Performance Evaluation of Core Measures for Acute Myocardial Infarction and Heart Failure Using a Comparative Performance Information System

by

Manasi Malvankar

A Capstone Project

Presented to Department of Medical Informatics & Clinical Epidemiology

and Oregon Health & Science University School of Medicine

in partial fulfillment of the requirements of the degree of

Master of Biomedical Informatics

April 2004

School of Medicine

Oregon Health & Science University

Master of Biomedical Informatics

Certificate of Approval

This is to certify that the Capstone Project of

Manasi R. Malvankar

"Performance Evaluation of Core Measures for

Acute Myocardial Infarction and Heart Failure

Using a Comparative Performance Information System"

Has been approved

[redacted]

Professor in charge of capstone project

5/12/2004

Date

Table of Contents

Abstract

Heart diseases such as Acute Myocardial Infarction (AMI) and Heart Failure (HF) are the cause of significant morbidity and mortality in United States. The quality of care and follow-up instructions received by these patients of AMI and HF can play an important role in the prognosis and re-hospitalizations of these patients. In order to deliver optimal care to patients, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) included Core Measures for AMI and HF as a part of their ORYX initiative, as indicators of hospital performance and compliance in meeting the quality of care criteria. There has been increasing use of Hospital Information Systems for quality improvement in patient care. This project shows usage of Midas+ information system and querying and reporting tools such as Microsoft Access and Crystal Reports for evaluating hospital performance for JCAHO Core Measures of AMI and HF. The analysis of these reports also shows individual physician compliance in meeting the Core Measures. Thus, such projects can be used by hospitals for directing measures for process improvement, increasing physician compliance and ultimately enhancing the quality of care for patients with AMI and HF.

1. Introduction

Cardiovascular diseases are the leading cause of death in United States. (1) A majority of these incidents are attributed to Acute Myocardial Infarction (AMI) and Heart Failure (HF). The treatment and follow-up delivered to patients with AMI/ HF on their first encounter with the hospital can make a difference in their prognosis and quality of life. (2,3) Also, appropriate and timely diagnostic measures and treatment protocols are believed to shift the trends in patient re-admissions with AMI/ HF. (1-3) With this view, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has developed Core Measures for AMI and HF and also for number of other diseases as a part of their ORYX initiative. (4) ORYX initiative is an attempt through which performance measurement data from healthcare organizations can be integrated into JCAHO's accreditation process. It has been implemented since 2002 with the goal of evaluating current performance for Core Measures and its factors in healthcare organizations in order to achieve better outcomes through process improvement actions. (5) Every year hospitals accredited with JCAHO gather data for these Core Measures, analyze for trends and also compare their performances across other organizations in the nation. Also, within an organization, the performance of individuals in meeting these Core Measures can be assessed as compared to their peers.

The performance measurement for a given organization for Core Measures can be efficiently carried out by use of hospital information systems. Quality assurance and improvement are one of the most useful applications of medical information systems (6) and there are many well-known examples in which these information systems have aided in performance measurement and quality improvement. COSTAR, the Computer Stored

Ambulatory Record, through one of its quality assurance programs, increased the compliance in treatment follow-up after positive throat cultures for streptococcus. (7) Similarly, decrease in length of hospitals days and improved outcomes for patients with hypertension, renal disease and obesity was facilitated by using Northwestern University Computerized Medical Record Summary System (NUCRSS) in Illinois. (8) The Complications Screening Program, using computer algorithms, administrative data and discharge abstracts, made it possible to target potential quality improvement issues in hospitals. (9) There have also been efforts in increasing physician compliance using information systems as one of the steps in quality improvement. For example, a computer-based ambulatory quality assurance program was developed at Harvard Community Health Plan to improve physician compliance in screening for colorectal cancer. (10) In another quality assurance project at Harvard University, the Ambulatory Care Medical Audit Demonstration (ACMAD) evaluated if prescribed treatment protocols were being followed (11) and one of the ACMAD studies showed deficiencies in care upto 42 % of the cases inspite of approval of the guidelines by the physicians. (12)

Utilizing an organization's information system for outcomes measurement and quality improvement can be an efficient method for periodic reporting and review of data for even Core Measures analysis. (13) For example, Robert Wood Johnson University Hospital of New Jersey with the help of their clinical information system increased administration of aspirin at discharge for AMI patients by 7.5%; improved smoking cessation counseling by 35% for AMI patients and 77% for patients with heart failure. (14) Also, using an information system for reporting data can aid in completeness and

accuracy of data as the information system checks for discrepancies in coding and abstraction. (15, 16)

This project demonstrates the use of a hospital information system in evaluating the hospital's performance in meeting the heart disease Core Measures. This project not only shows hospital compliance but also evaluates individual physician compliance for Core Measure indicators. The analysis of reports in this project can greatly help the quality management department in the hospital to recognize areas of shortcomings and take measures for increasing their performance. For example, Parkview Community Hospital in California implemented AMI Management program and compared its performance before and after the performance improvement program. Its inpatient mortality rate decreased from 16% to 8%; complications decreased from 14% to zero and consideration for beta-blockers increased from 31% to 52%. (14) Similarly, in three years, Berkshire Medical Center (BMC) in Pittsfield, Massachusetts, has shown significant improvement by increasing aspirin at discharge use from 96% to 100%; smoking cessation counseling from 43% to 100%; ACE-inhibitor use from 67% to 88%; lipid treatment from 59% to 92%; and referral to cardiac rehabilitation from 14% to 98%. (14) With such success stories and ability to utilize hospital information systems to create and analyze reports as shown in this project, many hospitals can strive and achieve improved performance and better quality of care for their patients.

2. Description of Core Measures

JCAHO identified 9 Core Measures as part of hospital AMI Core Measure set and 4 Core Measures as part of hospital HF Core Measures set. (17, 18)

2.a AMI Core Measures

- **AMI-1 Aspirin at arrival**

This measure assesses the percentage of AMI patients without aspirin contraindications who received aspirin within 24 hours before or after hospital arrival. The accommodation to 24 hours prior to arrival was believed important because of the increased public awareness about the benefits of immediate aspirin use (i.e., many patients are taking aspirin at home and/or emergency medical services are administering aspirin during transport). (19) According to current guidelines, a patient suspected of AMI should be immediately given aspirin upon arrival to the emergency department. (1) The early use of aspirin in patients with AMI results in a significant reduction in adverse events and subsequent mortality. Aspirin therapy provides a percent reduction in mortality that is comparable to thrombolytic therapy and the combination provides additive benefit. (17, 19)

- **AMI-2 Aspirin prescribed at discharge**

This measure assesses the percentage of AMI patients without aspirin contraindications who are prescribed aspirin at hospital discharge. Aspirin therapy in patients who have suffered an AMI reduces the risk of adverse events and mortality. Studies have demonstrated that aspirin can reduce this risk by 20% (17, 19) and is estimated to prevent subsequent attacks in 3.5 - 4 % of the patients who have been

previously treated for AMI. (1) National guidelines strongly recommend long-term aspirin for the secondary prevention of subsequent cardiovascular events in patients discharged after AMI. Despite these recommendations, aspirin remains underutilized in older patients discharged after AMI. (19)

- **AMI-3 ACEI for LVSD**

This measure assesses the percentage of AMI patients with left ventricular systolic dysfunction (LVSD) and without angiotensin converting enzyme inhibitor (ACEI) contraindications who are prescribed an ACEI at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less than 40% or a narrative description of left ventricular function (LVF) consistent with moderate or severe systolic dysfunction. Angiotensin converting enzyme inhibitor (ACEI) therapy reduces mortality and morbidity in patients with left ventricular systolic dysfunction (LVSD) after AMI. In addition, the likelihood of a recurrent myocardial infarction may also be reduced. Clinical trials have established that the use of ACEI initiated after recovery from an AMI improves long-term survival, with greater treatment benefit in patients with anterior infarctions or LVSD. (17, 19)

- **AMI-4 Adult smoking cessation advice/counseling**

This measure assesses the percentage of AMI patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during hospital stay. For purposes of this measure, a smoker is defined as someone who has smoked cigarettes anytime during the year prior to hospital arrival. Smoking cessation reduces mortality and morbidity in all populations. (19) Patients who receive even brief smoking-cessation

advice from their physicians are more likely to quit. Also, the patient's risk of reinfarction and AMI mortality are estimated to reduce within one year of quitting smoking. (17)

- **AMI-5 Beta blocker prescribed at discharge**

This measure assesses the percentage of AMI patients without beta blocker contraindications who are prescribed a beta blocker at hospital discharge. The use of beta blockers for patients who have suffered an AMI can reduce mortality and morbidity. Studies have demonstrated that the use of beta blockers are associated with about 20% reduction in this risk. National guidelines strongly recommend long-term beta blocker therapy for the secondary prevention of subsequent cardiovascular events in patients discharged after AMI. (17, 19)

- **AMI-6 Beta blocker at arrival**

This measure assesses the percentage of AMI patients without beta blocker contraindications who received a beta blocker within 24 hours after hospital arrival. The early use of beta blockers in patients with AMI reduces mortality and morbidity. Immediate administration of beta blocker therapy appears to reduce the magnitude of infarction and associated complications in subjects not receiving concomitant thrombolytic therapy. Beta blockers also reduce the rate of reinfarction in patients receiving thrombolytic therapy. (17, 19)

- **AMI-7 Median Time to Thrombolysis**

This measure assesses the median time from arrival to administration of a thrombolytic agent in patients with ST segment elevation or left bundle branch block (LBBB) on the electrocardiogram (ECG) performed closest to hospital arrival time. Time to thrombolytic therapy is a strong predictor of outcome in patients with an AMI. Nearly 2 lives per 1000 patients are lost per hour of delay. National guidelines recommend that thrombolytic therapy be given within 30 minutes of hospital arrival in patients with ST elevation myocardial infarction. (17, 19)

- **AMI-8 Time to PTCA (Percutaneous Transluminal Coronary Angioplasty)**

This measure assesses the median time from hospital arrival to PTCA in patients with ST segment elevation or left bundle branch block (LBBB) on the electrocardiogram (ECG) performed closest to hospital arrival time. The early use of primary angioplasty in patients with AMI who present with ST-segment elevation or left bundle branch block (LBBB) results in a significant reduction in mortality and morbidity. The earlier primary coronary intervention is provided, the more effective it is. National guidelines recommend initiation of percutaneous transluminal coronary angioplasty (PTCA) within 90 minutes after hospital arrival in patients with ST elevation myocardial infarction. (17, 19)

- **AMI-9 Inpatient mortality**

Mortality of patients with AMI represents is a deleterious outcome that is potentially related to the quality of care. This indicator identifies an undesirable outcome of care, and measures only inpatient mortality. (17, 19)

2.b HF Core Measures

- **HF-1 Discharge instructions.** HF-1 is further divided into 6 categories:

    a) HF-1a Activity Instructions at Discharge

    b) HF-1b Diet Instructions at Discharge

    c) HF-1c Follow-up instructions at Discharge

    d) HF-1d Medications instructions at Discharge

    e) HF-1e Symptoms worsening instructions at Discharge

    f) HF-1f Weight monitoring instructions at Discharge

This measure assesses the percentage of patient discharges with a principal diagnosis of heart failure with complete discharge instructions in the medical record. Educating patients with heart failure and their families is critical. Patient non-compliance with physician's instructions is often a cause of re-hospitalization. It is thus important that health care professionals ensure that patients and their families understand the prognosis of heart failure, the rationale for pharmacotherapy and prescribed medication regimen, dietary restrictions, and activity recommendations, and the signs and symptoms of deteriorating condition. Additionally, patients discharged from the hospital after an exacerbation of heart failure should have follow-up to ensure clinical stability. (18, 20)

- **HF-2 LVF assessment**

This measure assesses the percentage of heart failure patients with documentation in the hospital record that left ventricular function (LVF) was assessed before arrival, during

hospitalization, or planned for after discharge. Appropriate selection of medications to reduce morbidity and mortality in heart failure requires the identification of patients with impaired left ventricular systolic function. National guidelines advocate the assessment of left ventricular systolic function as the single most important diagnostic test in the management of all patients with heart failure. (18, 20)

- **HF-3 ACEI for LVSD**

This measure assesses the percentage of heart failure patients with left ventricular systolic dysfunction (LVSD) and without angiotensin converting enzyme inhibitor (ACEI) contraindications who are prescribed an ACEI at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less than 40% or a narrative description of left ventricular function (LVF) consistent with moderate or severe systolic dysfunction. ACEI therapy reduces mortality and morbidity in patients with heart failure and left ventricular systolic dysfunction. National guidelines strongly recommend ACEIs for patients hospitalized with heart failure. (18, 20)

- **HF-4 Adult smoking cessation advice/counseling**

This measure assesses the percentage of heart failure patients with a history of smoking cigarettes, who are given smoking cessation advice or counseling during hospital stay. For purposes of this measure, a smoker is defined as someone who has smoked cigarettes anytime during the year prior to hospital arrival. Smoking cessation reduces mortality and morbidity in all populations. Patients who receive even brief smoking cessation advice from their physicians are more likely to quit. National

guidelines strongly recommend smoking cessation counseling for smokers with cardiovascular disease, including heart failure. (18, 20)

3. Hospital Information System and Software Tools

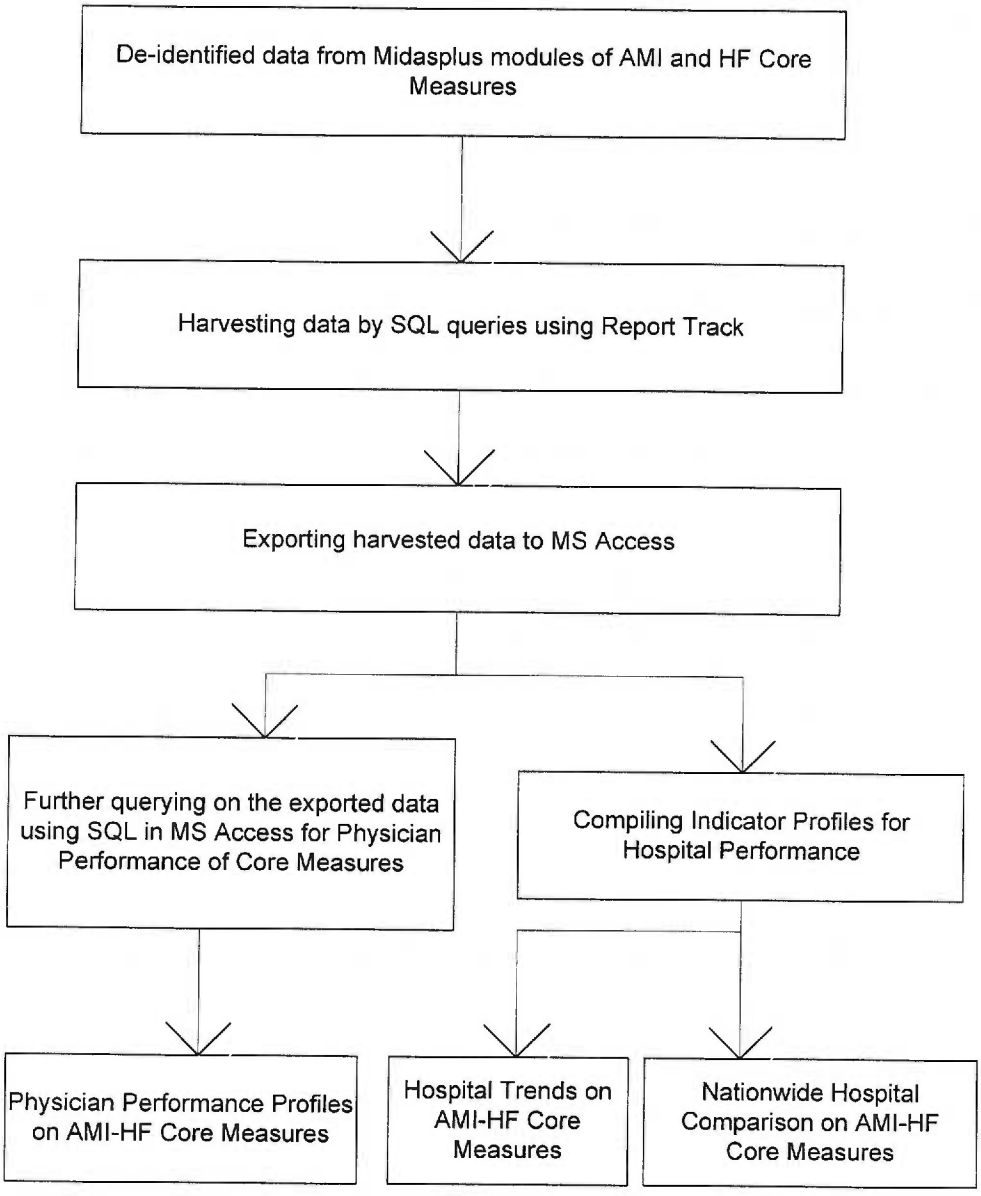
For this project, MIDAS+, a comparative performance measurement system is used. Midas+ is an outcomes, resources and case management system that can be integrated with the administrative information system of the hospital. Midas+ consists of different subsystems that are organized into modules for data collection in specific areas such as infection control, risk management, disease management etc. The underlying structure of Midas+ database is hierarchical and not relational. Hence direct Structured Query Language (SQL) queries cannot be written against Midas+ database. (21) But Midas+ has an interface of SQL reporting known as ReportTrack through which queries can be written in SQL, which are then interpreted to hierarchical database so that the user does not have to deal with the complexities of dealing with a hierarchical model.

However, Midas+ does not have the ability for measuring individual physician compliance. Hence this project has used additional database and reporting tools such as Microsoft Access (MS-Access) and Crystal Reports. The data gathered after querying from ReportTrack module of Midas+ is exported to Microsoft Access for further SQL querying and reporting using Crystal Reports.

Figure 1 illustrates the steps involved in the performance evaluation project. The de-identified data is gathered from disease management modules for AMI and HF. This data is queried using SQL queries on ReportTrack module to yield a data set that can be exported to MS-Access for further querying and reporting. Thus, physician profiling for

compliance for core measures can be obtained using additional SQL queries in MS-Access. The hospital compliance for the core measures can be obtained by compiling the indicator profile reports over the harvested data in ReportTrack. These reports can further be utilized for identifying opportunities for compliance improvement.

Figure 1. Project Schema



4. Data for Compliance Measurement

This project uses de-identified data that is already in Midas+ and has not used any data outside Midas+ modules. The data for AMI and HF core measure compliance is taken from AMI and HF core measures modules of disease management of MIDAS+ information system. This data is de-identified patient data that is entered monthly by case management nurses from paper-based chart reviews into the Midas+ modules. Though Midas+ modules have a robust format in order to collect accurate and complete information, the manual method of abstraction and data collection by nurses is one of the limitations of this report. The information collected primarily consists of core measures questions, for example – Was Aspirin given at arrival? Or Was Beta blocker prescribed at discharge? Was the patient given discharge instructions? The answers to most of the questions (except for core measures AMI-7 and AMI-8) are noted in the form of yes/no answers coded as "1" for "Yes" and "2" for "No". For core measures AMI-7 and AMI-8, the time in seconds is recorded. After the entire information is collected, it is compiled using SQL queries as described in the next section.

5. Data Querying

With the help of ReportTrack module, SQL queries are run over the data in AMI and HF modules and information needed for the analysis is extracted. As mentioned earlier, ReportTrack module is an SQL interface to Midas+. With the help of ReportTrack queries can be constructed in SQL to obtain the required results.

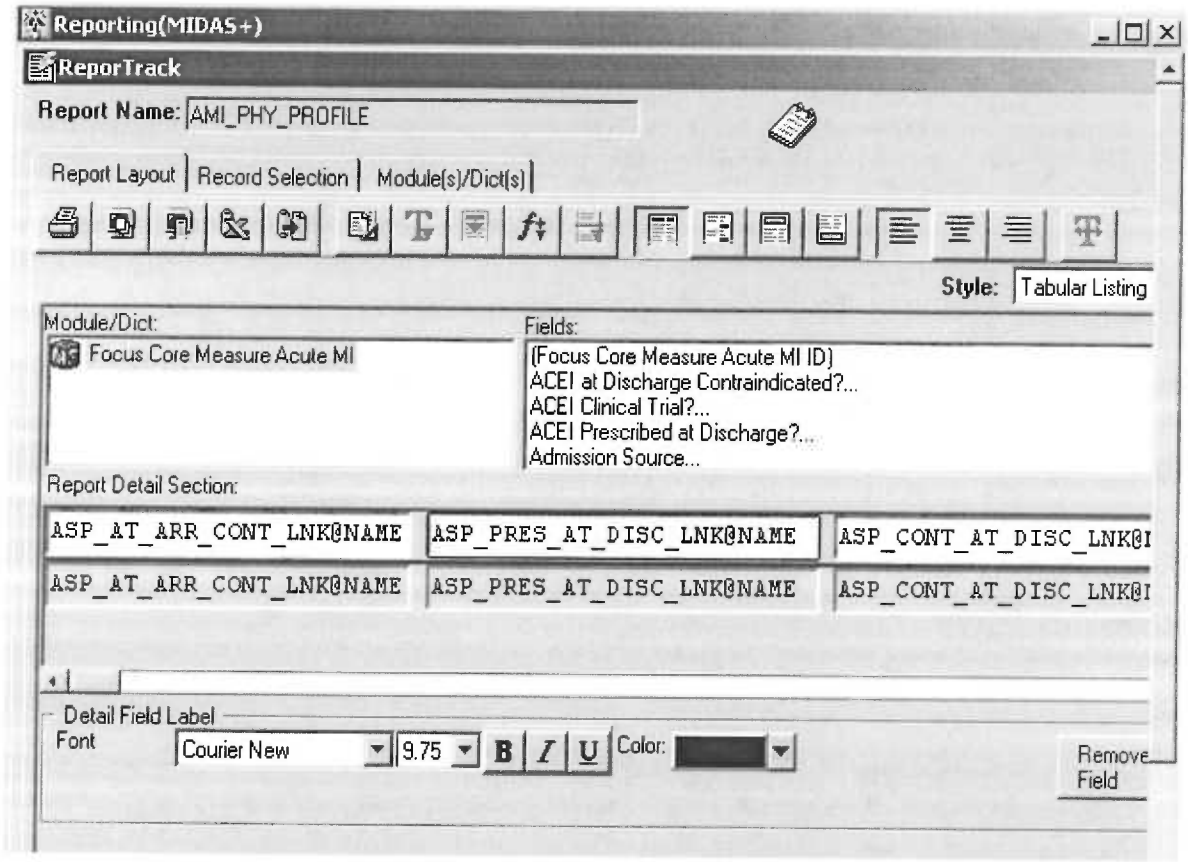
For example Figure 2 shows the following SQL query built in ReportTrack.

SQL query:

```
Select Aspirin_on_Arrival, Aspirin_at_Discharge, ACEI_LVSD,
Smoking_Cessation_Advice, Betablocker_arrival, Betablocker_discharge
from CoreMeasures_AMI
where encounter_date between "07/01/2003" and "12/31/2003"
```

The following snapshot shows the ReportTrack query.

Figure 2. ReportTrack Query



The results of the SQL queries are exported into the different tables of Access database. This export to Access has to be done as ReportTrack does not have the ability to create physician profiles or change report layouts and graphs. Also, initial use of

ReportTrack is mandated as only ReportTrack has the ability to harvest data from MIDAS+ system.

6. Reporting

The reports that can be generated with the core measure information are as follows:

(a) Physician profile reports – These reports are designed to examine how the physicians have performed in meeting the core measure compliance along with comparison to their peers.

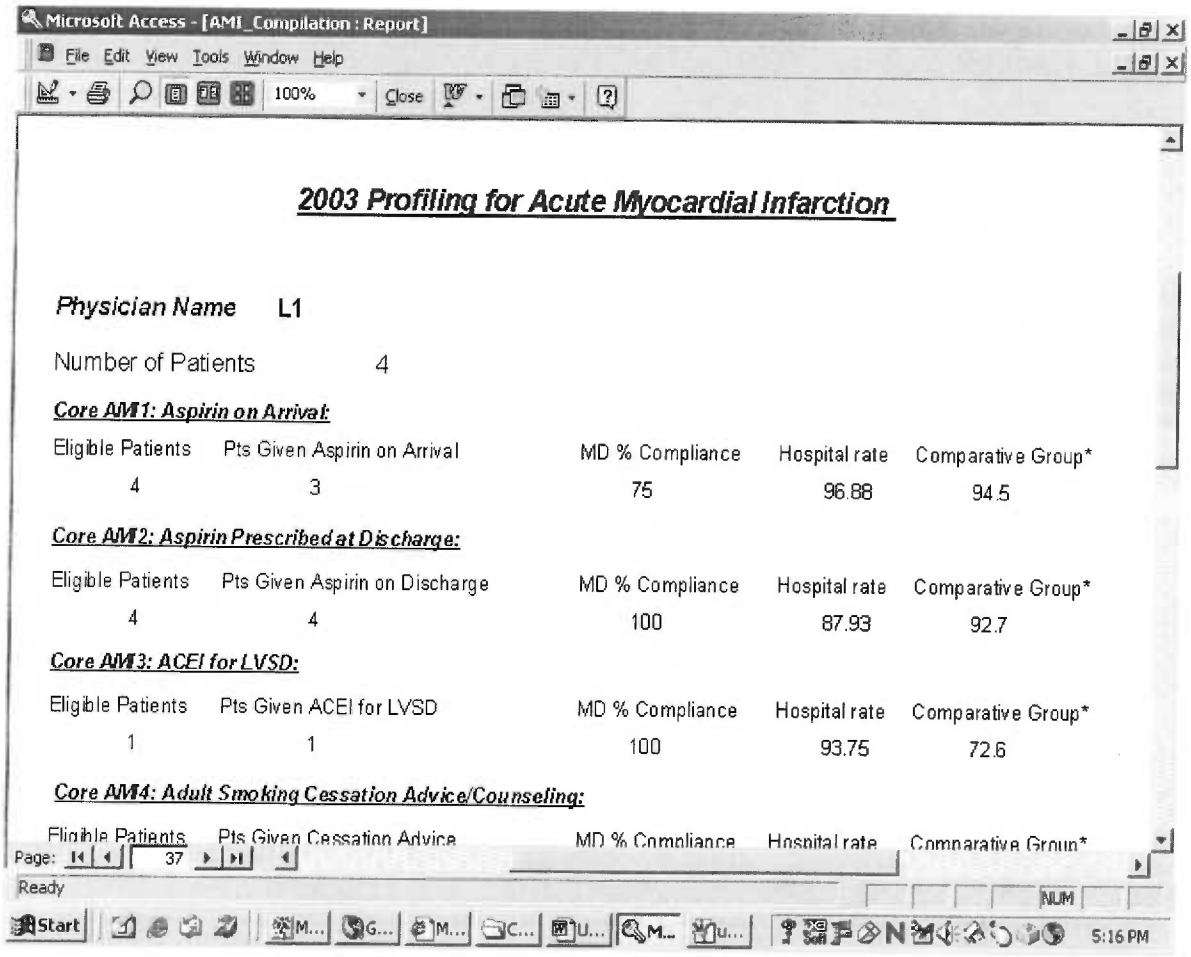
(b) Hospital performance report – The comparison of hospital performance for core measures through last two years and also with the national performance can be assessed with this report.

For AMI core measures, the indicators AMI-7 and AMI-8, which are computed in terms of time taken are computed but not included in the analysis for both the reports.

6.a Physician profile reports

These reports show the total number of patients with AMI/HF did the physician see; Out of them, the number of patients that were eligible for each core measure indicator and the number of patients that did actually receive the desired treatment and thus the physician compliance can be computed. The entire information for this report is obtained by querying the data that is exported to Access database from ReportTrack. The design of the report consists of multiple individual queries from different tables. A snapshot of the report is shown below.

Figure 3. Physician Profile Report


Microsoft Access - [AMI_Compilation : Report]

File Edit View Tools Window Help

100% Close

2003 Profiling for Acute Myocardial Infarction

Physician Name L1

Number of Patients 4

Core AMI1: Aspirin on Arrival:

Eligible Patients	Pts Given Aspirin on Arrival	MD % Compliance	Hospital rate	Comparative Group*
4	3	75	96.88	94.5

Core AMI2: Aspirin Prescribed at Discharge:

Eligible Patients	Pts Given Aspirin on Discharge	MD % Compliance	Hospital rate	Comparative Group*
4	4	100	87.93	92.7

Core AMI3: ACEI for LVSD:

Eligible Patients	Pts Given ACEI for LVSD	MD % Compliance	Hospital rate	Comparative Group*
1	1	100	93.75	72.6

Core AMI4: Adult Smoking Cessation Advice/Counseling:

Eligible Patients Pts Given Cessation Advice MD % Compliance Hospital rate Comparative Group*

Page: 37

Ready

NUM

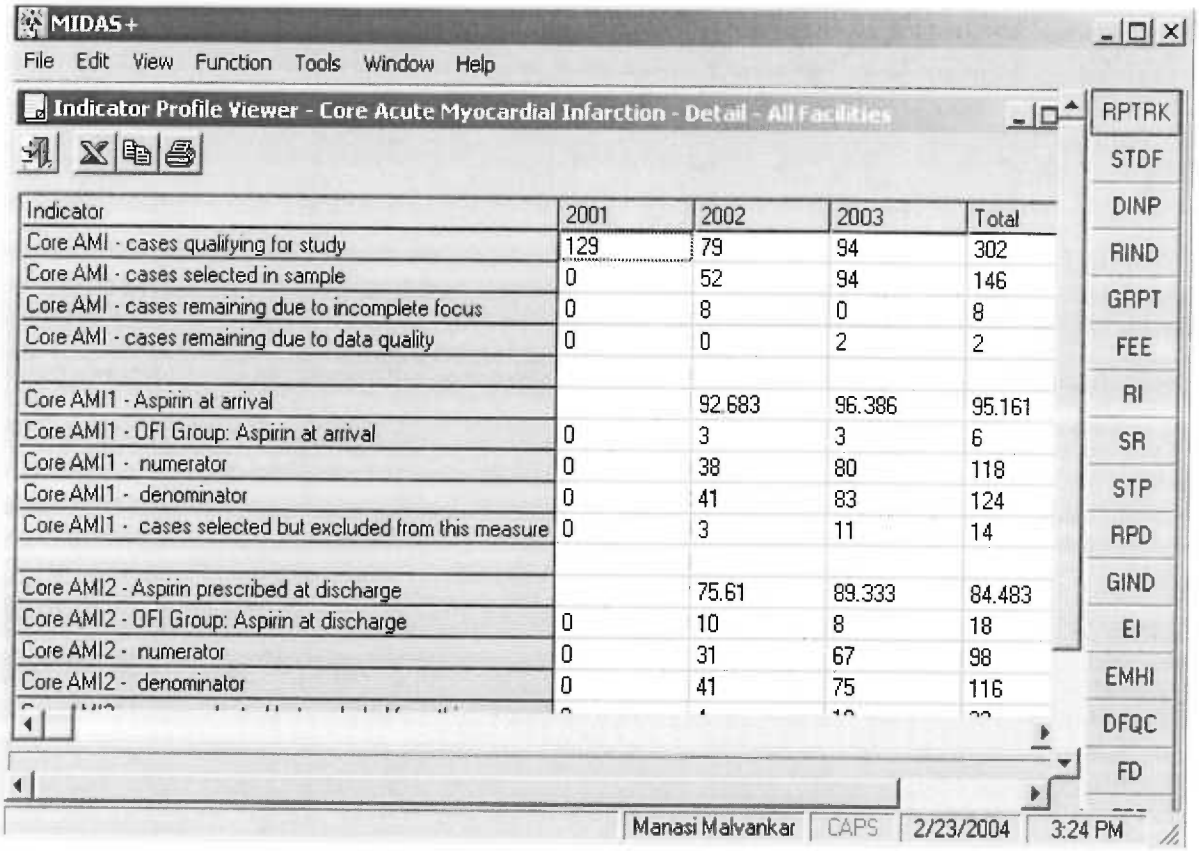
Start 5:16 PM

It may seem from the above report that the number of patients per physician is small thus the compliance percentages proportionately higher. The goal of these physician profiles is for the quality management department for quality improvement measures such as to identify and target the physicians who have less compliance and to increase awareness amongst all physicians about the Core Measures – their indicators and essential protocols. The hospital can run such profile reports for different periods to compare the effectiveness of the quality improvement measures and to target consistently defaulting physicians.

6.b Hospital performance report

This report compares the hospital's performance through 2002-2003 and also with other hospitals in the nation. The hospital performance for the core measures can be determined by compiling the indicator profiles for AMI and HF. These indicator profiles are computed from the harvested data in Midas+ for the different years.

Figure 4. Indicator Profile



Indicator	2001	2002	2003	Total
Core AMI - cases qualifying for study	129	79	94	302
Core AMI - cases selected in sample	0	52	94	146
Core AMI - cases remaining due to incomplete focus	0	8	0	8
Core AMI - cases remaining due to data quality	0	0	2	2
Core AMI1 - Aspirin at arrival		92.683	96.386	95.161
Core AMI1 - OFI Group: Aspirin at arrival	0	3	3	6
Core AMI1 - numerator	0	38	80	118
Core AMI1 - denominator	0	41	83	124
Core AMI1 - cases selected but excluded from this measure	0	3	11	14
Core AMI2 - Aspirin prescribed at discharge		75.61	89.333	84.483
Core AMI2 - OFI Group: Aspirin at discharge	0	10	8	18
Core AMI2 - numerator	0	31	67	98
Core AMI2 - denominator	0	41	75	116

7. Analysis

7.a Hospital Performance for 2002 and 2003

The hospital for which the analysis is done is named say, XYZ hospital. The performance of this hospital for 2002 and 2003 is as follows:

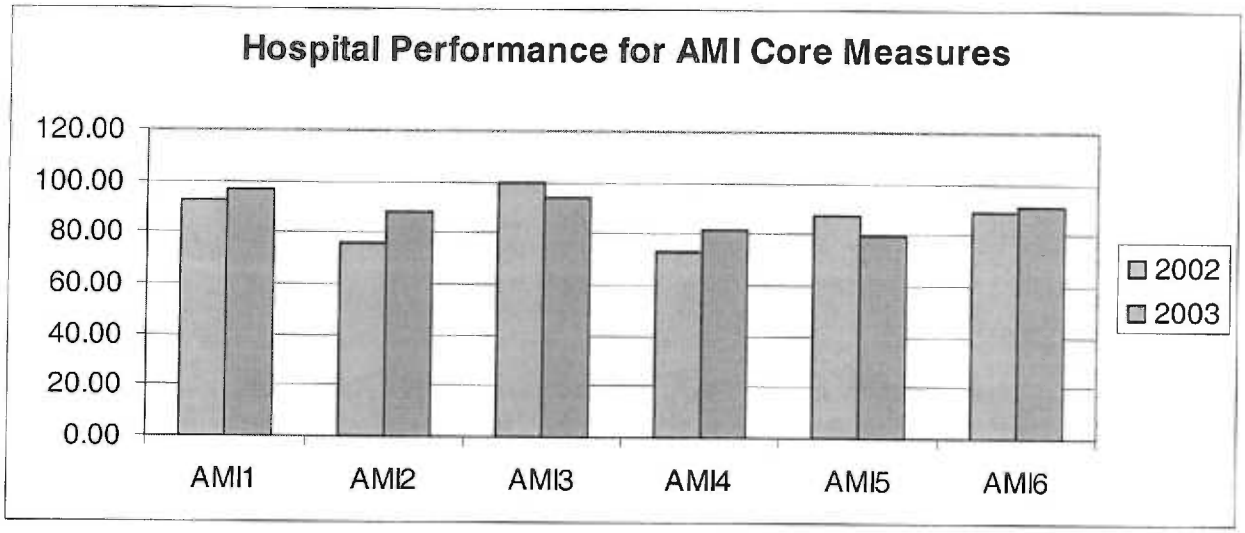
7.a (i) Hospital Performance for AMI Core Measures

Table 1

For first 6 core measures, the indicator shows percent compliance.

Indicator	2002	2003	% Change
Core AMI1 - Aspirin at arrival	92.68 %	96.88 %	5%
Core AMI2 - Aspirin prescribed at discharge	75.61 %	87.93 %	16%
Core AMI3 - ACEI for LVSD	100.00 %	93.75 %	-6%
Core AMI4 - Adult smoking cessation advice/counseling	73.33 %	81.81 %	12%
Core AMI5 - Beta blocker prescribed at discharge	87.50 %	79.68 %	-9%
Core AMI6 - Beta blocker at arrival	88.89 %	90.90 %	2%
Core AMI7 - Mean Time to Thrombolysis	81.00	59.00	
Core AMI8 - Mean Time to PTCA	1258.77	1303.64	
Core AMI9 - Inpatient Mortality	4.44	8.20	85%

Graph 1



From the above table and graph, it is seen that the hospital performed better in 2003 than its previous year for the following AMI Core Measures:

- AMI-1 Aspirin at arrival
- AMI-2 Aspirin prescribed at discharge
- AMI-4 Adult smoking cessation advice/counseling
- AMI-6 Beta blocker at arrival

The hospital performance declined in 2003 from its previous year for the following core measures:

- AMI-3 ACEI for LVSD
- AMI-5 Beta blocker prescribed at discharge

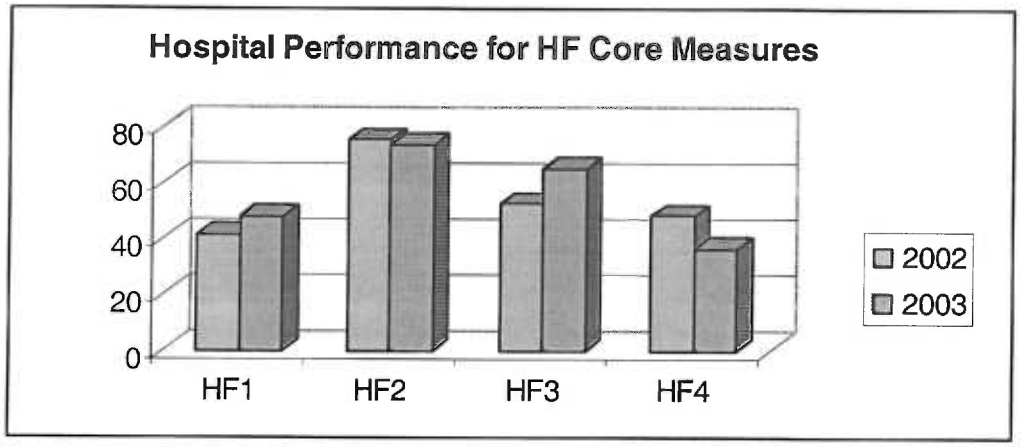
- AMI-9 Inpatient mortality – This indicator showed a significant increased by 85 % in 2003, which shows that the hospital has to make further inquiry for the cause of rise in inpatient deaths.

7.a (ii) Hospital Performance for HF Core Measures

Table 2

Indicator	% Compliance		% Change
	2002	2003	
Core HF1 - All Discharge Instructions	41.25	47.75	15.76%
Core HF1a - Activity instructions at discharge	84.375	94.81	12.37%
Core HF1b - Diet instructions at discharge	92.5	96.8	4.65%
Core HF1c - Follow-up instructions at discharge	90.625	97.2	7.26%
Core HF1d - Medications instructions at discharge	87.5	95.337	8.96%
Core HF1e - Symptoms worsening instructions at discharge	81.875	84.4	3.08%
Core HF1f - Weight monitoring instructions at discharge	56.875	51.5	-9.45%
Core HF2 - LVF Assessment	75.275	73.5	-2.36%
Core HF3 - ACEI for LVSD	52.381	64.8	23.71%
Core HF4 - Adult smoking cessation advice/counseling	48.148	36.3	-24.61%

Graph 2



From the table 2 and graph 2, it is seen that the hospital performance for HF core measures improved in 2003 for the following core measures:

- HF-1 Discharge instructions.
- HF-3 ACEI for LVSD

However, for core measure HF-2 LVF Assessment and HF-4 Adult smoking cessation counseling/advice, the hospital performance in 2003 was lower than that in 2002.

7.b Hospital Performance in 2003 in comparison with other hospitals

The other hospitals are collectively referred to as Comparative Group. These are a collection of hospitals, which also use MIDAS+ system for their core measure performance and thus, MIDAS+ can provide their collective performance but not individual performances to other hospitals.

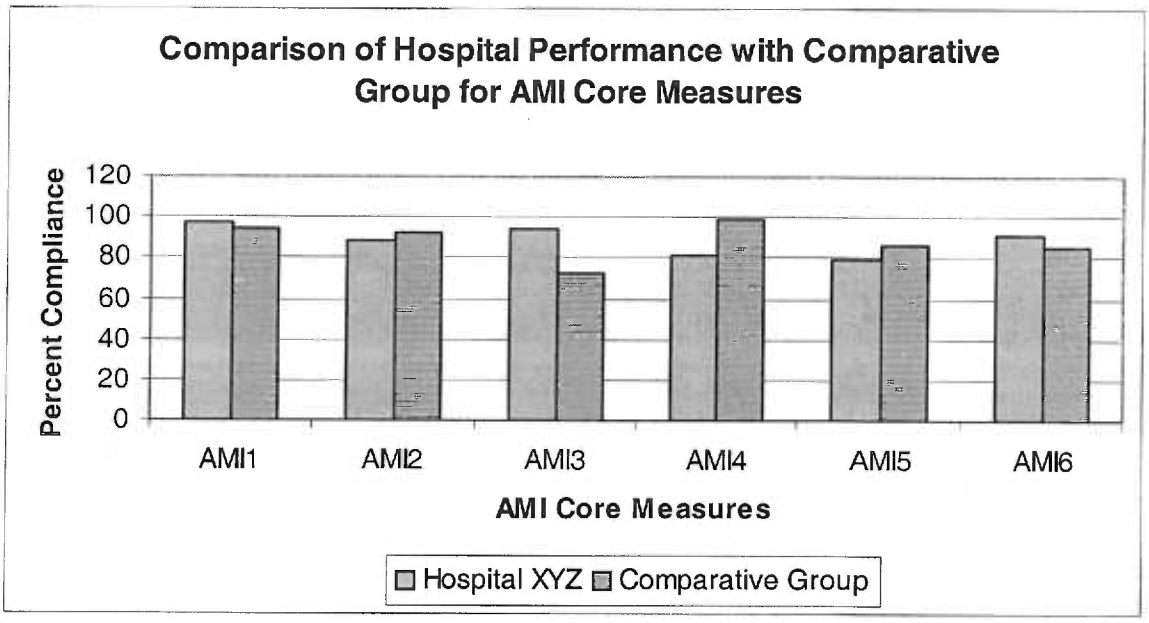
7.b (i) Comparison of Hospital performance with Comparative Group for AMI core measures

Table 3

Indicator	Hospital XYZ	Comparative Group
AMI1 - Aspirin at arrival	96.88	94.50
AMI2 - Aspirin prescribed at discharge	87.93	92.70
AMI3 - ACEI for LVSD	93.75	72.60
AMI4 - Adult smoking cessation advice/counseling	81.81	98.90
AMI5 - Beta blocker prescribed at discharge	79.68	86.00
AMI6 - Beta blocker at arrival	90.90	85.40

Table 3 shows that Hospital XYZ had better compliance than the comparative group for the core measures AMI-1, AMI-3, and AMI-6. Whereas the Hospital showed lower compliance than the comparative group for core measures AMI-2, AMI-4 and AMI-5. Graph 3 shows this comparison.

Graph 3



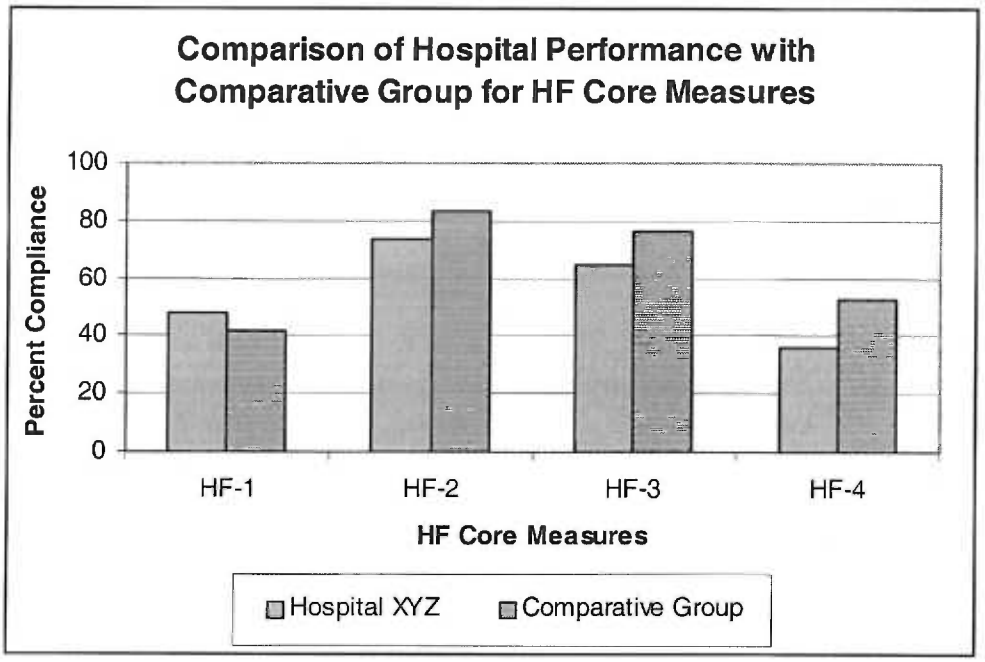
7.b (ii) Comparison of Hospital performance with Comparative Group for HF core measures

Table 4

Indicator	Hospital XYZ	Comparative Group
Core HF1 - All Discharge Instructions	47.75	41.60
Core HF2 - LVF Assessment	73.50	83.30
Core HF3 - ACEI for LVSD	64.80	76.50
Core HF4 - Adult smoking cessation advice/counseling	36.30	52.80

From Table 4 and the following graph 4, we can see that except for core measure HF-1, the hospital performance was lower than that of the comparative group.

Graph 4



8. Discussion

From the analysis we see that smoking cessation counseling for AMI patients rose by 12% from 2002 to 2003 (Table 1) where as decreased by 24.6% for HF patients. However, there is no consistent trend showing that the performance for all measures increased or decreased in 2003 as compared to previous year for example why should patients for one measure be advised more and less on the other measure. It does show lack of awareness amongst the staff and absence of reinforcement of performance requirements. It was also realized that the instruction sheets for admission and discharge for AMI and HF failure patients had not been revised since 2001. Thus, there needed to be changes or additions in process improvement in the hospital. Before making any

amendments, it is important to recognize the limitations of this report. The data for analysis was primarily collected by case management nurses by chart reviews. There can be errors in this type of manual abstraction from the charts into the information system. This discrepancy can have a significant impact on the determination as to whether a patient is even included in the population for certain performance measures and thus can significantly impact the healthcare organization's reported performance rate for that measure. Hence to verify the accuracy of the numbers reported, it is suggested that at least a sample of the data be re-abstracted and checked for accuracy.

Knowing where it stands can enable the organization set expectations to enhance its performance. As described earlier, many healthcare organizations increased their core measures performance by analyzing their numbers and making quality improvement changes such as education for physicians and nurses through extensive meetings and sessions about JCAHO Core Measures and how each person's action in treatment delivery can make a difference for the hospital's compliance; adding new forms to charts; assigning a staff member to monitor charts often and finally trying to integrate the changes in the workflow for better acceptance by the staff. From the success stories of hospitals discussed earlier (14), the inpatient interventions for the quality improvement department of the hospital can be categorized as follows:

- Increased education and enhanced communication amongst the staff members for JCAHO Core Measures
- Revised forms and checklists in treatment of AMI and HF patients
- Explicit guidelines for data abstraction for the Core Measures
- Ongoing data analysis and feedback of policy changes

9. Summary

Performance measurement using hospital information systems benefits the health care organization by providing statistically valid, data-driven mechanisms that generate a continuous stream of performance information. This enables a health care organization to understand how well their organization is doing over time and have continuous access to data to support claims of quality. The organization can verify the effectiveness of corrective actions; identify areas of excellence within the organization; and compare their performance with that of peer organizations using the same measures. We have seen how with the help of hospital information systems like MIDAS+ and simple querying tools like MS-Access, important data for AMI and HF core measures can be measured. The reports show not only hospital performance against other institutions but also physician performance against its peers. The results of these reports can help the hospital address areas of its shortcomings and make changes for setting policies to improve compliance and better patient care. However, the limitations of the data collection and abstraction have to be recognized. The effectiveness of the changes and also of other policy amendments can be assessed by running such projects over a period of time.

10. References

(1) French WJ. Trends in acute myocardial infarction management: Use of national registry of myocardial infarction in quality improvement. American Journal of Cardiology 2000; 85: 6-12.

(2) Ryan TJ, et al. American College of Cardiology/ American Heart Association Guidelines for management of patients with Acute Myocardial Infarction: Executive Summary, 1999.

(3) American College of Cardiology/ American Heart Association: Guidelines for the Evaluation and Management of Chronic Heart Failure in the Adult, Accessed February 15th, 2004.

(4) Introduction and Background of ORYX initiative. http://www.jcaho.org/pms/core+measures/1b_introduction.pdf Accessed March 1st, 2004.

(5) Performance Measurement in Health Care. http://www.jcaho.org/pms/ Accessed March 1st, 2004.

(6) Fitzmaurice JM, Adams K, Eisenberg JM. Three Decades of Research on Computer Applications in Health Care: Medical Informatics Support at the Agency for Healthcare Research and Quality. J Am Med Inform Assoc. 2002; 9: 144-160.

(7) Barnett GO, Winickoff R, Dorsey JL, Morgan MM, Lurie RS. Quality assurance through automated monitoring and con-current feedback using computer-based medical information system. Med Care. 1978; 16 (11): 962-970.

(8) Rogers JL, Haring OM, Wartman PM. Medical information systems: assessing impact in the areas of hypertension, obesity and renal disease. Med Care. 1982; 20 (1): 63-74.

(9) Kalish RL, Daley J, Duncan CC, Davis RB, Coffman GA, Iezzoni LI. Cost of potential complications of care for major surgery patients. Am J Med Qual. 1995; 10 (1): 48-54.

(10) Winickoff RN, Coltoin KL, Morgan MM, Buxbaum RC, Barnett GO. Improving physician performance through peer comparison feedback. Med Care. 1984; 22 (6): 527-34.

(11) Thompson MS, Palmer RH, Rothrock JK. Resources requirements for evaluating ambulatory health care. Am J Public Health. 1984; 74 (11): 1244-8.

(12) Palmer RH, Strain R, Maurer JV. Quality assurance in eight adult medicine group practices. Med Care. 1984; 22 (7): 632-43.

(13) Ritterband DR. Disease Management: Old Wine in New Bottles? J Healthc Manag. 2000 Jul-Aug; 45(4): 255-66.

(14) The American Health Quality Association. Fact Sheet: Success stories by Clinical Setting. http://www.ahqa.org/pub/media/159_766_4627.CFM#heart Accessed April 23rd, 2004.

(15) Hanson SP, Schutzengel RE. Pioneers and Perseverance: Implementing the EHR in Physician Practices. Journal of AHIMA. 2004 Jan, 75 (1): 38-43.

(16) Watt, Ann, et al. Keen Eye on Core Measures: Joint Commission Data Quality Study Offers Insights into Data Collection, Abstracting Processes. Journal of AHIMA 2003 Nov, 74 (10): 20-25.

(17) Overview of Acute Myocardial Infarction Core Measure set. http://www.jcaho.org/pms/core+measures/ami-overview.htm Accessed February 12th, 2004.

(18) Overview of Heart Failure Core Measure set.

http://www.jcaho.org/pms/core+measures/hf_overview.htm Accessed February 12th, 2004.

(19) Acute myocardial infarction core performance measures. Specifications manual for national implementation of hospital core measures. Oakbrook Terrace (IL): Joint Commission on Accreditation of Healthcare Organizations (JCAHO); 2002 July. p. AMI-1 to AMI-9-6.

(20) Heart failure core performance measures. Specifications manual for national implementation of hospital core measures. Oakbrook Terrace (IL): Joint Commission on Accreditation of Healthcare Organizations (JCAHO); 2002 July. p. HF-1 to HF-4-5.

(21) MIDAS+ information system – ReportTrack Implementation Manual.