
RAPID IMPLEMENTATION OF AN ELECTRONIC HEALTH RECORD IN AN ACADEMIC SETTING

STEPHEN L. BADGER, RYAN BOSCH, M.D., F.A.C.P., AND PRAVEEN TOTEJA

ABSTRACT

One of the roadblocks to wider implementation of electronic health records is the length of time it takes to implement a fully functional system. The George Washington University Medical Faculty Associates (MFA) has set a new standard for rapid EHR implementation by bringing over 100 physicians live in less than 30 days in a complex, academic setting. MFA leveraged a rapid implementation process based on study of successful implementations refined by Six Sigma principles. The rollout plan incorporated aggressive hands-on education, both in-person and virtual training modules for self-review, and a leadership triad of physicians, administrators, and information technology experts.

KEYWORDS

Electronic Health Record Implementation, EHR, Electronic Medical Record, EMR, Physician Utilization, Six Sigma, Medical Faculty Associates

Rolling out a full-purpose electronic medical record can take years at many organizations. George Washington University Medical Faculty Associates (MFA) in Washington, D.C. did it in less than 30 days. One of the capitol's largest multi-specialty physician practices, MFA relied on a unique combination of best-practices planning, just-in-time training, and aggressive follow-on support to bring ninety-nine faculty physicians – plus several hundred residents and interns, and two-hundred support staff – live on the group's new EHR in just twenty-eight days. This article offers a closer look at the MFA implementation and examines lessons learned that could potentially speed the pace of EHR rollouts in other ambulatory settings.

Paper Doesn't Cut It

Like many large, academic physician practices, MFA has earned a reputation as an early adopter of the breakthrough clinical technologies that have transformed patient care in recent decades. Its 275 physicians in forty-one medical specialties serve over 425,000 patients each year, including many national leaders. Formerly an unincorporated part of George Washington University School of Medicine, nonprofit MFA separated from the University in 2000 but continues as a world-class physician training ground, currently with 400 residents overseen by MFA's physician faculty. Yet, despite its cutting-edge reputation, until recently MFA relied, like

the vast majority of the nation's physician practices, on inefficient paper methods for storing patients' charts, prescribing medications, tracking laboratory test results, billing insurers and conducting a host of everyday activities.

Reinforced by decades of habit, MFA's paper-based recordkeeping methods were labor intensive and time consuming. Physicians in the Division of General Internal Medicine, for instance, had their phone messages hand delivered to any of three different mailboxes on separate floors of the practice's 325,000 square-foot facility. Similarly, because of the inefficiencies inherent in a paper process, it often took five to seven days to refill routine prescriptions. And getting lab results could take even longer.

The decentralized paper processes also were hurting MFA's bottom line by requiring excessive spending on human resources and by failing to capture significant revenues. Tens of thousands of patient charts, for instance, were split into multiple storage areas for each department, making their filing, pulling and re-filing a Byzantine operation for more than two-dozen full-time employees. On the revenue side, some patient encounters failed to be charged at all because the paper fee ticket was lost or simply not submitted and the lack of an electronic template led to some physicians selecting codes lower than justified by the services rendered.

It's no surprise, then, that MFA decided to adopt a more efficient electronic solution to enhance patient and physician satisfaction, improve recordkeeping, lower costs, accurately capture revenues and ultimately raise the quality of care it provided by streamlining and speeding the delivery of clinical information to physicians. MFA wasn't alone in this decision—a growing number of physician practices have embraced electronic medical records in recent years. About thirteen percent of hospitals and fourteen to twenty-eight percent of physician practices now use some form of EHR [1]. And no less an authority than the National Coordinator for Health Information Technology, David Brailer, M.D., (whose senior staff viewed MFA's new EHR in a November 2004 visit) has repeatedly said he believes widespread adoption of the EHR is inevitable. Several recent studies have demonstrated the technology's ability to cut expenses, boost revenues and prevent medical errors [2, 3, 4, 5].

Not Just Another Treadmill

After evaluating numerous EHR products, MFA purchased the TouchWorks EHR from Allscripts of Chicago, Ill. This EHR offers a highly integrated package of services including clinical messaging, results reporting, decision support, task management, clinical documentation, order entry, and administrative processes such as scheduling, billing, claims, authorizations and referrals.

Deploying the full EHR was anything but simple. In fact, few technology projects are as dauntingly complex as an EHR, and its implementation at MFA required the whole-hearted participation of a dedicated team of professionals. MFA leveraged a “leadership triad” consisting of the senior leadership from the administrative, physician, and information technology areas of the practice. This core project team consisted of the chief executive officer (the project’s executive sponsor), the director of the Division of General Internal Medicine (the project manager and physician sponsor), the chief information officer, and the director of clinical operations. The team’s first and most important step, which they began prior to the rollout to physicians, involved mapping and analyzing the efficiency of the old paper-based work processes – everything from handling a refill request to tracking down laboratory reports – and then converting these “workflows” into improved electronic procedures that could be facilitated by the EHR.

The workflow is the EHR’s essential blueprint, without which very little can be accomplished. A good project design based on sound workflows is what keeps an EHR from becoming a very expensive and time-consuming treadmill machine – an impulse purchase that sits in the closet, unused, because of insufficient foresight and commitment. Designing the myriad workflows that are facilitated by the EHR is the first step in the so-called 3-D methodology that MFA used to guide the implementation. The 3-D methodology (design, develop and deliver) borrows from various management styles, industry best practices and implementation experiences, and emphasizes identifying needs and planning the execution of the project ahead of time so as not to waste time during the rollout. Included in the methodology are Six Sigma tools and principles for mapping and analyzing the efficiency of workflows. (The objective of Six Sigma quality is to reduce process output defects to no more than 3.4 defect parts per million).

FIGURE 1. SIX SIGMA PROCESS

- 1 Define the problem.
- 2 Measure by collecting data and creating metrics.
- 3 Analyze to identify root causes.
- 4 Improve by eliminating root causes.
- 5 Control by making permanent changes and reviewing continuously.

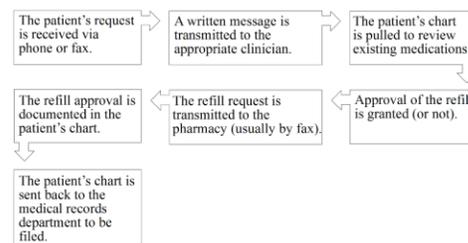
The Six Sigma process outlined in Figure One suggests that before you can decide whether a paper workflow is appropriate for conversion into an electronic workflow, you must first understand, document, and measure the current process. Fortunately, when the EHR project team began looking around for established workflows to analyze and redesign as electronic workflows, it found numerous paper protocols that would benefit if standardized across the Department of Medicine’s call center.

Designing Workflow for Picking Low-Hanging Fruit

Like many large practices, MFA long ago established a call center to address the high volume of patient calls into the Department of Medicine. Today, the call center fields over 2,100 patient calls a day for the department’s one-hundred physicians and employs twenty full-time customer service representatives, including some with clinical experience. Long before MFA began pursuing an EHR, the practice streamlined the call center by establishing teams of service reps and providers. There was a nursing team to take advice calls, a triage team to prioritize care, and several similar teams skilled in handling specific types of calls. Their jobs were complicated by a lack of uniform policies, meaning the nurse practitioners who decided whether to grant a patient’s request for a “bridge” prescription refill did so based on their knowledge of each individual physician’s policies. This led to a very time consuming process without standardization. The call center teams had established a set of protocols – “workflows” — for the most common incoming calls.

The project team sat down with the call center staff and literally mapped out on a white board every task and every role involved in the most common patient phone calls. Then, using 3-D principles and common sense, they analyzed the process map for efficiency and looked for ways to improve upon it electronically. Medication renewal requests, for instance, may include the steps outlined in Figure Two.

FIGURE 2. MEDICATION RENEWAL



Before converting the medication renewal process into an electronic workflow, the project team examined each step along the way to determine which steps could be automated

by the EHR, which would still require human interaction, how much information should be documented in the chart, and whether the entire process could be improved. They did this for every call center task, the idea being that once the physicians and Hospitalists and nurses got excited about using a new EHR function, the pathway for transforming the software functionality into actual human tasks within MFA would already have been established and the provider's enthusiasm would not be dampened. The team labeled this electronic-pathway process the "starfish method"—a catchy phrase whose purpose was to ensure physicians that they stood at the hub of an electronic nerve center. So when they pushed a button to write an electronic prescription, for instance, they could feel confident that someone out on one of the starfish's limbs knew how to receive that request and act upon it.

The workflow design process is complex and time consuming in any healthcare organization but an academic setting multiplies the difficulties. MFA's attending (faculty) physicians are responsible for overseeing the training of residents and interns, including seeing patients. As part of this training, the results of all tests ordered are routed to the attending physician for review, including those that the resident may have written. In the old paper-based system, the attending physician would sign the bottom of a resident's lab order slip and sign-off on the result before sending it to the resident with written instructions. Converting this workflow into the EHR meant designing a second layer of complexity—special protocols for tests ordered by residents (as opposed to physicians) and for the routing of the results of those tests.

While the project team was developing electronic workflows and configuring them into the EHR, they also tackled the question of physical access to the new system. They realized that if you are going to get rid of the paper chart and automate every possible paper process, you have to make access to the EHR as easy as picking up a pen and paper. After considering wireless PDAs and Tablet PCs the team settled on putting a new desktop computer in every exam room—there are fifty in the Division of General Internal Medicine alone—area pods and staff lounges. The strategy was in part symbolic. Few things communicate an organization's commitment to a technology project better than brand new computers with flat-panel displays. The project team figured MFA's physicians—long accustomed to cost-cutting measures—would see the computers going in and realize this was a system they would be expected to use. That would hopefully undercut one of the most common hurdles to an EHR implementation—physician resistance to abandoning their old paper-based work patterns.

Early Implementation Strategies

Beginning in January and March 2004, the team decided to test the different elements of the newly developed EHR

one at a time within select departments of the practice. They deployed the structured note module, for instance, in the cardio/thoracic department because the surgeons there were already accustomed to producing highly structured operative reports. That experience, it was hoped, would make the changeover less traumatic and might even turn the surgeons into enthusiastic supporters who would champion the EHR's adoption in other departments. The test runs had the added benefit of uncovering workflow challenges and other design issues that needed rethinking before the system's broader rollout.

When these deployments were well received, the project team decided to implement the entire EHR in one small department that would serve as a test-bed for a wider implementation. For this test they chose the Urgent Care Center, where patients with an existing physician relationship can receive immediate care even if their physician is unavailable. The team set a reasonable deadline for bringing the center up on the EHR but the emphasis in this first implementation was less on speed than on working the kinks out of the process. For instance, the project team was expanded to include clinicians from within Urgent Care and these sub-teams re-evaluated the EHR's workflows in light of their more intimate, departmental experience.

By May, the project team decided the foundation was in place for a much broader rollout of the EHR. Inspired by President Bush's mention of healthcare information systems in his February State of the Union speech, the team decided to push ahead with a highly aggressive, accelerated thirty-day rollout to all one-hundred physicians in the Department of Medicine. In addition to the Division of General Internal Medicine (the largest division in the department), the full EHR would be deployed in all the medical specialties, including Cardiology, Endocrinology, GI, Infectious Diseases, Podiatry, Pulmonary, Rheumatology, and Renal. It was an ambitious undertaking. Every physician, regardless of their attitudes toward technology and no matter how busy they were, would have to be trained and brought up on an unfamiliar, highly technical system that would entirely change the way they did their jobs. All in four weeks' time.

Just-In-Time Training

To accomplish this Herculean mission, MFA developed a phased training strategy that would focus on one or two EHR modules or components per week. The first week they would train the physicians on Tasking and Results, two modules that let the doctors immediately appreciate how the EHR could make their lives easier. The physicians were especially impressed with Results, which let them view the lab reports from patients they had just recently seen (a vast improvement over the days'- or weeks'-long reporting of the past, which reached them as a paper note). In the following weeks, the physicians were trained on the charge capture, electronic prescribing, clinical notes, and orders modules.

Physicians were expected to commit to the entire schedule of four two-hour training sessions, and were scheduled into the sessions under a highly regimented formula. It soon became apparent, however, that the physicians were not going to stick to their scheduled training hours. They would drop by the training center when they had a break in their schedules or at mealtime. They would stop by with five-minutes to spare and ask for guidance on just one task. Almost any arrangement seemed to be preferable to the one the team had organized. The project team realized that the training schedule they had so carefully mapped out in advance would have to be adjusted to accommodate the physicians' schedules. They quickly developed a just-in-time, or real-time training method that hinged on staffing a training "war room" with outsourced, professional trainers and project team members twelve hours a day, from 7 a.m. to 7 p.m. Providing breakfast and lunch for the physicians proved to be an effective strategy.

In addition to flexible scheduling, the training team learned to be flexible with the content of its sessions. Some physicians would come in the first week not knowing what a browser was, and the trainers would immediately downscale the session and focus on the fundamentals of signing in and using a mouse.

Another key success of the just-in-time training program was the strategy of bringing physicians up live on the EHR immediately after their classroom training. This was accomplished using one-on-one training with a member of the IS Department, conducted in the physicians' own department, often at a desktop computer in an empty exam room. Some physicians requested the follow-up training immediately after group training was completed; others needed several days to clear some time in their schedules. But in all cases the follow-up training and go-live took place within five days of the group training, so the information was still fresh in the physician's mind. This strategy called for a large commitment of resources on the part of the IS staff, especially in maintaining a challenging version control, with up-to-date information on which physician or support person was trained on which module, or who had signature authority for Charges. But the commitment proved worthwhile by assuring physicians were going live on the EHR as quickly as possible, reducing the chances of non-utilization and wasted effort.

Hurdling Physician Resistance

As with every rollout of a major technology initiative, MFA experienced several serious obstacles to the EHR rollout. Chief among them was physician resistance. It's just not easy to convince seasoned healthcare professionals to dramatically change the way they are accustomed to doing their jobs. The MFA project team ran into this hurdle early on when they discovered many physicians were refusing to use the new system to generate referral letters. The letters

between referring and consulting doctors are part of the warm handshake that builds a professional relationship between the two physicians. At first, the EHR's default referral letter proved to be impersonal – it looked like a computer-generated letter because it was. The MFA project team solved this problem by leveraging the flexibility of the EHR to document their referral note in the EHR using a combination of dictation, voice recognition, existing forms and templates – and then fine tuned the output to make it more personalized.

Most physician resistance, however, proved to be less specific but was easier to overcome. In this effort, the Eureka Effect was the team's best tool. They found it was critical to impress physicians right away with the EHR's capabilities. So, for instance, in the one-on-one follow-up training they would show a physician all the labs they had ordered in the past month and tell them that from now on the reports would automatically show up via a live feed with the labs as part of the physicians' daily task list, accessible at any time from any workstation.

Another important lesson concerning user resistance: It matters who leads the implementation. In getting physicians to go along with the project, it helped that the project manager was also director of the Division of General Internal Medicine, which held 35 of the 100 physicians in the project. His leadership and direction urged the division's physicians to work a little harder to understand and adopt the technology. And because MFA's CEO was openly and strongly committed to the project, this encouraged not only physicians and residents but the entire two-hundred-member support staff of MFA to quickly learn and adopt the EHR.

Other Lessons and Potential Pitfalls

In addition to the many lessons already mentioned (project leadership, just-in-time training, one-on-one follow-up, the Eureka Effect), MFA's accelerated rollout of its EHR turned up several anecdotal lessons, including:

- Don't call it a panacea. While it is important to communicate how the EHR will bring substantial improvements to the practice, avoid the overuse of hyperbole such as "it will make your life easier," or do things "faster," and "better," etc. Users should be cautiously optimistic about the new system so they understand that there will be a substantial learning curve but also real benefits.

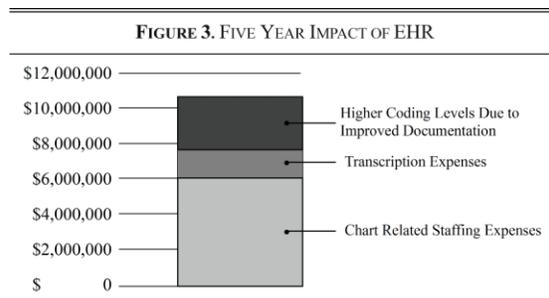
- Be sensitive to the "uncovering" of embarrassing issues that the project may reveal. The project team needs to recognize the embarrassment factor and encourage clinicians to cooperate in fixing the problem.

- Resist entrenched loyalties and support structures. In the past, physicians may have relied on a favorite support person to handle their administrative tasks but that approach runs counter to the centralized support network of an EHR system. MFA countered this highly decentralized and ineffi-

cient practice by designating teams of support personnel to handle particular tasks, such as pre-authorizing medications. Once physicians were confident that someone on the other end of the EHR was taking care of their task, they felt comfortable letting go of that responsibility.

Results Matter

MFA's physicians, nurses and support staff have now grown accustomed to a highly efficient, centralized and automated business process. Instead of using paper notes to remind them of chores, physicians get real-time reminders and task lists electronically. Instead of checking three mailboxes on three different floors for patient messages that may be outdated, they receive real-time e-messages from the call center. Lab results, which once took days or weeks to deliver and were sometimes initially delivered to the wrong provider now go directly to the ordering physician via a live feed with the laboratories. And prescriptions, which routinely took patients one week to fill, are now guaranteed within twenty-four hours.



In a hundred different ways, the EHR has streamlined and improved the everyday processes that support and uphold MFA's delivery of quality care. The EHR also has improved the practice's bottom line. A high-level, very conservative return-on-investment analysis conducted by MFA in October, 2004 revealed a ten-fold decrease in paper chart pulls following the implementation. Over five years, MFA estimates it will save more than \$6.3 million in chart-related staffing expenses alone (including RN time devoted to chart pulling).

Revenues have also been strongly impacted by the new system. Over five years, MFA estimates that better documentation due to EHR-driven improvements in E/M coding will generate nearly \$3.5 million in revenue. Finally, reductions in transcription expenses due to electronic dictation methods are estimated to save MFA more than \$1.3 million over five years as more physicians learn to use the EHR's dictation module.

Taken together, MFA conservatively estimates the newly implemented EHR will have a positive financial impact of

more than \$11.7 million over five years (see Figure Three). That figure, which is in accordance with other recent studies documenting significant economic benefits from implementing an EHR [6], does not take into consideration the substantial added impact of rolling out the system to MFA's remaining 175 physicians.

While the challenges of winning physician adoption of an EHR are often cited, the experience of MFA proves that medical groups can rapidly implement an EHR on a large scale in a complex environment. Considering the magnitude of the ROI, not to mention anecdotal improvements in physician and patient satisfaction, the MFA rapid-rollout experience suggests that the fear of a long, drawn-out deployment may no longer be a valid reason for putting off implementation of an EHR. The practice's example further indicates that the best practices and the technology for improving the delivery of clinical care are available today and that the time for adopting them is now.

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AUTHOR CONTACT INFORMATION

Stephen L. Badger.
Chief Executive Officer (LEAD AUTHOR)
The George Washington University Medical Faculty Associates
2150 Pennsylvania Ave, N.W.
Suite #10-403
Washington, DC 20037
(202) 741-3350 - Office
(202) 741-3356 - Fax
sbadger@mfa.gwu.edu

Ryan Bosch, M.D.
Director, Division of General Internal Medicine
The George Washington University Medical Faculty Associates
2150 Pennsylvania Ave, N.W.
Suite #2-105
Washington, DC 20037
(202) 741-2182 - Office
(202) 741-2185 - Fax
rbosch@mfa.gwu.edu

Praveen Toteja
Chief Information Officer
The George Washington University Medical Faculty Associates
2150 Pennsylvania Ave, N.W.
Suite #5-110
Washington, DC 20037
(202) 741-3645 - Office
(202) 741-3640 - Fax
ptoteja@mfa.gwu.edu

AUTHOR BIOGRAPHIES

Stephen L. Badger, Chief Executive Officer, Treasurer and Director, The George Washington University/ Medical Faculty

Ryan G. Bosch, MD, FACP, Director, Division of General Internal Medicine, Director, International Center for Executive Health, Associate Professor of Medicine, The George Washington University/Medical Faculty

Praveen Toteja, Chief Information Officer, The George Washington University/Medical Faculty