

Implementation of an Enterprise-wide Electronic Health Record: A Nurse-Physician Partnership

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Abstract. Maimonides Medical Center (MMC), a 705-bed tertiary hospital located in Brooklyn, New York, is a not-for-profit, voluntary hospital and the third largest independent teaching hospital in the United States. Its strategic plan includes research and academic initiatives, specifically, physician and nursing leadership development and a nursing scholarship program. In 1996 executive management allocated resources for the development of an information technology environment to improve the quality of care, increase patient satisfaction, reduce costs, and position the hospital for future growth initiatives, all accomplished through the use of an Electronic Health Record (EHR). The result was the Maimonides Access Clinical System (MACS) that has transformed the delivery of health care throughout MMC and serves as a model for other US hospitals. In addition, since 2007, MMC has also participated in the Brooklyn Health Information Exchange (BHIX) a New York State HEAL grant initiative implementing a Regional Health Information Organization (RHIO), an exchange of clinical information between Brooklyn hospitals, nursing homes, and home health agencies that aids in the transition of care for its shared patients.

Keywords: health care systems; clinical informatics; health care technology; health care economics and organizations; health care quality, access, evaluation

1. Introduction

In 1996 the executive management of MMC allocated the resources for the development of a strong information technology and systems environment that would improve the quality of care, increase client satisfaction, reduce costs, and position the hospital for future growth and initiatives [3]. The result was the 100% clinician use of the Maimonides Access Clinical System (MACS) EHR that has transformed the delivery of health care at MMC and serves as a model for other large hospitals nationwide. It is one of a few known hospitals that have incorporated distinct EHR systems from different vendors into an integrated EHR. MMC's strategic direction for 2008-2013 includes the improvement in the delivery of patient care with the expansion of its physical plant and information technology infrastructure [2].

2. Materials and Methods

In order to design and implement the MACS EHR, an integrated user group consisting of physicians, nurses, and all ancillary departments was tasked with making decisions related to designing an EHR to meet clinicians' workflows and enhance the delivery of integrated care across the MMC health care network. Each EHR system was tailored to meet user needs and all patient care situations. In addition to user acceptance and compliance, another major goal was to embed the use of the EHR in all clinical practice settings at the point of daily information. Therefore, physicians, nurse

practitioners, and registered nurses had vital input regarding the development of a standard set of clinical protocols, order sets, and system customization since it was, and still is, a dynamic process. [4] In addition, with the use of MACS EHR and technology, MMC was poised to be able to collect and analyze data trends to change practice patterns, improve client outcomes, standardize delivery of care, and meet regulatory mandates. During the process of system customization, clinical practices were defined and then incorporated into the EHR. At present, there are more than 3,000 computers, including Personal Digital Assistants (PDAs) and wireless workstations, strategically located throughout the organization. All clinicians have access to their appropriate systems and EHRs anytime and anywhere, even from their homes. Once educated, clinicians, based on their role and responsibility, have access to the appropriate systems. For example, the ED EHR provides functionality that guides all caregivers through recommended practices for client assessments and plans of care, as well as accelerating the rate of entering and completing the medication ordering and documentation processes. The success of implementation and use of technology is multi-factorial, therefore, starting with the organizational mission, philosophy, and culture, MMC's Management Information Services (MIS) Department developed a specific implementation model from the point of system selection through design, implementation, and evaluation. This implementation model also includes a Return on Investment (ROI) analysis that not only monitors financial indicators but the impact on clinical and operational efficiency outcomes as well.

3. Results

Today the MACS EHR system is used by 100% of MMC clinicians and benefits have been remarkable. In addition to user satisfaction, MMC has seen a 68% decrease in medication processing time, a 55% decrease in medication discrepancies, and a 58% reduction in problem medication orders. At present, MMC's medication reconciliation compliance is 82% with a hybrid approach from admission to discharge. Proposed interventions, that is, with the replacement of the current EHR, will increase medication reconciliation compliance to approach 100%. [4] Duplication of ancillary orders has decreased by 20% overall, including a 48% reduction in duplicate laboratory diagnostic tests. Since 1996, accessibility of clinical data has improved time of diagnosis and treatment, contributing to a 30.4% reduction in the average length of a patient's hospital stay. These improvements have enabled additional patients to be served by MMC in addition to a major increase in patient revenue capture.

4. Conclusions

Physicians, nurses, and staff have embraced the MACS EHR, enabling MMC to achieve clinical improvements and cost savings in health care delivery. Facilitators to this implementation included the building of a support structure that used near real-time training based on user-specific computer knowledge and clinical function, go-live support, appropriate and available resources, and the emphasis on interdisciplinary teamwork. By providing MMC physicians, nurses, and staff with real-time clinical information about a patient's health status, MMC has reduced drug interactions, adverse drug reactions, incidences of poly-pharmacy, duplicity of testing, decrease in length of hospital stay and readmissions due to the expanded delivery of coordinated care. At present, MMC is undergoing the replacement of its current inpatient EHR for a

more robust functionality including evidence-based guidelines. In order to monitor the delivery of health care in a more efficient and safe manner, the Inpatient EHR Outcomes Committee has selected the following measures to be studied with the implementation of the new system (April 2009): catheter associated blood infections, deep vein thrombosis, pain management, pressure ulcers, patient handoffs, organizational communication, and medication reconciliation.

References

- [1] Brooklyn Health Information Exchange [homepage on the Internet]. Brooklyn, NY: BHIX Brooklyn Health Information Exchange; c2008 [updated 2008]. Available from: <http://www.bhix.org/>
- [2] Maimonides Medical Center. The Joint Commission Orientation Session. 2008.
- [3] Anderson HJ. The Hospital as the Network Hub. *Health Data Management*. 2008; August: 35-40.
- [4] Kossman, SP, Scheidenhelm, SL. Nurses' Perceptions of the Impact of Electronic Health Records on Work and Patient Outcomes. *CIN: Computers, Informatics, Nursing* 2008; March/April: 69-77.

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