



Electronic health information system at an opioid treatment programme: roadblocks to implementation

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Abstract

Rationale Electronic health systems are commonly included in health care reform discussions. However, their embrace by the health care community has been slow.

Methods At Addiction Research and Treatment Corporation, a methadone maintenance programme that also provides primary medical care, HIV medical care and case management, substance abuse counselling and vocational services, we describe our experience in implementing an electronic health information system that encompasses all of these areas.

Results We describe the challenges and opportunities of this process in terms of change management, hierarchy of corporate objectives, process mastering, training issues, information technology governance, electronic security, and communication and collaboration.

Conclusion This description may provide practical insights to other institutions seeking to pursue this technology.

Introduction

Despite decades of predictions that the electronic medical record (EMR) revolution is coming, most health care organizations still use paper charts and manual processes. The transformation to an electronic platform has been promoted to reduce costs, provide better patient care and services and dramatically improve outcomes. The most recent survey of EMR implementation published in *The New England Journal of Medicine* indicated that only 4% of doctors have a fully functional system, with 13% having a basic system [1]. This means a majority of health care transactions are still on paper which has been a practice since the 1950s.

There are many good reasons why EMRs have not proliferated. First, it was the vendors. There are many and the interoperability issues remain daunting. Then, there are the transition issues. With the adoption of technology in most spheres of business, in came Moore's Law, leading to the temptation to hold out for newer, better, faster and cheaper products.

Sorting through the literature, the most significant roadblock to EMR implementation prior to 2009 was financial. Executives were

reluctant to commit millions of dollars to a project unless they could be assured of positive cash flows within a reasonable period of time, the return on investment issue. Unfortunately, demonstrating this return can be challenging, as many EMR benefits are intangible, non-financial or difficult to quantify. It is possible, however, to establish a sound business justification for implementing an EMR using realistic assumptions and verifiable data.

In 2009, President Obama called upon us as a nation to have a fully digital health record by 2014. As we get ready to overcome perhaps the most significant challenge – financial, in part because of the American Recovery and Reinvestment Act, new hurdles are appearing. There is the issue of confidentiality and privacy of EMRs, which may conflict with the legal provisions of the Health Insurance Portability and Accountability Act. Standardization and meaningful uses are now the new buzzwords and may become additional reasons for delay.

There have been lots of success stories – some completed and others in the final adjustment stages. In this report, we share the growing pains of adoption and roadblocks to implementation in a large community-based, multi-service urban agency.

Addiction Research and Treatment Corporation's history of clinical service delivery

The Addiction Research and Treatment Corporation (ARTC) is a community-based not-for-profit 501(c)(3) corporation treating substance abusers in Brooklyn and Manhattan since 1969. ARTC is one of the largest minority-operated substance abuse treatment organizations in the nation, and the largest non-hospital-based opioid treatment programme in New York State, serving more than 3000 patients annually. Since inception, ARTC has provided a wide range of comprehensive health care including primary medical care, HIV/AIDS care and substance abuse treatment services to over 30 000 patients throughout Brooklyn and Manhattan.

Addiction Research and Treatment Corporation's seven opioid treatment programme clinics are CARF-accredited, and ARTC is dually licensed by the New York State Office of Alcoholism and Substance Abuse Services for substance abuse treatment and the New York State Department of Health under Article 28 for primary medical services, including HIV/AIDS care and case management.

Despite this history and current capacities to deliver a wide spectrum of clinical services and to conduct an equally wide array of behavioural and biomedical research, considerable challenges remain at ARTC. These include a largely paper-based information system without any integration of clinical, fiscal and administrative data. The only major components of ARTC's operations where information was stored in an electronic database were selected counselling and medical services, methadone administration/dispensing and billing. Even these areas were not thoroughly integrated and any assessment of the quality or integrity of these sub-systems of information was limited.

Addiction Research and Treatment Corporation's original processes were characterized by redundancy of data elements and duplication of staff effort, with the potential for conflicting data and wasteful and inefficient use of corporate resources. This state of affairs resulted in labour-intensive efforts to store or retrieve information, to monitor or assess care or clinical outcomes and to answer clinical, administrative or fiscal questions.

Patient and staff dissatisfaction, the absence or delay of critical information at the point of clinical service and less than adequate productivity or inability to assess productivity were also consequences. Another limitation was in ARTC's ability to pose or answer relevant clinical, administrative or research questions of value not only to ARTC, but also to the field of substance abuse treatment and primary medical care practice or policy.

A fully integrated electronic health information system has the potential to meet these challenges for ARTC, and also may provide valuable information about the impact of an electronic health information system in the setting of substance abuse treatment services. Specifically, we anticipated that a comprehensive analysis of the implementation would have the potential to provide insight about how such a system can enhance outcomes management, and incorporate evidence-based practices and deliver cost-effective services in addiction treatment settings, and in health care facilities in which addiction treatment is delivered in combination with other health care services. While this was not the first time ARTC engaged in developing a more comprehensive electronic record process, the agency was more determined to learn from its past failures to be

more successful. Unlike previous efforts, ARTC governance provided both its authorization for the commitment of corporate resources and encouragement for achieving successful outcomes.

Background

Domains for evaluation of the electronic health information system

Supported by a grant from the National Institute on Drug Abuse, the analysis included the following domains: (1) quality; (2) productivity; (3) satisfaction; (4) risk management; and (5) financial performance. While a comprehensive review of the research design is beyond the scope of this paper, the challenges incurred are instructional, and are presented in this report.

Preliminary work towards implementing the electronic information system

Introductory presentations

In order to enhance buy-in to this project, senior executive staff gave presentations to various stakeholders, including patients, clinicians, managers and the ARTC Board of Trustees. These presentations included the challenges and opportunities involved in bringing a fully integrated electronic health information system to ARTC.

Needs assessment

Three needs assessment groups were assembled and consisted of: (1) medical staff and other clinical staff; (2) senior management; and (3) patients (two from Brooklyn and two from Manhattan clinics).

The three groups met separately with staff to suggest items that they believed would improve quality, productivity, satisfaction, risk management and financial performance. The sessions were led by a moderator, who read a standardized pre-written document to each group detailing the purpose of the session. The document itself was not shown to participants. A recorder documented the responses on flip charts for easy reference by all participants.

Participant considerations

The planning and implementation of the project were, to the extent possible, in conformance with the regular activities of stakeholders within the agency. For patients, programme input and satisfaction surveys were conducted utilizing the Patient Advisory Committees. The Patient Advisory Committees have engaged in very similar activities for a number of years, with participation aided by provision of refreshments and transportation reimbursement.

Many strategies guided ARTC's processes. They included meetings within each stakeholder group and across stakeholder groups, problem identification from the perspectives of the various stakeholders (patients, clinicians and managers), soliciting the views of personnel and providing objective programme and financial data.

These meetings resulted in the recognition that many paper-based databases exist, while few electronic databases exist. In addition, these meetings resulted in an appreciation of the need to

integrate these databases to reduce redundancy and modify content to include crucial clinical and managerial information allowing for more evidence-based practices. These meetings also identified several strengths, including the receptivity of patients and staff.

Another strategy included a commitment to using corporate capital and human resources where possible. This strategy led to ongoing discussions of whether to develop an in-house system versus purchasing a software program with user-defined features versus a hybrid product. To this end, the agency conducted a cost-benefit analysis of an in-house system while simultaneously reviewing software programs from several vendors. The utilization of this process identified potential problems and guided the analysis to seek solutions. The final recommendation and decision was to use outside consultants to develop a hybrid system.

Additional information provided by stakeholders assisted in ranking features in terms of priority of need, content design and functionality. A list of recommended features from the clinicians and managers included: interoperability with current systems and practice management, 'alerts', decision support, accuracy, privacy and security, public health monitoring, linked capabilities, user defined reports, remote access, concurrent users, prescriber modification and upgrading potential, ease of integration, user support, storage capacity, notes capability – structured, voice recognition, and dictation.

Addiction Research and Treatment Corporation allowed a 1-year period for design and a considerable period for implementation of the electronic information system. In addition, the uniformity of operations at each of our seven clinic sites would allow for nearly concurrent transition to the electronic system.

Choosing the system

Addiction Research and Treatment Corporation began this endeavour by first performing a focus group among select providers. Then, committees were formed to explore what the corporation wanted. These committees met once a month as a steering committee to review progress. After performing initial investigatory work, a final steering committee meeting was convened and the decision made to bring in a consultant to bring the corporation to the final step of choosing an electronic health record (EHR).

In the month of June 2007, a consultant was hired to assist in completing the planning for acquiring an EHR for ARTC. This consultant immediately counselled ARTC to revise its planning approach and utilize work groups with a designated project manager to guide the project with senior staff responsible for final review of results. This method began with the formation of an initial work group (called the Executive group) made up of stakeholders from the whole corporation. This group began work on laying out a framework for a needs assessment that would inform the corporation about areas that require investigation during a systems analysis. Following a review by the external consultant, ARTC revised the structure and some functions of its information technology department.

Requests for information were sent to known vendors starting September 2007. Concurrent to the requests for information, a staff survey was performed in the fall of 2007. Because of the long-distance nature of the relationship with the consultant, the needs assessment report was not completed until several months after the original projected date. Challenges included use of terms on both

sides that were often misunderstood and ineffective email communications. Phone calls fell short of actual face-to-face meetings. As a result, the needs assessment was not completed until early 2008.

At this point, other critical decisions were necessary. It became clear that establishment of one major system integrating all clinical and support operations was not possible. It was decided to focus on clinical services, billing and associated managerial priorities. The requests for information also revealed that vendors for primary medical care services were more plentiful than those for behavioural clinical services, and vendors providing both types of services were virtually non-existent. It was also decided to focus on vendors of EMRs for the following reasons: (1) vendors for behavioural clinical services did not consistently include medication management (a critical operation at ARTC); (2) it was logistically not possible and financially prohibitive to implement two new systems (one medical and one behavioural); and (3) there was more financial support and regulatory guidance for medical care software than for behavioural services.

Requests for proposals were sent in March 2008, and ARTC chose a vendor for its primary medical and HIV-related services. A systems analysis began in parallel with the planning stages for the implementation of the new system. The systems analysis used the information provided for by the needs assessment report. Issues were categorized under three separate 'field groups'. These three groups were 'Patient Care', 'Administrative' and 'Technology'. The field groups met on a weekly basis into late 2008 providing the Executive group with data and recommendations that could be either implemented immediately or referred to senior staff for deliberation and resolution. By the end of 2008, ARTC was getting ready to 'go-live' with the new system in early 2009.

Discussion

Challenges

Addiction Research and Treatment Corporation has utilized a mixed paper-based and electronic system throughout its seven clinical sites and its corporate headquarters for a number of years. This system was not sufficiently integrated to provide data to address adequately the domains delineated above.

The one area where a totally new process was required was the training of all stakeholders in the electronic information system and many stakeholders in basic computer competency.

Various roadblocks arose resulting in unforeseen delays. These issues required resolution before further planning could take place. The roadblocks were categorized under the following headings:

- change management;
- hierarchy of corporate objectives;
- process mastering;
- training issues;
- information technology (IT) governance;
- electronic security, and
- communication and collaboration.

Change management

Through our involvement with an external consultant, we were introduced to the concept of change management, along with materials to support the concept [2–4]. Established more than 40

years ago, ARTC has a firmly established corporate culture, the understanding of which was necessary to affect the magnitude of change associated with the implementation of an EMR system. Also, the different divisions within the corporation would have to collaborate in ways that were new and unfamiliar. Both of these issues were tackled via recommendations to senior leadership, but changing the thinking and habits of decades-long veteran employees was a continuing challenge.

Changes initiated included:

- Regular meetings by senior staff.
- Formalized strategic planning over short- and longer-term time horizons.
- Inter-departmental teams reviewing processes globally and streamlining them. This activity also garnered an appreciation for what others' responsibilities were.
- A proactive and responsible approach to information technology (see *Information technology governance*).

Hierarchy of corporate objectives

During this process, a formal hierarchy of corporate objectives was articulated by senior management in order to bring a standard way in which all stakeholders could think about and understand needed change. The elements of this hierarchy (with the most important listed first) consisted of:

- compliance with regulations;
- finance;
- quality;
- patient satisfaction, and
- staff satisfaction.

Compliance with regulations was considered most important, because non-compliance could lead to closure of the agency regardless of financial health. Finance came next, because poor financial management would threaten the agency's ability to seek funding, regardless of quality. Quality could be defined in different ways depending on the role of the employee. Anything dealing with patients would come under the definition of 'quality of care'. Administrative processes would be looked at from a 'quality-of-work' point of view. Lapses in quality were believed likely to impact patient and staff satisfaction negatively. Patient and staff satisfaction were last in line, as they were thought to be most directly related to the preceding elements of the hierarchy.

Process mastering

Addiction Research and Treatment Corporation utilized a method called 'process mastering' to prepare for implementation [5]. The package of solutions included:

- flow charting critical processes within the agency pertaining to the software;
- standardizing processes, selecting the best possible way to perform said processes, and
- streamlining processes consistent with the hierarchy of corporate objectives and backed by evidence to separate critical steps in a process from any unnecessary steps.

Training issues

It was also found, again not surprisingly, that many employees lacked the computer skills necessary to operate the new system

effectively. While staff knew their job tasks and what was expected of them, they did not necessarily have the proficiency or confidence to generalize those skills so that they could perform their job functions on a computer without retraining in a very specific, rote-minded fashion. Staff evaluation and training included:

- skills and knowledge assessment on basic computer skills;
- development of a standardized training programme for all software applications in use by the agency;
- construction of training facilities, and
- continued assessments and continued training to keep up with updated software.

Information technology governance

Another factor associated with delay was the fact that the corporate IT department did not have formal governance over its sphere of operations, limiting its ability to perform its job and fully support end users within the agency. IT governance as a concept had been in place in the corporate world for years, but at ARTC, where IT was not as well understood, computers were treated as regular office equipment [6]. Each department/division would order equipment independently and then expect the IT department to integrate it within ARTC's IT infrastructure. This often led to wasted time and resources as some purchased items were only installed with great difficulty or were totally incompatible. Returning equipment was often impossible as the return period had expired. With IT governance came a complete restructuring of the department, resulting in:

- the cessation of purchase of incompatible software and hardware;
- IT department leadership in acquiring new hardware and software, thereby allowing our agency personnel with the requisite expert to find the best technological solutions, and
- software and hardware installations structured and planned out in advance.

Electronic security

Security of data and material, especially pertaining to patient information, has always been a priority at ARTC. There were many solutions and methods for safeguarding data and material that could be utilized, some better than others. The information gleaned from the work performed during the needs assessment portion of the EHR implementation highlighted how vulnerable the agency was to sabotage, not only from within, but also from without. According to our IT department, a USB flash drive had enough disk space to hold one of our databases. This meant that a vehicle for data theft, readily available at local stores, could be purchased for less than the price of dinner. The solution was to limit use of external media. All devices that write to media were disabled, unless special exceptions were granted. These exceptions had to be approved by both the IT director and the senior vice-president of the division of the employee requesting the exception.

Other improvements to security included changing the ARTC firewall solution. A Spam blocker for email was installed. Finally, a lock protocol was implemented for all workstations on the corporate network. After several minutes of inactivity, workstations automatically locked, requiring the user to unlock it with user name and password. This final measure protected patients and

employees from malicious and accidental protected information access or disclosure.

An area of concern to all health care providers is reconciling the various privacy and confidentiality regulations with the electronic information system. The Health Insurance Portability and Accountability Act applies to all providers. In addition, there are confidentiality regulations applicable to substance abuse treatment programmes (42 CFR Part 2), plus the various federal and state regulations pertaining to patients with HIV disease. At ARTC, where substance abuse treatment, primary care and HIV/AIDS care have been provided for decades, involving all clinicians, irrespective of their discipline or specialty, we have dealt with these issues for years, which made the transition from a largely paper-based information system to an electronic information system less onerous than might well be the case for other institutions.

Electronic security is a constantly evolving subject area, especially as technology changes and the general use of technology become more commonplace. Knowledge of new regulations and new laws or addendums to current laws is paramount in order to avoid legal problems. Therefore, updating electronic security remains an ongoing, high-priority activity.

Communication and collaboration

Communication between stakeholders was a major hurdle prolonging the time spent in planning this project. There were terms used that were often misunderstood, based on divergent training and personal or professional experiences of the various stakeholders. Face-to-face meetings were necessary. This was especially critical between operational divisions, the finance division, and the chosen EHR vendor.

Communication with the EHR vendor was not as much of an issue, as the implementation manager assigned to work with the corporation was based in the same city, and was readily available to the project manager. Face-to-face meetings were common and could be carried out the same day if urgently needed.

Summary and conclusions

Throughout the process of implementation, preparation was a key factor in the efficient and productive implementation of EHR. Stakeholder participation from all levels of the agency ensured a relatively smooth deployment and continues to be a large part of

improving the system. The biggest lesson learned through this process was the need to evaluate all processes in a critical, yet non-judgmental way to maximize efficiency and productivity, with the overall goal of improving the quality of services to patients.

In this way, change came to be viewed by personnel as a means to improve their work performance rather than a threat to employment, and while this change may not have been embraced by everyone, critical mass was finally achieved whereby everyone recognized the absolute need and inevitability of change.

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