

Capital Region Healthcare: Cost and Quality Benefits

John Janas III, MD
Deane Morrison, RPH, CIO
Capital Region Healthcare
Concord, NH

Program Summary

Capital Region Healthcare (CRHC) is an evolving Integrated Delivery Network (IDN) located in central New Hampshire. It includes three acute care hospitals licensed for 450 beds, two visiting nurse associations performing 160,000 visits annually, an affiliation with a mental health system, and a 100-bed assisted living facility under construction. In the mid-90s, CRHC embarked upon a strategy for acquiring primary-care physicians and their practices. Today, there are 20 primary-care practices comprised of 75 providers and a family practice residency/clinic comprised of 16 residents and eight faculty. Total revenue for the IDN is \$175 million.

Recognizing the need to focus on the productivity of its primary-care providers and the qualitative outcomes within those practices, CRHC began an information technology strategy that focused on implementing an electronic medical record (EMR). The focus of this article is on the cost reductions and qualitative benefits realized from the reengineered workflows implemented in conjunction with the EMR in CRHC's pilot clinic, Family Care of Concord (FCC).

Family Care of Concord is located in Concord, NH. It is a member of Capital Region Physician Group, a subsidiary of CRHC. It consists of one board-certified family practitioner, one double board-certified internist/pediatrician, and two nurse practitioners. Support staff includes three registered nurses, two licensed practical nurses, and three medical assistants. The practice manages 7,200 active patients and averages 1,200 visits/month. The payor mix is approximately 42% managed care, 15% Medicare, 3% Medicaid, 5% self-pay, and 35% commercial insurance. The practice contracts with seven managed care companies.

FCC opened in April of 1996 utilizing ClinicaLogic, a DOS-based electronic medical record from MedicaLogic, a privately held company out of Portland, OR. In December of 1997, the practice converted to Logician, MedicaLogic's Windows-based product. The practice uses Medisense from Compusense for its practice management and scheduling needs.

Benefits and Results

The benefits and results realized by implementing the electronic medical record system are as follows:

1. Elimination of Transcription: The practice has eliminated all transcription costs by utilizing structured flowsheet views, note templates, and point-of-care documentation. The practice generates approximately 14,000 visits per year. The average CRHC practice generates approximately thirty-five lines of transcription per patient. At a cost of \$0.11 per line, the practice estimates a savings of \$53,900. However, it does take approximately one hour longer per week per provider to generate the documentation. That time at a blended rate of \$55.00 per hour for four providers for 46 weeks equates to about \$10,120. The net savings to the practice is \$43,780.

2. Chart Pulls: At FCC, the traditional paper chart has been eliminated. Assuming one chart pull per visit at 6 minutes each and using the average salary for the practice's support staff of \$17 per hour (including benefits), the practice estimates a savings of \$24,500 annually.

3. Prescription Generation: New prescriptions and refills are generated as a by-product of the documentation process. Each prescription takes less than three minutes to complete. (Electronic steps include creation of prescription from the documentation, automatic allergy and interaction checking, flag to physician for review and signature, fax to pharmacy.) Prior to the electronic record, the average time to complete a prescription was approximately 15 minutes. (A significant difference is that no chart pulls are necessary for prescription refills.) The practice generates approximately 400 prescriptions per week, the majority of which are refills. Saving 12 minutes per prescription equates to a total savings of 4,200 hours per year. Using the average salary for the practice's support, the practice estimates a savings of \$71,400 annually.

An ancillary benefit of electronic prescription data is the ability to easily regenerate patient prescriptions in the event of managed care company formulary changes, which have occurred eight times since the EMR was implemented.

4. Coding: By using the system, the practice has reduced time spent coding. When problems are documented in the EMR, ICD9 diagnosis codes are automatically assigned. At 14,000 visits per year and an average of two codes per visit, the practice generates approximately 28,000 diagnosis codes. Assuming 15% of the codes needed to be researched at an average of five minutes per code, 350 hours of coding time is saved per year. Using the practice's average support staff salary, \$5,950 has been saved.

This feature also allows the practice to track and report their patient acuity to insurance companies. Insurance companies are beginning to use this information to calculate reimbursements and quality bonuses. In the future, through the use of MedicaLogic's enhanced Evaluation and Management Code module, FCC expects to accurately meet Medicare's coding compliance regulations.

5. Lab Interface: The practice utilizes a lab interface (HBOC Star Lab) to upload results into the EMR, thus reducing data entry and filing time. Results are sent every 20 minutes. The practice generates about 6,500 laboratory tests annually. It took about one hour to file 20 results; therefore, the practice has saved approximately 325 hours of filing time. Using the practice's average support staff salary, it saved \$5,525 annually. In addition, the system generates letters notifying patients of their results. The average turnaround time has been reduced from two or three weeks to one week, thus improving patient satisfaction.
6. Referrals: Referrals are generated by the provider during the clinical encounter, eliminating the need to manually fill out paper-based payor forms. The practice generates about 3,600 referrals annually. Using the system, an estimated seven minutes per referral are saved, for a total of 420 hours per year. Using the practice's average salary, it has saved \$7,140 annually. Overall turnaround time for a referral has been reduced from one day to within an hour.

Additionally, using the reporting tools and the documentation database, the practice has eliminated payor-based denials and can report provider referral patterns for payor utilization requirements.

7. Qualitative Reporting: The practice uses the system to report their quality indicators to qualify for managed care payor's incentive bonus programs. Typical areas targeted include the Pap smears, mammograms, and diabetic eye exams. For one managed care company, the average compliance is approximately 60% for providing diabetics with annual eye exams. By capturing discrete data through the system, FCC was able to document that 199 out of 200 patients received such exams. Compared to the average compliance estimate of 60%, the practice performed approximately 80 more eye exams. Nationally it is expected that about

40% of all diabetics tested will have a surgically correctable complication detected. Therefore, the practice estimates that it diagnosed and prevented complications in 32 patients that otherwise may have gone undetected. Based on these results, the practice has qualified for the maximum quality bonuses provided by this payor.

8. Drug Recalls: The practice can utilize the system to generate patient letters in the event of drug recalls. Since opening the practice, there have been four recalls affecting 45 patients. All patients received letters within one day of the drug recall alerts.
9. Hospital Inpatients: FCC generates approximately 760 admissions per year. The EMR is accessible from within the hospital in the emergency room and on the inpatient floors. Instead of dictating discharge summaries and having them transcribed by the hospital's medical records department, the discharge summary is produced directly from the EMR and a hard copy is forwarded to the medical records department for filing. Having access to the patient's record in the hospital setting allows providers to have up-to-date patient information to support clinical decision-making.
10. Patient Satisfaction: Throughout the project, concern for patient satisfaction was of paramount importance to the practice. CRHC began performing patient satisfaction surveys in the third quarter of 1997. The average patient satisfaction for the practices within Capital Region Physicians Group is 88.2%. FCC's average results are 88.9%. FCC concludes that the EMR did not negatively impact patient satisfaction and in fact may have contributed to improving patient satisfaction.

Benefits and Results Summary

DIRECT COSTS ANALYSIS	Annual
TOTAL BENEFITS	\$158,295
TOTAL EXPENSE	\$37,000
NET BENEFITS	\$121,295
NET BENEFITS/PROVIDER	\$30,324

Family Care of Concord, a group of four providers, has measured net annual cost reduction of approximately \$121,300 for the practice or, \$30,300 per provider annually.

Another method for estimating cost reduction is to compare FCC's staff-to-provider ratio to the national average. FCC has a staff-to-provider ratio of 2.0. The industry average, according to National MGMA survey data is 3.4. Based on a difference of 1.4 staff per provider, the practice is saving approximately 5.6 full-time equivalents annually. Using the support staff average salary of \$17 per hour, the practice estimates a net savings \$161,000, or \$40,200 per provider annually.

STAFF/PROVIDER RATIO ANALYSIS	Annual
TOTAL BENEFITS	\$198,000
TOTAL EXPENSE	\$37,000
NET BENEFITS	\$161,000
NET BENEFITS/PROVIDER	\$40,250

The implementation of the EMR has also made several quality improvements. FCC has been able to respond faster to prescription refill requests, alert patients to drug recalls, notify patients of laboratory results, and quickly initiate referrals. Through the documentation and reporting, the practice has demonstrated that it has exceeded the quality standards set forth by Health Plan Employer Data and Information Set (HEDIS) and managed care companies.

Implementation Overview

A) Project Implementation Challenges

An information technology project of this magnitude faced cultural, financial and technical challenges.

As with any change, there are natural cultural resistances. Staff resistance to changes in traditional work roles and their readiness to use microcomputers had to be considered. Additionally, the team needed to be sensitive to the needs and concerns of the patients as they implemented this new technology.

The initial financial investment of \$87,000 for hardware, software, and implementation was significant. Annual support costs, which include software maintenance fees, upgrades, information technology support staff, and depreciation, are \$37,000. Senior management endorsed the pilot of the EMR, despite the significant initial investment and the absence of relevant research about the benefits of an EMR.

There were technical challenges with the design and implementation of real-time interfaces. Coordinating efforts between external vendors and information technology staff was time-consuming, yet critical. Room size, ergonomics and patient-provider interactions all needed to be taken into consideration when deciding where to place personal computers. Migration from the DOS-based product (Clinicalogic) to the 32-bit Windows product (Logician) required both an extensive data conversion and a complete re-training effort.

B) Project Implementation Challenges

To successfully implement the electronic medical record (EMR), both clinical and technical expertise was required. Technical expertise included network, interface and project management resources provided by the Information Technology department. The staff of Family Care of Concord provided clinical expertise.

Responsibilities of the technical team included:

- Sizing of server based on number of concurrent providers to accommodate adequate data storage and acceptable response time
- Configuration and installation of server, network, software and microcomputers
- Providing customized training that integrated the newly designed workflows with the application software
- Establishing a project timeline, coordinating project resources, and managing the budget

Responsibilities of the clinical design team included:

- Prioritizing feature implementation
- Creating EMR-based workflows
- Establishing clinical content for go-live, such as development of templates and encounter forms
- Testing of system to verify functionality and integrity

C) Workflow Design

Productivity enhancements and quality improvements do not occur merely by implementing the EMR. A conscientious effort to reengineer workflows is necessary to optimize benefits. To support the newly created workflows and promote point of care documentation, microcomputers were placed in each exam room (8), each provider's office (4), and at each clinical workstation (7).

The following section describes a patient's visit using the newly implemented workflows.

- Support staff register and schedule patients in Medisense, which utilizes a one way demographics interface to upload ADT information to Logician.
- Upon arrival, patient checks in and is acknowledged in Medisense by support staff.
- Fee slip is placed outside exam room door by support staff.
- Nurse checks computer to see patient arrived.
- Patient is brought into exam room by nurse. Customized encounter screens are assigned to the patient's electronic chart based on type of visit; vital signs are entered. Prior clinical results are automatically available.
- 6. Provider enters exam room. By accessing the encounter form, the following information is readily available: applicable protocols, medications, current problems, allergies and directives, and vitals entered by nurse. Provider updates any necessary information at the point of care, eliminating the need for transcription. Prescriptions and patient education handouts are generated and sent to the laser printer. Services, tests and referrals are entered into the system.
- Patient leaves exam room and checks out. Provider delivers prescriptions and patient education handouts. Support staff schedules any follow up appointments. Fee slip is collected and forwarded to the central billing office.
- All paper based documents (consult notes, insurance correspondences, etc) are scanned. For medical and legal reasons, consent forms must be saved, so the practice utilizes a day file system for tracking this information.

Conclusions

A well-implemented EMR can create numerous savings and quality improvements.

CRHC will strive to duplicate the successful use of the EMR in each of its primary care practices. Cost savings of between 2.25 and 3 million dollars could be achieved if the EMR is successfully implemented in the CRHC practices (75 providers).

In addition, and equally as important, numerous qualitative advantages are inherent in using an EMR. A successful implementation of an EMR need not negatively impact patient satisfaction ratings and may, in fact, contribute to increased patient satisfaction.

However, CRHC recognizes that successful implementation of the EMR is largely dependent on multiple factors, including: provider belief the system will make a difference, provider willingness to promote and accept change, management commitment, technical competence of staff, and leadership and project management abilities. The challenge is to duplicate FCC's success.