

# University of Arkansas for Medical Sciences electronic health record and medical informatics training for undergraduate health professionals\*

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The University of Arkansas for Medical Sciences (UAMS) is planning interprofessional training in electronic health records (EHRs) and medical informatics. Training will be integrated throughout the curricula and will include seminars on broad concepts supplemented with online modules, didactic lectures, and hands-on experiences. Training will prepare future health professionals to use EHRs, evidence-based medicine, medical decision support,

and point-of-care tools to reduce errors, improve standards of care, address Health Insurance Portability and Accountability Act requirements and accreditation standards, and promote appropriate documentation to enable data retrieval for clinical research. UAMS will ensure that graduates are ready for the rapidly evolving practice environment created by the HITECH Act.

## INTRODUCTION

The Health Information Technology for Economic and Clinical Health (HITECH) Act, title XIII of the American Recovery and Reinvestment Act (ARRA) of 2009 [1], sets the stage for a fundamental and far-reaching shift in health care practice. Through provisions and financial incentives that promote adoption of electronic health records (EHRs) by primary care physicians, creation of regional centers that assist physicians transitioning from paper to electronic records, and development of health information exchanges that provide infrastructure and support for the electronic interchange of health information among providers, insurers, and systems, one of the act's objective is to establish a foundation for adopting EHRs nationwide.

Also, under provisions in the act, the Office of the National Coordinator for Health Information Technology is establishing programs to address the urgent need for a highly qualified health information technology workforce to support health care professionals, clinics, and hospitals as they increasingly rely on information technology. Support to further this objective includes grant funding supporting creation of Curriculum Development Centers [2] and Community College Consortia to Educate Information Technology Professionals in Health Care [3].

A third foundational component in the widespread transition to EHRs and integration of informatics into health care practice is the corresponding transformation in the clinical education of health professionals. Throughout their training, students in academic health sciences programs will need to develop the knowledge, skills, and attitudes to become leaders in this era of evolving informatics-enhanced health care. Section 3015 of the HITECH Act includes provisions

for funding "demonstration projects to develop academic curricula integrating certified EHR technology in the clinical education of health professionals" [1]. Although no grant opportunities have been announced to fund section 3015 of the HITECH Act, the University of Arkansas for Medical Sciences (UAMS) is developing an interprofessional curriculum that supports the adoption of both EHRs and medical informatics tools by students in the five UAMS colleges.

## BACKGROUND ON ARKANSAS AND THE UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES

Arkansas is a small rural state with UAMS, a public institution, as its only academic health sciences center. UAMS is commonly known as "Arkansas's medical center." As such, Arkansas's citizens and state government take a keen interest in UAMS as an institution where Arkansans receive their health professions education and as a provider of health professionals throughout the state.

The vast majority of students enrolled in the colleges of health related professions, medicine, nursing, pharmacy, and public health and the graduate school are from Arkansas and practice in Arkansas after completing their education. The UAMS College of Medicine (COM) is under legislative mandate to ensure that qualified Arkansas applicants are given priority and that students represent each of the four congressional districts. This mandate is motivated by the prospect that many will become primary practitioners and return to their hometowns. The *2009 State Physician Workforce Data Book* [4] confirms that the UAMS COM ranked second among the states in the percentage of students in the first-year class who matriculated to medical school in their legal state of residence (88%), third in percentage of physicians who are retained from undergraduate medical education (58%), and third in the percentage of physicians who are retained from undergraduate

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and graduate education (80%). Similar or even greater retention percentages apply with respect to the health professional education programs of the other UAMS schools. UAMS graduates have a very significant impact on the health care environment throughout Arkansas.

To help support the “homegrown” health care professionals, UAMS has a very well-developed Area Health Education Center (AHEC) program with eight AHECs distributed around the state. Each AHEC has a mix of clinics, educational programs, and rotations for UAMS students. The AHECs play a vital role in clinical education activities of most UAMS colleges and residency programs. They also provide services for health care professionals in their region. The emphasis on the AHEC program reflects the UAMS commitment to the entire state and the UAMS role in educating and supporting health care professionals throughout the state.

### ELECTRONIC HEALTH RECORDS AND CLINICAL EDUCATION

In March 2009, the COM dean asked the medical informatics committee, a subcommittee of the curriculum committee, to investigate the recently announced HITECH Act and to identify strategies for incorporating EHR technology and training into an interprofessional clinical education curriculum as outlined in section 3015. The dean and the committee considered UAMS to be an appropriate institution for such a demonstration project because:

- the deans of the five colleges are committed to establishing interprofessional activities
- the five colleges all are involved with EHRs
- UAMS Medical Center maintains a robust EHR environment and is routinely listed among the top 100 most wired hospitals

Recognizing that information resources and services provided by the UAMS Library compose a fundamental component of health care education, research, and practice at UAMS, the library associate director serves as an *ex officio* member of the COM curriculum committee and as the chair of the medical informatics committee. In its consideration of the charge from the COM dean, the medical informatics committee acknowledged the importance of rich and easily accessible library resources and services—including evidence-based medicine, medical decision, and point-of-care electronic information resources and medical literature searching—as components of the spectrum of converging technologies connected with implementing and using EHRs in clinical education and practice. The committee noted that previous UAMS Medical Center, information technology, and library initiatives provide a foundation positioning UAMS to include medical informatics in the proposed curriculum:

- UAMS implemented the Sunrise (Eclipsys) EHR system, which includes licensing for Clin-eguide (basically, Skolar MD with Clin-eguide, electronic

books from Ovid, Drug Facts and Comparisons, and other clinical resource components).

- The library purchases licenses and provides training and support for a variety of clinical resources and point-of-care tools, such as UpToDate and statewide licensing for DynaMed.

- Clinical resources provided by the library are accessible through the computer workstations at each clinical station, enabling the integration of these resources directly into the EHR. (Questions remain about what is technically feasible and what is appropriate when integrating specific medical decision support tools into the EHR.)

Coinciding with the COM dean’s directive regarding integration of EHR training and use in the curriculum, UAMS was forming a number of committees to consider possible opportunities in response to the HITECH Act, including an EHR committee. The medical informatics committee presented its ideas for an interprofessional curriculum to the campus-wide EHR committee. Initial concerns that the EHR committee would find these ideas about the curriculum to be inconsequential compared to such issues as meaningful use, Medicare and Medicaid reimbursements, and EHR vendors issues were allayed when the hospital chief medical officer, assistant medical director for clinical informatics for the hospital, UAMS chief information officer, representatives of the administration, and several clinicians expressed wholehearted support for curriculum transformations to help provide UAMS students with the appropriate skills, knowledge, and attitudes concerning EHRs. The clinicians were also enthusiastic about preparing students to adequately document patient records to ensure accurate, meaningful retrieval of data for clinical research.

Reflecting the broad support of the idea, the COM associate dean, assistant medical director for clinical informatics, and library associate director were directed to develop, within a week, a specific proposal for the EHR committee to review. Members of the informatics committee, central support personnel, associate deans of other colleges, and key faculty members were gathered to develop the proposal.

#### **The proposal: interprofessional curriculum integrating electronic health records, evidence-based medicine, medical decision support, and point-of-care training**

The proposal written during that first week has changed very little despite repeated reviews. The proposal states its goal to be:

We will develop and validate a model for interprofessional electronic health record and medical informatics training including a seminar series on broad concepts and online modules, didactic lectures, and hands-on training throughout the curriculum. This model could be portable and expanded to train others in Arkansas and elsewhere. Curriculum will prepare future physicians, nurses, pharmacists, and allied health and public health professionals to use electronic health records, evidence-based medicine,

medical decision support, and point-of-care tools to reduce errors, improve standards of care, address [Health Insurance Portability and Accountability Act (HIPAA)] requirements, and meet accreditation standards. Attention will be given to standardization of EHR documentation to allow data retrieval for clinical research.

Students will use EHR and other knowledge technologies from their first patient care encounters through completion of their formal training in an interprofessional environment and in college specific curricular activities.

Mock patient electronic records will be used in classes, clinical simulations, and standardized patient learning activities and assessments. Web-based instructional learning activities will be used to supplement face-to-face training. Clinical librarians will participate in training, rounds, and development of evidence-based medicine and clinical resource learning activities. [5]

The EHR committee and the UAMS chancellor approved the proposal and efforts to identify and seek funding to support the proposal under any applicable workforce training provisions of the HITECH Act. Recognizing that integration of EHR and medical informatics training and interprofessional interactions are indispensable components of forward-looking health care training curricula, it was agreed that development of the curricula of the UAMS colleges would continue along the lines envisioned in the proposal, even if no external funding to support the effort were forthcoming. A formal EHR training steering committee was formed with representation from all UAMS colleges and appropriate central support services. Presentations were provided to the deans and their leadership groups to obtain their support and to identify one or two representatives from each college for the committee. The library, the office of educational development, the center for clinical skills education, and the AHECs are also represented on the committee.

### Competencies

Two sources of authoritative competencies were identified to assist the committee in defining the scope of EHR and medical informatics competencies to be addressed at UAMS.

1. The Joint Work Force Task Force of the American Health Information Management Association and the American Medical Informatics Association published "Health Information Management and Informatics Core Competencies for Individuals Working with Electronic Health Records" in October 2008 [6]. This document provides an overview of the skills, attitudes, and behavior changes that are necessary for the electronic environment. The core competencies worksheets provided the framework for a gap analysis of each college and across the UAMS curricula. Analysis of the worksheets uncovered deficiencies in UAMS preparation for EHRs and in medical informatics use and indicated where additional learning opportunities are needed. Analysis also provided insights into opportunities to develop shared resources across disciplines.

2. "Scientific Foundations for Future Physicians" was produced by the Association of American Medical Colleges in conjunction with the Howard Hughes Medical Institute in May 2009 [7]. The current UAMS COM curriculum is being influenced by the competencies defined in this report, specifically, "Competency M8: Apply quantitative knowledge and reasoning—including integration of data, modeling, computation, and analysis—and informatics tools to diagnostic and therapeutic clinical decision making," which addresses the need for informatics tools and access to clinical data in the curriculum. The integration and use of data and informatics tools for diagnostic and therapeutic clinical decision making, such as evidence-based medicine and medical informatics tools, are of special importance. The understanding of how proper practices in using the EHR facilitates clinical research data collection and analysis is also fundamental.

### COLLEGE-SPECIFIC AND INTERPROFESSIONAL CURRICULA

Each college and/or discipline has identified the knowledge and skill competencies and behaviors related to EHRs, evidence-based medicine, and medical informatics that their students must master. Each college or discipline is also identifying core objectives reflecting the specific competencies related to that particular discipline. The majority of EHR and medical informatics training will occur in each college. However, interprofessional training will increase as opportunities for partnering across colleges are explored and encouraged. Sharing expertise across disciplines and producing online educational modules presenting basic concepts pertaining to all disciplines will help minimize the duplication of time and effort by educators and instructional developers.

### Seminar series

All first-year classes will be introduced to the converging electronic health care environment through a year-long interprofessional seminar series focused on the EHR. Attendance will be required for all first-year students of the colleges. Presentations will be given by acknowledged content experts in conjunction with presenters or hosts from the various UAMS colleges. Seminars will incorporate "application" questions to challenge the students about use of the concepts being presented. Each college will determine how they will provide the time and structure for open discussion and reflection among students and faculty. Interprofessional response groups may also be formed to foster greater appreciation for other disciplines. Seminar topics will be:

1. "Overview of Significance of EHRs & Emerging Informatics Technologies"
2. "Health Economics and Health Policy Issues of EHRs"
3. "Implications of the EHR in Clinical and Translational Research"



4. "Using New Technologies in a Real Life Hospital/Clinic Setting"
5. "Ethical Questions in a World of Electronic Health Records"
6. "Decisions and Outcomes Improved by Medical Informatics Tools"

As an adjunct to the seminar series, a speakers bureau of UAMS experts, including librarians, on the practical application of the EHR and medical informatics tools will be created and publicized on campus. Colleges and departments will be encouraged to call on these experts to supplement their curricula with presentations, case presentations, and question-and-answer sessions tailored to their disciplines.

### Mock patient record database

The EHR training committee has identified various tools currently available on campus to create mock patient records in the Sunrise information system. A health care professional will assist the colleges in developing a database of mock patient records. The goal is to identify opportunities for integrating even small samples of mock and/or real records and medical informatics into clinical correlations, standardized patient learning encounters, Objective Standardized Clinical Exams, simulations, and preclinical orientations. The curricula will present and discuss the EHR whenever possible in live settings to emphasize the importance of the EHR and medical informatics to the health professions students. Awareness of the responsibilities and the interconnected nature of health care will develop among the students of all colleges as they contribute to building an accurate, integrated EHR. The requirements for information confidentiality and other HIPAA provisions will be fundamental to the design of how EHRs are used in the curricula, as well as a fundamental component of the curriculum itself.

### EVALUATION AND ASSESSMENT

An evaluation plan for the program has been designed to ensure efficacy and to guide development of enduring materials and expansion of the program. The evaluation and assessment plan focuses on evaluating the curricular materials and activities with respect to usability as well as efficacy in producing knowledge, attitude, and behavior change toward use of principles of evidence-based medicine and medical informatics. The evaluation will be used to modify and increase training activities in future years.

### SHARING OF ENDURING MATERIALS

Some educational activities will be developed into web-based modules and presentations. This strategy will result in enduring materials to be reused, modified, and repurposed as they are tailored for various disciplines in the UAMS colleges. These online materials will also be available for use in the UAMS residency and hospital staff education programs and will be available to off-campus locations.

The training materials will also be shared with other Arkansas higher education institutions that offer health sciences programs including community colleges, Arkansas professional associations and agencies, and other health sciences academic centers nationwide through MedEdPortal and other means of sharing.

### ELECTRONIC HEALTH RECORD TRAINING AND CREDENTIALING FOR HOSPITAL STAFF AND BEYOND

The associate medical director for informatics for the hospital is a member of the EHR training steering and medical informatics committees. He has proposed that much of the training that is being developed for the students would be appropriate for any credentialing that might be necessary for health care providers in the hospital. Materials could be modified to meet this similar training requirement. There has been discussion of whether formalizing the EHR training for students could lead to the credentialing of all students who complete the EHR training activities. Until credentialing becomes formalized, evolving plans in this area are tentative.

### STATEWIDE INITIATIVES

The Arkansas governor quickly responded to the announcement of HITECH Act funding opportunities to support the adoption of EHRs. The Arkansas surgeon general was assigned responsibility to define and implement a health information exchange for Arkansas. The Arkansas Foundation for Medical Care, a private, nonprofit educational organization dedicated to the clinical evaluation and improvement of health care in Arkansas, was assigned the lead role in seeking regional extension center funding, with UAMS acting as a partner. These centers will provide EHR training for existing health care professionals and assist with workflow issues in primary care practices.

The UAMS EHR Training Steering Committee leadership has been asked to participate in planning, developing, and sharing materials with other state initiatives. The collaboration among these groups demonstrates the significant statewide commitment to the broad and fundamentally transformative objectives of the HITECH Act and is cited to promote approval of proposals submitted under the act. From the point of view of the UAMS EHR Training Steering Committee, the library, and the medical informatics committee, these collaborations afford further opportunities to promote and foster informatics skills and use of related information tools outside the curriculum. This would include, for example, orientation to DynaMed and free resources and training support for use of informatics tools by UAMS and AHEC librarians.

### SUMMARY

UAMS and Arkansas have a vested interest in developing an interprofessional curriculum to prepare future physicians, nurses, pharmacists, and

allied health and public health professionals to use EHRs, evidence-based medicine, medical decision support, and point-of-care tools to reduce errors, improve standards of care, address HIPAA requirements, and meet accreditation standards. While participating in EHR initiatives for practicing health care professionals, UAMS will prepare students to enter the workforce with the knowledge and skills needed to take full advantage of EHRs and medical informatics tools. With the great majority of UAMS health professions graduates remaining in the state to practice, UAMS has an opportunity and fundamental responsibility to help transform the health care environment for Arkansas.

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