHR workflow study data are often obtained in single institutions, with a limited number of participants and specialties. Increasing our understanding of the subtleties of residents' EHR usage not only can help educators understand how residents use the EHR but also may provide information on another cognitive factor to assess residents' performance. This, however, will only occur when EHR skills are considered an important part of residency training and we ask our EHR vendors to help us develop validated electronic tools to assess EHR performance.

Commentary

Residents are tasked with developing proficiency in clinical skills while providing direct patient care. This dual goal cannot be achieved unless competency in clerical responsibilities is gained as well. These responsibilities can include timely documentation to communicate a patient’s clinical progress and order entry to ensure that the patient receives proper treatment.

In an era of technological advancements that includes the widespread implementation of the electronic health record (EHR) mandated by the Health Information Technology for Economic and Clinical Health (HITECH) Act, a majority of clerical tasks can now be completed via a computer.\(^1\) While EHR usage is associated with reduction of human medical error, costs, and patient mortality,\(^2\)\(^-\)\(^4\) it can nevertheless be disruptive to clinical workflow because of an unbalanced focus on the computer screen over direct patient care.\(^5\)\(^,\)\(^6\) Thus, in addition to completing patient-related tasks, residents must learn to be efficient in the use of the EHR. Increasing efficiency in EHR usage could improve patient care as well as the educational experience of the learner.

For this reason, the Accreditation Council for Graduate Medical Education (ACGME) recognizes the importance of the EHR in residency education. Access to an EHR or a commitment to EHR adoption is a core requirement for residency program accreditation.\(^7\) Effective utilization of the EHR is now considered a milestone in the evaluation of residents in various specialties,\(^8\) and residency programs are tasked with evaluating and reevaluating EHR use.

During and after EHR adoption, hospitals require clinicians and learners to undergo training to
reduce the risk of error and adverse events related to EHR usage. Therefore, every time a learner is hired or a medical student is assigned to rotate at a facility with an EHR, time is invested to complete this training. This time was previously dedicated to learning clinical skills. In addition, updates are continuously made to the EHR software to optimize it. The nature and timing of updates is determined primarily by EHR companies in close consultation with clinicians. Depending on the impact of the changes, users must be retrained and more time dedicated to this retraining—time that again was previously used to develop clinical skills or to increase one’s knowledge base.

EHR companies are well equipped to assess the quality of their product and to make improvements. They consult clinicians with the goals of assessing the quality of the software, improving safe practices, and decreasing the risk of errors. EHR companies are not, however, tasked with determining the impact of an update on graduate medical education. This task falls on educators, who must ensure that the educational workflow is not obstructed. Educators must ensure that learners are connecting with their patients, not only their computer screens; are not staring at their computer screens when an attending physician is teaching; are not frustrated when the software they previously knew how to use has been updated; and are being efficient in their EHR usage.

When an educator assesses EHR efficiency, this assessment should not be considered just a way to make learners work faster. It should be seen as another cognitive factor in the assessment of medical knowledge and clinical reasoning. Therefore, studying residents’ EHR usage may be a useful way to diagnose difficulties in learning and clinical performance. For instance, is the learner spending too much time transcribing all the heart range changes that occurred overnight to present during rounds? Or is the learner identifying trends in the heart rate and discovering that the patient may be developing a serious bacterial infection, then implementing a management plan before rounds? Is the resident performing a medication reconciliation for discharge too quickly, resulting in inaccuracy and contributing to subsequent medication error?

The use of EHRs and the impact on medical education have been studied previously. Quantity of time spent using the EHR is the primary measure of resident workflow. The most common method relies on human observers to measure EHR use in the form of time-motion studies. Use of this method has resulted in substantial growth in informatics research but has been fraught with inconsistencies that negatively affect research quality and generalizability of results. In the graduate medical education environment, the effect of these weaknesses can be particularly profound. First, the specialties studied vary, with many institutions having no clear residency education leader committed to improving EHR adoption. Further, while the purpose of time-motion studies is to study resident task efficiency, few studies focus on process improvement. Because institutions may utilize different EHR vendors, EHR workflow study data are often obtained in single
institutions, with a limited number of participants and specialties.\textsuperscript{45–63}

Because of the nature of time-motion studies, humans must observe EHR use and the EHR workflow. The amount of data that can be obtained is limited by the availability of observers, and the process is labor intensive. Study outcomes are often not consistent. While most observers note time spent using the EHR, studies look at a variety of tasks, including general nonspecific EHR usage,\textsuperscript{64–71} documentation focus,\textsuperscript{72–76} order entry,\textsuperscript{77,78} data gathering,\textsuperscript{77,78} and patient interaction.\textsuperscript{79–83} Each of these outcomes, while important to resident workflow, lacks standardization and can limit widespread process improvement interventions. These limitations of the previous research decrease its generalizability and reduce its usefulness in determining the impact of EHR usage on resident education.

A systematic method to evaluate learners’ use of the EHR must be developed. An ideal approach should consist of the following:

1. **An electronic tool that is automated, objective, and generalizable across different institutions and EHR platforms should be developed and validated.** A clinician’s workflow in general is variable and erratic, especially as observed by humans. While human observers can generate useful data, it is ironic that electronic tools are not widely used to assess efficiency in EHR usage. Electronic tools are consistent, can be easy to use, and allow a large quantity of data to be easily collected and stored.

2. **Humans should be involved, not to observe use of the EHR, but to interpret the data that are collected.** The study by Chen et al. was one of the first to use time-tracking software within the EHR to increase understanding of resident workflow.\textsuperscript{84} While the quantity of data collected was greater than that in any other study of EHR usage and/or resident workflow, Chen et al. did not determine whether other factors influenced the time spent using the EHR.\textsuperscript{85} Was more time spent when the EHR was updated or when more patients were admitted? Did the resident complete a night shift and spend more time than usual on the EHR to complete overnight tasks? If the resident’s EHR use was addressed, would the intervention have had a greater impact when the patient census was higher? Even with the development of an objective, validated, and automated tool to measure EHR use, humans must continue to be involved, as the data can be misinterpreted and a resident’s workflow misjudged.

3. **Both macroscopic and microscopic studies of EHR usage are needed.** Resident EHR workflow studies should always begin with a general (macroscopic) overview of EHR usage. For example, how much time does each resident spend using the EHR? This overview allows residency programs to identify heavy users of the EHR and easily determine residents’ EHR efficiency. This type of study, however, should not be the only one employed, as the EHR has many components and is used differently depending on the context. Therefore, a granular
A microscopic approach should also be used to help determine which parts of a resident’s workflow are least efficient. Is it during admission, where they are tasked with not only assessing a patient but also entering orders to ensure a safe transition from the emergency room to the hospital floor? Or is it during the morning information-gathering process, where they are tasked with extracting and interpreting a vast amount of information to prepare for rounds? Does the resident prioritize documenting or reviewing the patient’s objective data during the course of the day?

Increasing our understanding of the subtleties of residents’ EHR usage will be difficult but necessary. Using novel systematic approaches to study residents’ EHR workflow not only can help residency educators understand how residents use the EHR but may also provide information on another cognitive factor to assess a resident’s performance. This, however, will only occur when EHR skills are considered an important part of residency training and we ask our EHR vendors to help us develop validated electronic tools to assess EHR performance. Being able to use a computer in patient care does not necessarily make one a competent or incompetent physician. Overlooking EHR inefficiency as merely a sign of technological inadequacy, however, may produce incompetent physicians and limit the impact the EHR can have on the quality and safety of patient care.

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Notes

6. Accreditation on Council for Graduate Medical Education. “ACGME Program Requirements for
Graduate Medical Education in Internal Medicine.” November 10th, 2019. 


45. Hill, R. G., L. M. Sears, and S. W. Melanson. "4000 Clicks: A Productivity Analysis of Electronic Medical Records in a Community Hospital ED."
Technology on Work Process and Patient Care in Labor and Delivery.


Usage and Task-Switching during Resident’s Working Day: Disruptive or Not?”


85. Ibid.

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