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Abstract

This article will outline the background and development of a longitudinal curriculum in information mastery in the Oregon Health & Science University (OHSU) Family Medicine Residency program.

Introduction

Introduction

Over 2.79 million pages of journal articles are published annually in MEDLINE. This number has likely increased since the time of the publication of the manuscript that highlighted this information (2005), given the fact that the number had increased by nearly a million pages per year from the prior decade.[1] Academic clinicians and teachers often comment on the inability to "keep up" with the information overload that is happening in medicine. Due to the dramatic increase in available information in the literature and a desire to move away from anecdotal practices in medicine the field of evidence-based medicine (EBM) was born. While some resources would site EBM's philosophical origins dating back to the mid-19th century,[2] frequently cited sources in the field of Family Medicine date to the more recent 1990's as a time when EBM began to take its roots in primary care education and training.[3] Despite having had these important perspectives in the medical literature for over the past 20 years, many Family Medicine residency programs have struggled with the development and incorporation of a curriculum in 'information mastery'. Only recently have quality articles appeared reviewing newly developed curricula in information mastery and evidence-based medicine.[4] This article will outline the background and development of a longitudinal curriculum in information mastery in the Oregon Health & Science University (OHSU) Family Medicine Residency program.

Background

The information mastery longitudinal curriculum was one component of the revision of the entire Family Medicine Residency program at OHSU as it transitioned from a three-year to a four-year training program in July 2012. The program is taking part in the four-year Family Medicine Residency Pilot, which has been approved by the ACGME and will be overseen by a specially designated committee from the Review Committee for Family Medicine.[5] Along with rotation modifications and transitions, the residency program incorporated three new longitudinal curricular threads into the training program: Information Mastery, Leadership and the Patient-Centered Medical Home. Each curricular thread targeted a specific year in the residency-training program and the Information Mastery curriculum was placed in the second year of the residency. The residency leadership anticipated that, being in the second year, the residents in the program would have been exposed to some evidence-based medicine practices in the clinics and hospital settings, observed some of the data and reports that were being distributed to the clinicians in the practices, and had an opportunity to migrate away from a focus through internship that was largely concentrated on the immediacy of patient care.

Literature and Relevance to Family Medicine Residency Training

Khan and Coomarasamy describe a hierarchical approach to effective teaching and learning in order to acquire competence in evidence-based medicine.[6] The lowest level in this hierarchy includes content that is solely didactic, classroom or standalone teaching time. As one progresses up to higher levels in the hierarchy clinically integrated and interactive activities are included. At the highest level of the ranking interactive and clinically integrated activities are combined. We decided to incorporate this highest-level approach in the development of the information mastery curriculum, to ensure that we had the best chance of the residents developing competency in this important area. Thangaratinam et al. compare the traditional learning environment with the 21st century learning environment. In their article, the authors describe how traditional clinical teaching occurred through 'osmosis' of the senior clinician imparting their experience and authoritative practice upon the medical decision making of the learner. This

is contrasted with the modern learning environment where learners should be asking an answerable question, acquiring and appraising the evidence, and subsequently integrating this evidence into practice and applying the evidence in the learners' medical decision making.[7] Slawson and Shaughnessy have also argued that, "There is a need to teach the applied science of information management along with, or perhaps even instead of, teaching the basic science of EBM."[8]

The current version of the ACGME (Accreditation Council for Graduate Medical Education) Program Requirements for Graduate Medical Education in Family Medicine, which went into effect in July 2007, specifically identifies areas of practice-based learning and improvement (one of the six core competencies) including the ability to locate, appraise, and assimilate evidence from

scientific studies related to their patients' health problems and using information technology to optimize learning.[9] The more recently developed "milestones", which are a joint venture of the Accreditation Council for Graduate Medical Education and the American Board of Family Medicine, identify the highest obtainable level (Level 5) of practice-based learning and improvement (PBLI-1) as, "Incorporates principles of evidence-based care and information mastery into clinical practice."[10] Residency programs will be held accountable for meeting these important milestones in the future. The American Academy of Family Physicians (AAFP) has developed recommended curriculum guidelines for Family Medicine residents relating to scholarly activity and information mastery, which have also been endorsed by the

Association of Departments of Family Medicine(ADFM), the Association of Family Medicine Residency Directors(AFMRD), and the Society of Teachers of Family Medicine(STFM).[11] The guidelines include recommendations regarding the expected knowledge, skills and attitudes of residents towards specific elements of information mastery. Lastly, a new online resource is available to Family Medicine residencies: the Family Medicine Residency Curriculum Resource (http://www.fammedrcr.org/).[12] This website includes a large number of curricular resources for Family Medicine residency programs, including content relating to information management.

Methods

Development of the Curriculum

See Table 1 for a list of the concepts and issues that were considered in the development of the new Information Mastery Curriculum. Using the Kern six step approach to curriculum development,[13] we first identified the 'problem' we were trying to address: the data from our electronic health record (EHR) was demonstrating inadequate and inconsistent application of preventive health services in our clinic populations (including immunizations, screening tests, etc.), resulting in suboptimal patient care. We also recognized that our Family Medicine residents did not have a unified curriculum in information mastery and evidence-based medicine and were receiving information about these areas in an ad-hoc fashion during our regular didactic time. In terms of a needs assessment of the targeted learners, we recognized that there was variable understanding of the basic principles of EBM and basic statistics, which would need to be addressed as a component of the curriculum.

The residency program decided to provide 2 hours of weekly time to the curriculum, spanning a total of 16 weeks. The use of 16 weeks was arbitrary but strategic, given the fact that the residency has three outpatient practice sites with 12 residents at each site. Time in the second year of training would be equally split amongst the residents from the three training sites, totaling 48 weeks (in addition to 4 weeks of "intensives" – one week blocks of dedicated didactic time, spaced throughout the year). In order to maximize the incorporation of adult learning theory principles we decided to have a self-directed learning session precede each small group session. Research has demonstrated that active learning can enhance academic achievement,[14] promote superior skills in social and cognitive performance,[15] superior professional competencies, [16] [17] retention and application of knowledge, [18] enhanced understanding and mastery of course content, [19] and mastery of difficult subjects.[20] The small group sessions in the week following the self-directed learning session were with a faculty member who possessed some extra knowledge or expertise in the content area for that session. The faculty-facilitated sessions would allow the residents an opportunity to review the work and concepts from the self-directed session the prior week. Goals and objectives were

developed for each of the self-directed and faculty facilitated sessions.

Table 1: See Illustration 1

Table 2 itemizes the 16 sessions that were included in the Information Mastery Curriculum.

See Illustration 2

Results

Evaluation and Outcomes

In this first year of implementation of the Information Mastery curriculum, feedback about the curriculum has come from both residents and faculty. A summary of the salient themes in terms of feedback from residents and faculty in the Family Medicine Residency program can be found in Table 3.

Discussion

Various evaluation tools have been utilized in publications relating to information mastery and EBM curricula. Cabell and colleagues measured the number of Ovid log-ins during resident rotations[21] and Ross et al. measured the number of EBM terms used during continuity clinics after introducing an EBM curriculum into a Family Medicine Residency. Others have utilized resident ratings of self-confidence in EBM knowledge and skills after implementing an EBM curriculum[22] [23]or resident attitude and knowledge quiz scores after working with a learning coach.[24] A modified version of the Fresno test of EBM[25] was also utilized in one Family Medicine Residency after implementation of an information mastery curriculum, though the authors admitted the use of the grading rubric difficult to apply and "required several practice sessions to calibrate grading".[4] A systematic review of instruments used for evaluating education in evidence-based practice identified 104 unique instruments.[26] Since it was the first year of implementation of the information mastery curriculum at the OHSU Family Medicine Residency, a specific evaluation tool has not been utilized yet. There has been concern expressed by the leadership in the residency and faculty involved in the curriculum that there does not appear to be a validated instrument that would adequately capture the anticipated outcomes from this new and innovative curriculum, since many of the sessions explore novel content.

Conclusion(s)

The OHSU Family Medicine Residency has successfully implemented a new information mastery curriculum as one component of the new four year residency program. Mixed feedback from the involved residents demonstrates ample opportunities for refinement and improvement of the curriculum. The greatest challenge though will be finding a suitable evaluation tool or instrument that can measure the resident outcomes after participation in the longitudinal curriculum. While the measurement of EBM knowledge, skills, attitudes and behaviors would be very useful, perhaps the most important variables relate to patient-oriented outcomes, which have been infrequently measured in the EBM literature. This is an area that requires attention in EBM research moving forward. Additionally, while assessing resident awareness and use of EBM during their training is valuable, continuing to practice the use of EBM after residency is of utmost importance. Unfortunately, an exploratory study of residency graduates' practice habits found that residents instructed in EBM skills did not regularly practice these skills after graduation, in large part due to time and workload pressures,[27] emphasizing the importance of also studying long-term clinically oriented behaviors in trainees.

Abbreviation(s)

evidence-based medicine (EBM)

Oregon Health & Science University (OHSU)

Acknowledgement(s)

OHSU Family Medicine Residency

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Illustrations

Illustration 1

Table 1

Considerations in Developing the Information Mastery Curriculum
- Number of hours allocated in the resident schedules
- Expertise and availability of local faculty in the Family Medicine Department, Residency and Institution
- Scheduling considerations (location of residents by rotation line, location of faculty, location of meeting space, administrative assistance)
- Incorporation of adult learning theory and principles
- Incorporation of data from residents' patient panels (scorecards, data reports, etc.)
- Relevant reading materials, web-based material and resources
- Recommendations/guidelines/requirements from accrediting agencies, academies and national academic organizations

Illustration 2

Table 2

Information Mastery Curricular Components
Session 1: Introduction to the Information Mastery Longitudinal Curriculum - Facilitator: Course Director - Independent study: resident scorecard analysis and development of individual improvement goals (short session, remainder of time used for this activity)
Session 2: Data Analysis and Incorporation Into Your Practice - Facilitator: Department faculty physician; Data Team Director - Objectives: review EHR practice reports, clinician scorecards and individual improvement goals
Session 3: Self-directed learning session - Independent study: resident review of evidence surrounding a clinical case – low back pain
Session 4: Evidence-based practice: Low Back Pain Management - Facilitator: Department faculty physician researcher - Objectives: highlight research/evidence on diagnosis and management of low back pain; focus on how to "filter" the literature for evidence-based practice recommendations

Session 5: Self-directed learning session - Independent study: resident review of "Basic Statistics for Clinicians" articles
Session 6: Understanding Basic Statistics in Medicine - Facilitator: Department faculty researcher - Objectives: review of basic research statistics and interpretation of medical literature (hypothesis testing, measures of association, correlation, regression, etc.)
Session 7: Self-directed learning session - Independent study: residents use various electronic resources to answer clinical questions (pediatric UTIs, COPD treatments, imaging in smokers)
Session 8: Understanding Basic Statistics in Medicine - Facilitator: Institutional librarian - Objectives: focus on efficiently and effectively searching for evidence based answers utilizing established EBM online resources
Session 9: Self-directed learning session - Independent study: Residents run and analyze their own clinic patient panel reports using EHR
Session 10: Using Point-of-Care Resources in Patient Care- Facilitator: Department faculty physician; local EHR expert/super-user-Objectives: learn how to run customized panel reports in EHR

Session 11: Self-directed learning session - Independent study: resident review of UPSTF guidelines & comparison with personal clinic panel reports
Session 12: USPSTF Guidelines in Clinical Practice - Facilitator: Department faculty physician; USPSTF guideline author - Objectives: learn about guideline development, how to critically evaluate the literature, benefits of and drawbacks to the guidelines
Session 13: Self-directed learning session - Independent study: resident creation of PDSA based on panel reports
Session 14: Quality Improvement Curriculum - Facilitator: local university Chair of Public Administration - Objectives: review, critique and refine PDSA process specific to resident patient panel
Session 15: Self-directed learning session - Independent study: write an essay based on reflections of the information mastery curriculum
Session 16: Session wrap-up and review - Facilitator: Course Director - Objectives: review curriculum essays, provide feedback/suggestions for improvement

Illustration 3

Table 3

Feedback from the Information Mastery Curriculum
Resident Feedback - Positive
• "Outstanding resources among our Department's faculty" • Case-based/problem-based sessions worked well • Useful information resources for clinical decision making • Increased knowledge and ownership of patient panels
Resident Feedback - Negative
• Scheduling problems • Transportation challenges (to and from small group sessions) • Pulled residents out of clinic/patient care (concerns about visit numbers) • Request for a "web-based" option • Felt it was an "add on" to an already heavy workload
Faculty Feedback - Positive
• Improvement in patient care by residents • Improvement in data management and the practice of EBM by residents
Faculty Feedback - Negative
• Poor attendance/late arrivals for small group sessions • Many faculty unaware of the details of the entire curriculum

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