

# Measuring the Success of Your EPR Implementation

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**KEYWORDS:** Electronic Patient Record (EPR), Electronic Medical Record (EMR), Implementation, Drug Utilization Review (DUR), workflow, practice management, process re-engineering.

**INTRODUCTION:** Computerization of physician practices is an on-going reality. With increasing fiscal restraint and a greater demand by all stakeholders for demonstrated value, it is important to measure the success of EPR implementations. Each stakeholder (physicians, patients, office staff, payors and administrators) has a different need for information and demonstration of value.

**BACKGROUND:** The Centre for Evaluation of Medicines, an academic research institute affiliated with McMaster University, is conducting a study on prescribing practices amongst community physicians in the Hamilton area. The research project is called the COMPETE study (Computerization of Medical Practices for the Enhancement of Therapeutic Effectiveness). COMPETE is a three year project to compare quality of information gathered by paper chart reviews vs. EMR and to assess the effectiveness of computer generated educational interventions.

As part of our efforts to study use of medications in a community family practice setting, we have recruited family physicians who have agreed to use an Electronic Medical Record system with a structured data entry interface.

**DESCRIPTION OF EPR SYSTEM:** We have recruited 32 family physicians in 18 Family Practice Clinics in the Hamilton, Ontario area to participate in the study. Twelve physicians are reimbursed through a capitation funding system, the rest are reimbursed through a Provincial Fee-for-Service program. Most physicians are community-based physicians practicing in an urban setting; one clinic of six practitioners practice in a rural setting. Each physician pays a nominal monthly fee to get a complete EPR system. Physician willingness to pay was previously described by us at TEPR 1998. <1> The system includes a local area network (LAN) using Windows NT on the server and Windows 95 on the workstations. Each physician gets, on average, 4 workstations –one for the receptionist and three for the exam rooms. The software used is Purkinje's Dossier of Clinical Information (DCI) version 1.4 which is commercially available in Canada, the United States and Europe. Initial sites had version 1.3, which were converted to version 1.4 when it became available in the summer of 1999. The system includes practice management software for billing and scheduling. This software is interfaced with Purkinje's DCI to allow access to a patient's EPR chart from the scheduler program. The server has mirrored hard-drives using a Raid 1 configuration. System back-ups are done nightly and the tape is taken home by a designated staff member at each site. Each site has a service contract with a systems integrator to ensure a 2 hour response time/4 hour fix for server problems and a 4 hour response/8 hour fix time for all other equipment. System downtime has been less than 2%.

Most physicians enter some patient data electronically. On average 75% of patients seen in participating clinics have their information entered in the EPR. A few physicians do not enter progress notes on paper and chart all patient information into the computer. However, others use a mix of paper and electronic chart. Generally, patients with multiple complaints (not those with multiple problems!) and those who require counselling have their records entered on paper. Purkinje's structured EPR does not lend itself to easy charting of psychosocial and counselling problems. More information about physician charting and data quality will be presented by us at TEPR 2000.

Patient information from outside the office, including lab reports, consult notes, x-ray reports, generally come into the office on paper. About 11 of our 18 sites have laboratory results being sent electronically. A few offices scan other reports into the EPR.

**METHOD:** We developed qualitative and quantitative measures of medical office processes and front office efficiencies pre- and post-EPR implementation. We developed data collection tools that could be used to collect the appropriate data. We included variables that were expected to improve with EPR implementation and those that were not expected to improve. We measured the same processes pre-EPR and six months post-EPR. We used the same measurement tools to minimize bias.

We developed questionnaires on perception of the amount of time a task takes and tools for observing time spent in various office tasks. All sites were reviewed for their current office processes and workflow to gather baseline data and to assist in business process re-engineering.

## RESULTS:

As can be seen in Table 1a, there are significant gains to be made in computerizing the front office functions. This is not news. Despite all recruited practices having used electronic billing systems before joining the COMPETE study, most sites still made significant gains in the billing data entry and reconciliation process. Some of this is attributable to better software, but much of it is probably attributable to training. The COMPETE project pays for any additional training that staff may require – something physicians are generally reluctant to do.

Table 1a	<b>ADMINISTRATIVE TASKS</b>	<b>Before</b>	<b>6 Months Post</b>	<b>% Change</b>
	Prepare Day Sheet (min)	14	1.1	- 92
	Chart Pulls/Refile for Day Visits (#)	46	32	- 30
	Chart Pulls/Refile for Day Visits (min)	110	61	- 45
	Writing in Chart - Other Staff (min)	47	79	+ 70
	Billing Data Entry and Reconciliations (min/month)	764	497	- 32

For the physician tasks, gains in electronic charting clarity and completeness are made at a price: 60% more time appears to be spent on charting functions (Table 1b). There is some speed gained in writing prescriptions, but it is quite small and negligible in the big picture. There is no change in the time it takes to review lab results – even if they come in electronically.

Table 1b	<b>PHYSICIAN TASKS</b>	<b>Before</b>	<b>6 Months Post</b>	<b>% Change</b>
	Writing in Chart - MD (min)	130	207	+ 60
	Percent paper use (%)	100	33	- 67
	Prescription writing and renewals (min)	19	15	- 21
	Consult/Other Reports & Review (min)	17	16	- 6
	Lab Reports & Review (min) -- All Sites	17	17	0
	Lab Reports & Review (min) -- Sites c Electronic Lab	18	19	+ 6

So, if physicians are taking more time to chart, where is that time coming from? We asked physicians the questions listed in Table 2a and 2b. Most physicians felt that they were working the same length of day. Some felt they were working a longer day, but they were also seeing more patients. Most physicians felt they were spending more time charting than they did before the introduction of the EPR. Most agreed that the volume of work had not changed since the EPR was put into place. The vast majority felt they were saving time elsewhere that justified continuing on with use of the EPR.

Table 2a	LESS	SAME	MORE
Are you working longer day?	0	12	6
Are you spending more time charting?	0	6	12
Is the volume of work at end of the day....	3	11	4

Table 2b	NO	YES
Are you getting a better quality chart?	7	11
Are you saving time elsewhere during the day?	3	15

Gains are made in the filing of lab results and the handling of lab results. Most physicians who had lab results sent electronically to their office felt it made their practice more efficient (Table 3). This was somewhat surprising as many sites have faced lab-related problems that are escalated to the COMPETE team.

Other areas where physicians felt they saved time was in being able to print out referral notes to consultants, being able to record and print out repeat prescriptions faster and being able to do follow-up notes faster.

Table 3	Number of Replies
Where are you saving more time?	
Reviewing Electronic Laboratory Results (N=11)	8
Referral Letters automatically done	4
Faster prescriptions/repeat scripts	3
Follow-up Notes are easier to do	1
Administrative tasks faster	2

## CONCLUSION:

Initial success of EPR implementation varied from site to site, although all sites were able to be brought up to a minimal level of EPR utilization using the measurements described. Several methodological issues arose in measuring clinical and office processes. A phenomenon of cognitive dissonance was noted with physicians' perceptions of time to chart a patient note. Most physicians feel that it takes them longer to chart using the EPR, yet they report that they are able to see more patients or leave earlier at the end of the day.

This cognitive dissonance may be related to the fact that the EPR consolidates many tasks and computerizes them (e.g., prescription writing, lab result review). As physicians spend time doing these other tasks on the computer, they are all lumped under the category of 'charting', whereas previously they would have been considered separate tasks and counted separately.

## REFERENCES:

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**BIOGRAPHY:**

Karim Keshavjee is a Family Physician with a part-time practice in Mississauga. He has a full-time position with Searle Canada as a Medical Affairs Manager. He is an Associate Member of the Centre for Evaluation of Medicines, an independent academic research institute affiliated with McMaster University in Hamilton, Ontario.

Currently, he is on secondment to the Centre for Evaluation of Medicines to help manage the COMPETE (Computerization of Medical Practices for the Enhancement of Therapeutic Effectiveness) study. COMPETE is research project which is studying how medicines are used in a community setting by computerizing the medical records of Family Physicians in Hamilton, Ontario.