

Data Quality Management in EMR Entry

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KEYWORDS

Electronic Medical Record (EMR), data quality, data management, chart review, data entry, Drug Utilization Review (DUR)

INTRODUCTION

In order for our study to maximize the efficacy of EMR based decision-support it is important that physicians meet the following criteria. First, to chart as many patients as possible into the EMR in real time. Second, to chart relevant patient information (i.e. diagnoses and medications) in a structured format. We instituted a case management process that assists physicians in meeting these goals.

BACKGROUND

The Centre for Evaluation of Medicines (CEM), is an independent academic research institute, situated at St. Joseph's Hospital in Hamilton Ontario and affiliated with McMaster University. COMPETE (Computerization of Medical Practices for the Enhancement of Therapeutic Effectiveness) is a three year project to compare quality of information gathered by paper chart reviews versus EMR and to assess the effectiveness of computer generated educational interventions.

The COMPETE project goals were

- To develop a Primary Care EMR network that we could use to research the benefits and risks of computerization
- To assess possible changes to the prescribing of medications through the comparison of Computer Decision-Support versus "Usual Practice" - (i.e. mailing of guidelines to physicians)

The COMPETE Project team consists of a small group of individuals whose areas of expertise are in research, teaching, trial coordination, medical practice and database creation.

METHODS

Ambitious Goals and Definition of Success

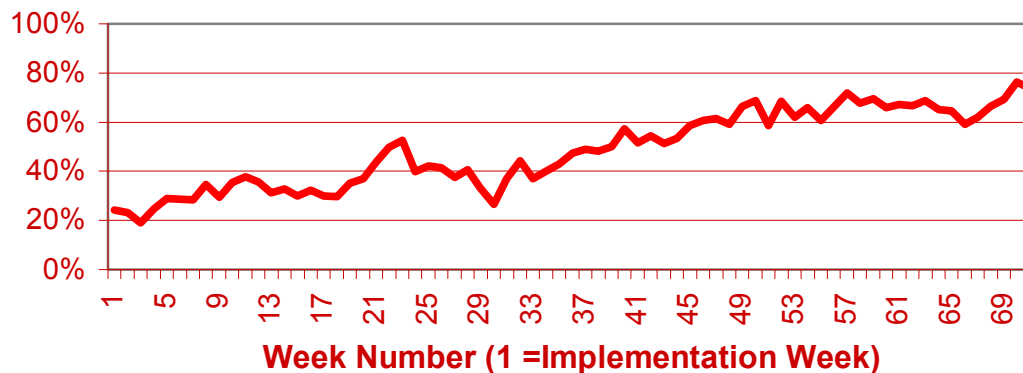
- Recruit 100 physicians to participate in the study
- Introduce EMRs to family physicians in a limited geographic area
- Have 80% of patient visits charted in real time
- Capture structured data on each patient visit
- Introduce computerized decision-support to each physician

Our Achievements of Goals to Date

- Recruited 32 physicians
- Went slightly outside of our proposed area to get recruits
- Still working on getting physicians to chart patient encounter in real-time. Multi-complaint patients and counseling patients remain a challenge. Not all physicians like to chart in real time, (about 56% of patients are charted in real time)
- When physicians use the EMR properly, data is quite well structured. (i.e. 90% of diagnoses coded in ICD9 and 95% of medications are coded)
- To have successful CDSS, physicians need to enter structured data in real-time

Physicians' Ramp Up Data

Percent of Patients Charted in EMR - Normalized



The previous graph shows normalized ramp up data for the first year after physician sites start up. There is a natural increase in the data entry for about 1 year, then data entry plateaus.

Some physicians do not catch on to the EMR, or they lose their momentum after start-up. The Case Management process is necessary to reach desired goals: (high level chart entry into structured data fields)

The Case Management process involves the Case Manager making visits to all sites (between January 99 and October 99)

Thirty-two physicians were interviewed to obtain their perceptions and to determine specific problem areas

- Cycle 1 - Jan./Feb. '99 (8 physicians)
- Cycle 2 - March/April '99 (6 physicians)
- Cycle 3 - April '99 (3 physicians)
- Cycle 4 - May/June '99 (2 physicians)
- Cycle 5 - August '99 (5 physicians)
- Cycle 6 - Sept./Oct. '99 (8 physicians)

Data reports were developed by the data manager from EMR and billing data extracted from each site through encrypted downloads.

Data reports were sent to each physician in the form of a feedback letter.

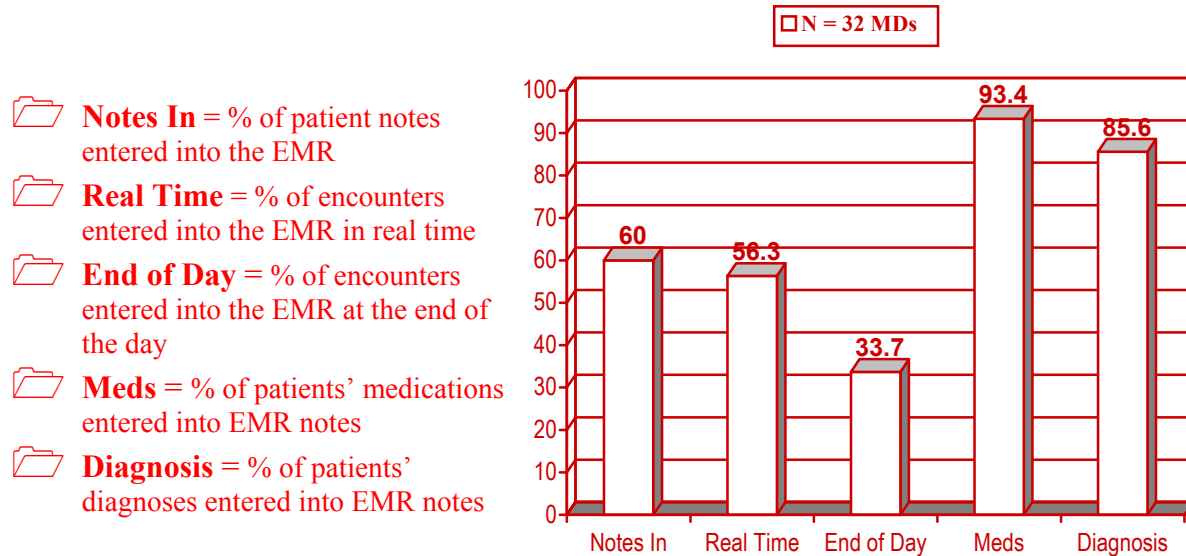
1st Report (letter) – was not well formatted

- Data was presented from each site's start date to September 1999. The review period was too long and provided no peer data comparison
- There were data reporting inconsistencies that were not corrected

2nd Report (letter) - was better prepared

- Outlined a two-month period covering September to November 1999
- Report provided peer average comparison of key variables [such as percentage of EMR entry compared to aggregate and top ten medications prescribed]

Physicians' perception of how they use the EMR is seen in the following table.



Physicians' Perception verses Actual EMR use

5. Physicians' perception of how they use the EMR is quite accurate when compared to the data, displaying actual EMR use, extracted from the sites

	PERCEPTION	ACTUAL
NOTES	60% notes entered same day	57% notes entered same day
MEDS	93% patient's current meds	96% patient's current meds
DIAGNOSIS	86% patient's current visit	85% patient's current visit

Timeline of Change Management Interventions

Major Influences:

- Initial training and handholding sessions for each site
- User Group meeting April 1999
- Case Managements visits to obtain feedback
- Extra training class offered to physicians and staff

Report 1 [October 1999] - mailed to sites (data from site start-up to September 1999)

Major Influences:

- Report 1 - Feedback letter/data about physicians' progress
 - Ad-hoc Case Management visits and extra training classes are offered

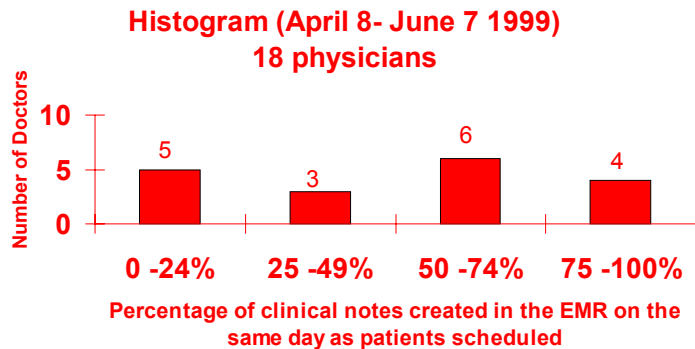
Report 2 [December 1999] - generated (data from September to November 1999)

Major Influences:

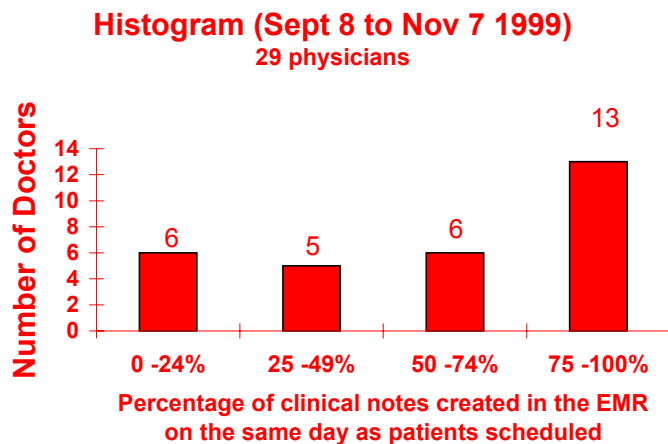
- A User Group meeting was held in November 1999 [non-attendees were mailed training tips]
- Case Management visits included structured one-on-one training for physicians, These visits are/were targeted from Report 2 findings

Report 3 [January 2000] - mailed to sites (data from November 1999 to January 2000)

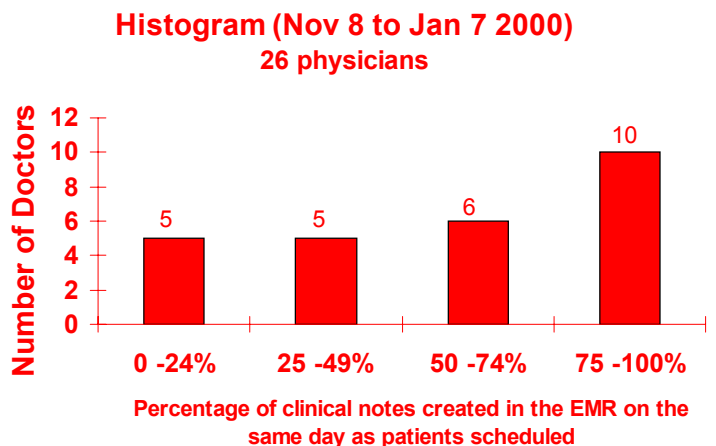
Physician EMR entry - Report 1



Physician EMR entry - Report 2



Physician EMR Entry - Report 3



Preceding three report/histograms represent physician data entry levels over the course of nine months [April 1999 to January 2000]

Only a slight change/improvement is noted when reviewing EMR entry data in these aggregated graph forms. [i.e. Reports 1 – 3]

However, substantial improvements are noted when comparing individual physicians' data entry levels over time, who have received intense one-on-one re-training and coaching (i.e. preceding tables for physician A to F)

Case Management [One-on-One Physician Training]

Case Study One

6. A comparison of multi-physician sites that have shown considerable improvement in EMR data entry as a result of one-on-one physician retraining sessions

Physician	April '98 - June '98	April '99 – June '99	Sept. '99 – Nov. '99
A	7%	61%	65%
B	8%	56%	42%
C	16%	58%	51%
D	14%	69%	63%

- Sites had many inefficient office workflow issues and technical difficulties
- Conducted several Case Management visits, provided extra training sessions for both physicians and staff. Dedicated extra time to solve technical issues. Set milestones and goals for all site staff.

Case Study Two

9. A comparison of two sites [slightly later timeframe] that have shown considerable improvement in EMR data entry as a result of one-on-one physician retraining sessions

	April '99 - June '99	Sept. '99 – Nov. '99	Nov. '99 – Jan.'00
Physician E1	19%	81%	89%
Physician E2	1%	44%	47%
Physician F	21%	29%	51%

- Sites had a number of Case Management issues [i.e. inefficient workflow and an inability of physicians to prioritise their workloads]. Key staff members demonstrated resistance to change.
- Conducted several Case Management visits and provided extra training sessions for both physicians and staff.
- Conducted Practise Management review of office structure and practice.

Hindsight

Selection of sites and physicians is crucial

Requires an efficient practice with motivated staff and physicians who are ready for change, eager to learn, and have a desire to use the computer

Must allow for ample training time and for individuals to engage in learning

Eight hours of training is not enough. Individuals must adopt an ongoing process including training, practice, and refreshers

It is necessary to provide constant feedback about appropriate data entry (i.e. correcting quirks and inconsistent charting methods.)

CONCLUSIONS

- Report/Feedback Letters alone are not very successful
- User Group Meetings offer efficient methods of problem-solving, but prove difficult to get total physician participation. A great deal of time is involved in setting up meeting, holding meeting and then disseminating decisions to all physicians after discussion [i.e. non attendees]. These meetings initiate peer pressure and foster guidance
- Additional training classes for slower learners and new staff are beneficial with relative small cost and minimal set-up time.
- One-on-one re-training and hand-holding visits are very helpful, but are costly and time consuming.

Future Directions

- Align financial incentives with data entry and data quality
- ✓ Currently we subsidize 75% of computer costs
- ✓ In the future suggested subsidy of 50% while offering physicians an opportunity to earn the additional 25% through the provision of quality data
- ✓ Develop a mix of data quantity and quality requirements
- Provide decision-support tools that require quality data entry. This can improve patient care if data quality is consistently high.

BIOGRAPHY

Sue Troyan has worked in research for the past 18 years including large multi-centre clinical trials for the Department of Clinical Epidemiology and Biostatistics at McMaster University. Areas of research include chronic heart failure, lung cancer and intensive care trials. Sue has expertise in Case Management, administering and teaching Quality of Life measurement tools.

Sue has been Project Co-ordinator with the COMPETE study, located at St Joseph's Hospital in Hamilton Ontario, since August 1996.