

## Impact of Accreditation on Information Management during Accreditation of a Hospital through IM Balance Score Card

Syeda A. Fatima, University of Modern Science, Dubai, UAE  
Latha Krishnadas Mazumder,  
Professor, Khawarizmi International College, Abu Dhabi, UAE

### **Abstract**

*The need for accreditation is being felt extremely throughout various healthcare organizations due to complexity of operations and necessity for excellent customer service. Accreditation has been the weapon to achieve overall quality improvement covering various aspects. The impact of accreditation is still found to be a big question. The present study uses the IM Balance Scorecard to monitor and improve the quality of critical processes associated with Information Management. Various sections of IM Balance scorecard include Service delivery, Medical Records, Patient Safety, Financial & IT indicators. There has been remarkable improvement in all the listed processes which was confirmed by the satisfaction surveys conducted as well as from data repository.*

*IM Balance Scorecard objectively guided the level of improvement including remarkable improvement in service delivery, improvement in quality and use of medical records, enhancement of patient safety features as well as considerable improvement in financial and IT efficiency during the Accreditation Period.*

**Keywords:** *IM Balance Score Card, Impact of Accreditation, Information Management Indicators.*

### 1. Introduction

HMIS has been envisaged to facilitate better planning, monitoring and control of medical and health services at all levels for the administrators using decision support indicators and to assist the doctors and medical staff to improve health services with readily reference patient data, work flow enabled less-paper process and parameterized alarms and triggers during patient treatment cycle. HMIS is state-of the-art healthcare solution to provide better care to patients by addressing all the major functional areas of the hospital & the entire gamut of hospital activities.

Automating complex administrative, financial and clinical processes in a hospital frees the staff to spend more time on caring for patients and extending the reach of services from in-patient to out-patient, to long-term care and even home care. Access to information and the automation of complex tasks and workflow is key to not only making this work, but work efficiently.

MedicaPlus is the state of the art HMIS system [1]. It is designed and developed using the latest technologies and international standards. During the last few years, Health Insights has further progressed thereby developing and enhancing the MedicaPlus system. MedicaPlus has been developed utilizing the latest technologies open architecture, components based architecture and international standards. Medica Plus's component based design allows it to easily adapt to and implement any customizations requested by clients; it also allows it to virtually integrate with any system. This also accommodated the inclusion of some of the latest technologies seamlessly such as Hand Held & Palm Top PCs.

Information management in hospitals is a complex task. In order to reduce complexity, Winter et al [2] distinguish strategic, tactical, and operational information management. This is essential, because each of these information management levels views hospital information systems from different perspectives, and therefore uses other methods and tools. Without proper strategic planning it would be a matter of chance, if a hospital information system would fulfil the information strategies goals.

Quality monitoring has become one of the methods for purchasers, patients and providers to evaluate the value of health care expenditures and cost containment. Mc Glynn [3] describes six such challenges namely balancing perspectives, defining accountability, establishing criteria, identifying reporting requirements, minimizing conflict between financial and quality goals, and developing information systems.

Mark et al [4] observed that serious and widespread quality problems in the form of underuse, overuse or misuse were prominent in American health system thereby causing harm to many patients. It was also concluded that current measures would not materialize unless there is a systematic overhauling on delivery of healthcare services, education and training of clinicians and assessment & improvement of quality.

Information systems (IS) are increasingly being used for measuring and improving quality. Bates et al [5] describes integrated delivery system's plan and experiences with measuring and improving quality using IS that is possible only when it's integrated with routine provision of care. This process in turn has built clinical data warehouse that serves as a repository for quality information across the network. This data could be used for decision support and decision making in addition to other benefits such as reducing unnecessary use of laboratory testing, reporting abnormalities to key providers, prevention and detection of adverse events, devising new prescribing patterns so as to reduce drug costs. In addition next major initiative was to introduce computerized guidelines on a more widespread basis which would be challenging.

Huge sums have gone into hospital information systems worldwide some of them equivalent to \$50m for a large hospital, yet the overall benefits have rarely been assessed. Upon evaluation of the systems it was observed that more than three quarters have failed and moreover there is no evidence that it has improved the productivity of health professionals. Peter et al [6] proposed evaluations of hospital information systems need to be multidimensional that includes many aspects beyond just technical functionality.

The accreditation program offered by Accreditation Canada emphasizes measurement and outcomes, uses technology to gather and analyze results, emphasizes the use of indicators to monitor performance by recognizing the complex interactions, integration of services, and range of conditions that influence health. One third of all new accreditation programs and standards developed worldwide have taken the lead from Accreditation Canada [7].

There was little or no information with regard to impact of quality of care since the implementation of hospital accreditation in Lebanon. With the support of the Syndicate of Hospitals in Lebanon and the Ministry of Public Health Fadi et al [8] conducted a study to assess the perception of nurses on the impact of hospital accreditation on quality of care. Cross sectional survey design was selected where fifty four hospitals that successfully passed the accreditation surveys were included.

Traditionally, the balanced scorecard (BSC) has been an effective tool in linking measurement to strategy. However, what is least understood is how the BSC can be used to redefine organizational relationships, re-engineer fundamental processes and transform organizational culture, for superior performance in an organization with the same people, services and technology that previously delivered dismal performance. Peter and Bruce [9] highlighted the process and uses York Central Hospital in Toronto, Ontario, Canada as an illustrative example.

### 1.1. IM Balance Score Card

Health Information Management systems are the foremost requirement for management of healthcare organizations due to the need to manage huge and critically important data. IM Balance scorecard provides the means to improve the level of efficiency, timeliness and appropriateness so as to improve the outcomes of overall processes Development and Management of services delivered. The need of the hour

is to improve the customer satisfaction, employee productivity and the quality of services, and all can be achieved effectively through HMIS and can be monitored using IM Balance Scorecard.

IM Balance scorecard is identified as a tool to gauge the performance of various operations at administrative & Clinical level, still its applications has received inadequate focus. Customer satisfaction is an asset to the organization in this competitive environment, which can be achieved only through improved service delivery; hence IM Balance Scorecard is instrumental in achieving customer satisfaction through monitoring of service delivery.

The Balanced Scorecard forms a conceptual measurement model for assessing the overall Development and Management of the quality of services, where this model complements numerical measures of past performance with measures of current performance. Some of the attributes of measurements include Waiting Times, operational ease, quality of documentation, patient safety.

Having Balanced Standard will decrease evaluator subjectivity so that the evaluated processes or outcomes have the same guidance in understanding the performance. All the processes or outcomes are benchmarked to certain numerical or qualitative perspective and then the actual processes or outcomes are measured against the set criteria and then judged as either *Lagging* or *Leading Indicator*. The processes were further classified as High Risk, High Volume or Problem Prone depending on their nature and their impact.

The IM Scorecard would assist the Management in the following manner:

- Measurement of vital indicators and implementation of strategies to improve them.
- Measure the results or outcomes of implementation of HMIS in service delivery improvements.
- Tracking of vital indicators through signals, ignoring which may lead to organizational collapse.

The IM Balance Scorecard enables the Employees to:

- Stay connected with the Management in order to address their concerns
- The employees would gain timely feedback to their desires and concerns
- Gives a sense of leadership and organizational accountability
- Promotes employees towards organizational alignment and sense of attachment to its mission & vision.

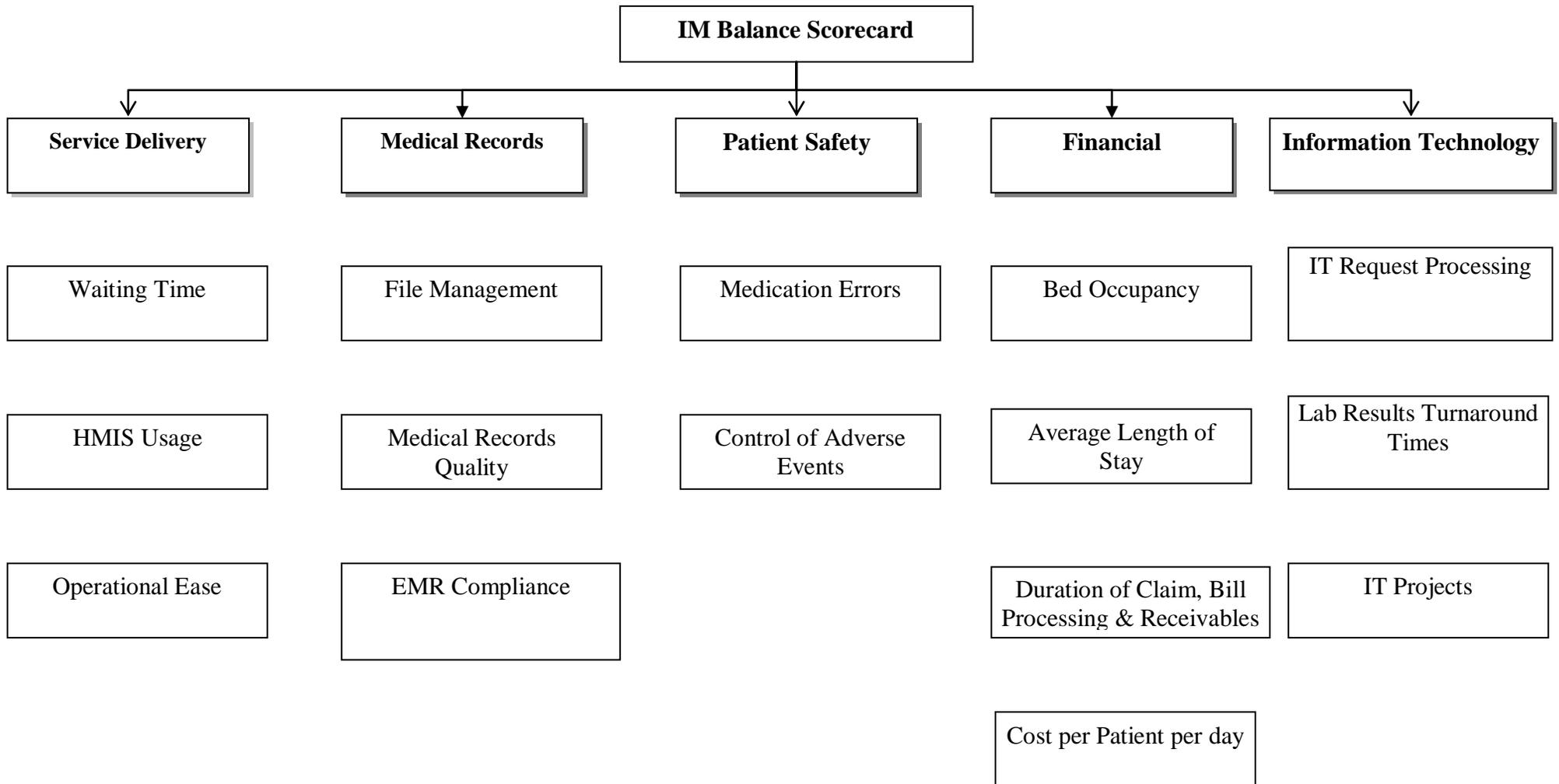


Figure 1: IM Balance Scorecard

## 2. Results and Discussion

Technology being the heart of development & Growth, HMIS will form the core of development which is monitored through the tool of IM balance card. IM Balance scorecard provides the means to monitor the indicators as part of the accreditation process.

### 2.1. Service delivery

#### Waiting time indicators

(High Volume)

- An overall decrease in the total OPD waiting time is recorded as 50%.
- A percentage decrease in waiting time at reception by 80%, cashier by 63%, insurance by 40%, File retrieval by 80%, nursing station by 58%, consultation by 25%, radiology by 53%, and laboratory by 55% and pharmacy by 25% has been noticed.

After the implementation of MEDICA PLUS, considerable decrease in the waiting time @ nursing station, insurance, lab, radiology and pharmacy has been observed. The reasons for the reduced OPD time are as follows:

- a) Improved customer service (Observance of Accreditation standards) at reception counters to avoid inconvenience due to patient load,
- b) 100% On-line approval for the availing the hospital services from Insurance agencies (no need to wait for approval through fax),
- c) Payment receipts printed in the Files room as soon as the payment is made by the patient, the file room personnel get intimated about the patient and transfer file from File room to the concerned department,
- d) Physicians are able to regulate consultation time per patient as number of patients waiting is available on his screen,
- e) Availability of K-net ATM payment terminals at Reception, Nursing Stations as Physicians that has reduced the waiting times considerably at the cash counters.

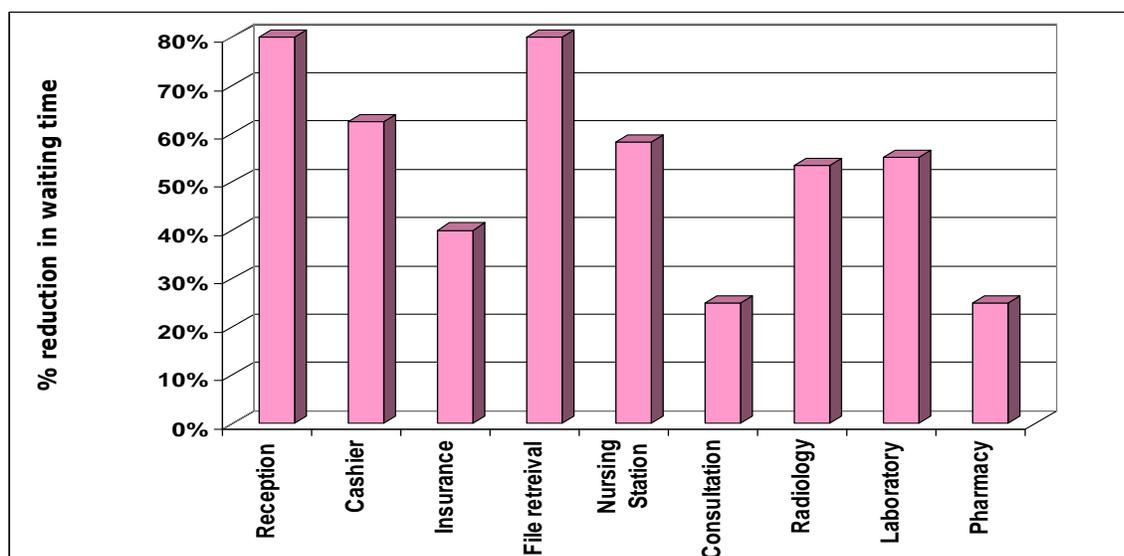


Figure 2: Percentage reduction in waiting time in OPD Patients at different Service Delivery Stations

Table 1 below lists the minimum, median and maximum time spent by patients @ each OPD clinic. The results show that highest Minimum time is reported in Internal Medicine & cardiology dept and OB gynaecology which could be due to more number of patients in these departments. Highest Median time is obtained for OB gynaecology, Dental, Paediatrics and Internal Medicine departments.

The Maximum times reported are very high, these higher values can be due to the following reasons:

- i. More patients
- ii. Unavailability of the Doctor
- iii. Doctor with in-patients
- iv. Doctor with emergency patients or attending meetings.
- v. Long procedure for the preceding patient.
- vi. Potter taking more time to transfer file from file room to nursing station.
- vii. Consultation time/ patient might be more because of private hospital.

OPD Clinic - Waiting Time (min)			
Departments	Minimum	Median	Maximum
Pediatrics	10	35	90
OB & Gyn	15	50	100
Ortho	5	10	30
Dental	2	25	90
Ophthalmology	1	15	30
Dermatology	1	10	35
ENT	5	16	45
Internal Medicine & Cardiology	15	35	110
Urology	6	18	25
Physical Medicine	2	10	15
<b>Minimum</b>	<b>1</b>	<b>10</b>	<b>15</b>
<b>First Quartile</b>	<b>2</b>	<b>11.25</b>	<b>30</b>
<b>Median</b>	<b>5</b>	<b>17</b>	<b>40</b>
<b>Third Quartile</b>	<b>9</b>	<b>33</b>	<b>90</b>
<b>Maximum</b>	<b>15</b>	<b>50</b>	<b>110</b>

Table 1: Maximum and Minimum Times Spent at Service Delivery Stations in OPD

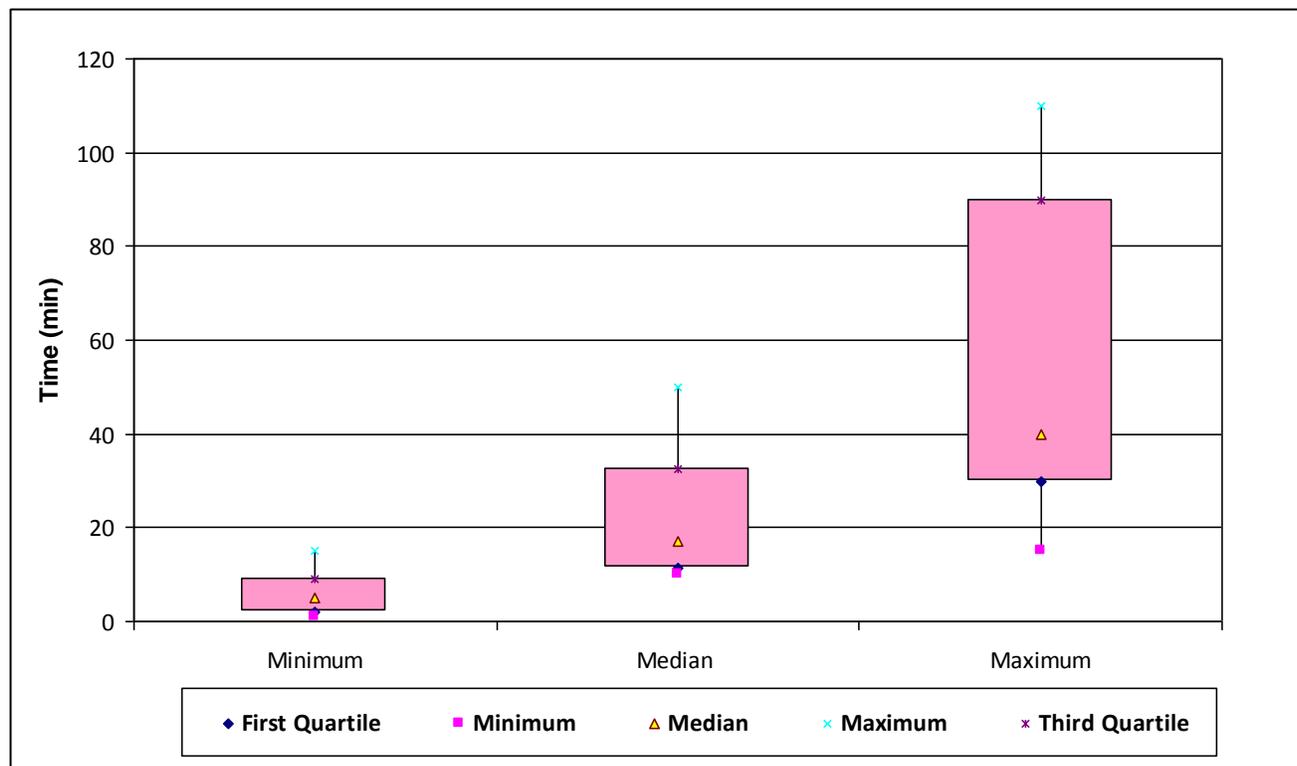


Figure 3: Box Whisker Plot for OPD Waiting Times for different Departments

The Box Whisker plot graphical represents the different data measures for the mean patient waiting time reported from different OPD clinics.

#### HMIS Usage Intensity:

(Problem Prone)

- The average usage intensity of HMIS in OPD by Physicians is recorded as 89%. They have been using for prescribing medication, ordering procedures or investigation and accessing patient medical records to view patient data and view investigation results.
- The average usage intensity of HMIS in OPD by Nurses is recorded as 13.5%, as Nurses have limited use of Medica plus in OPD clinic. They use it mostly to view patients available for consultation.
- The average usage intensity of HMIS in OPD by receptionists /cashiers is recorded as 88%. Receptionists and cashiers have maximum usage of Medica Plus to make appointments, data entry for registrations and billing of patients.
- The average usage intensity of HMIS in IPD by physician is 69.5%, by nurses is 76% and by receptionists is 64%.

#### Operational Ease due to HMIS

(High Volume)

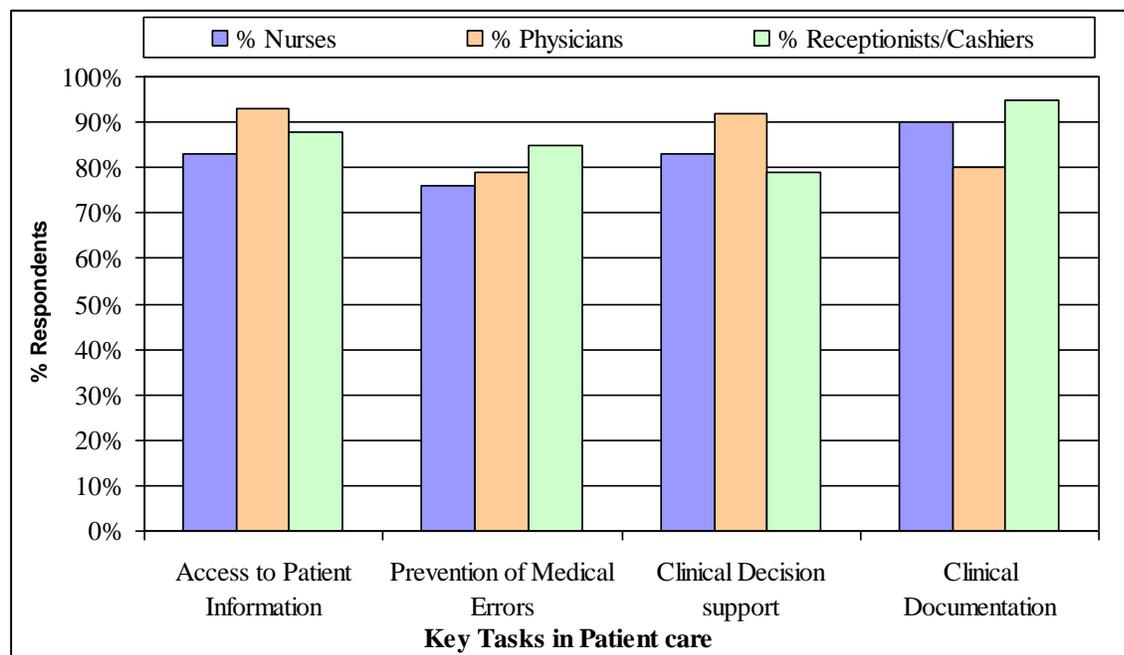


Figure 4: Key Tasks in Patient Care for Various Categories

- Significant Operational ease in performing various key tasks such as Access to patient care, medical error prevention, clinical decision support and clinical documentation has been reported by an average of 86% physicians, 78% nurses and 84.5% receptionists.

## 2.2. Medical Record Indicators

### Medical Record Management

(High Volume)

The implementation of file tracking software of MEDICA PLUS has resulted in considerable decrease in the number of lost files.

- An overall reduction of about 96% in the total number of files lost during the whole process of accreditation has been observed. The 4% loss of files can be attributed to human error.
- The number of files merged has improved to 4 times during accreditation.
- The breach in Confidentiality has reduced by 96% during the complete period of accreditation.

Further improvement in the confidentiality can be attributed to the manual security as the files are sent in special boxes with locks and the access to open the locks is with the nursing personnel at nursing stations.

### Medical Record Quality

(Problem Prone)

- The quality of OPD medical records is found to improve by an average of 121% with respect to completeness and 98% with respect to clarity, during the accreditation period.
- The quality of IPD medical records is found to improve by an average of 166% with respect to completeness and 99% with respect to clarity, during the accreditation period.

It can be observed from the recorded data that quality indicators were very poor in Jun 2007 (Starting phase of Accreditation). The sudden increase by 50% in the 2nd yr can be attributed to the demand of strict

compliance with Accreditation Canadian standards. The considerable reduction in the number of unclear phrases might be attributed to increased dependence on HMIS. Further improvement is attributed to the incorporation and use of ICD-10 in MedicaPlus.

### EMR Compliance

(Problem Prone)

- Greater than 80% EMR compliance has been reported for Ophthalmology, Dermatology and Physical Medicine departments whereas below 70% EMR compliance is shown by the rest of the OPD departments. The least compliance has been reported in the case of Internal medicine, Pediatric and Gynecology departments which can be attributed to the patient load.

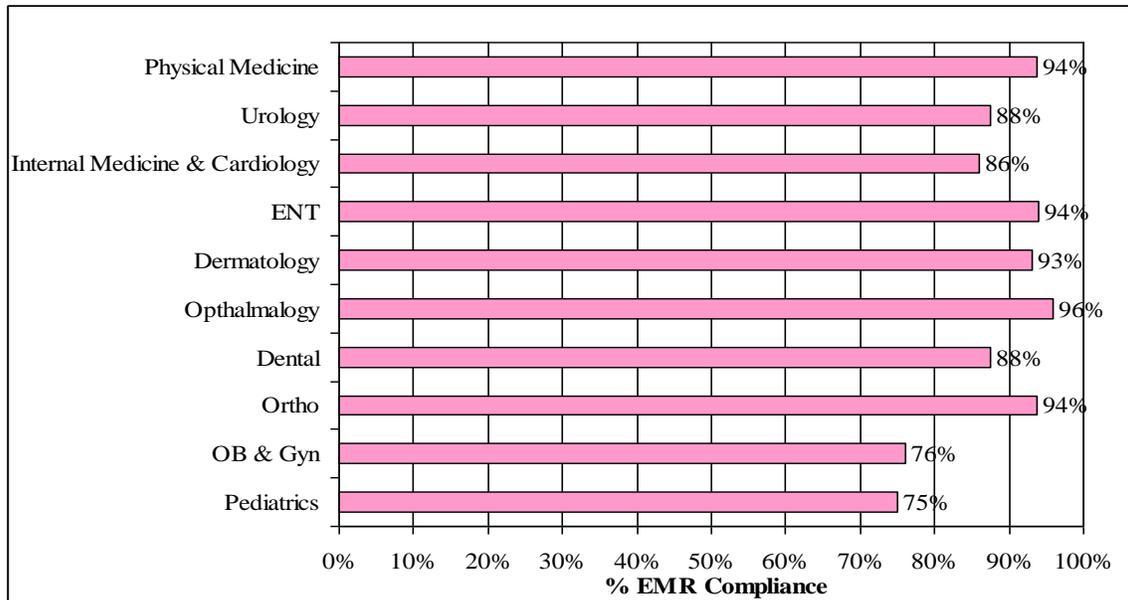


Figure 5: % Electronic Medical Record Compliance for various OPD Departments

- EMR compliance rate of 96% has been reported in IPD which is attributed to the fact of substantial implementation of Accreditation Canada standards of Information Management systems.

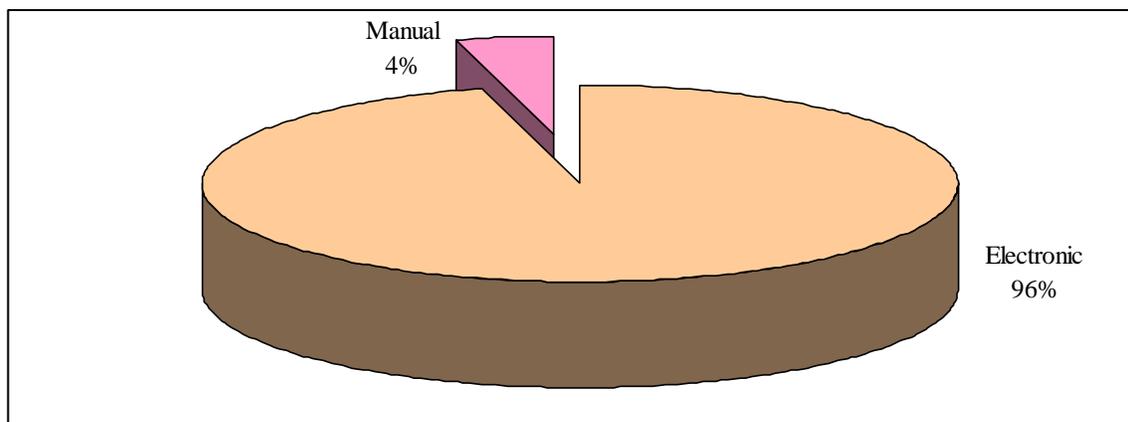


Figure 6: % Electronic Medical Record Compliance for IPD

**2.3. Patient Safety Indicators****(High Risk)****Medication Errors**

- 85% reduction has been observed in the case of errors related to administration of drugs.
- Medication orders are entered electronically thereby nearly 100% reduction in prescription errors and dispensing of wrong medicines.
- A near 100% improvement in managing the unavailability of prescribed medicine has been achieved.

**Control of Adverse Drug reactions**

- The compliance rate of overall management of patient conditions for adverse events such as Abnormal Lab results, Allergic reaction due to drug-drug interaction, Chronic Disease (BP, Diabetes), Reminders for Appointments & Immunization/Vaccinations Follow-up was found to be greater than 92%. Prevention of expired drugs from dispense was 100% achievable.

The results for the medication errors show that a drastic reduction in medication errors has taken place due to MEDICA-PLUS tickler Alert system. Customizable time intervals are set for drug administration; it also displays additional information such as administration instructions, drug information (indications, contraindications, cautions, side effects and doses. Whenever the inventory falls below reorder level, the tickler is fired and the pharmacist orders the new stock of medications.

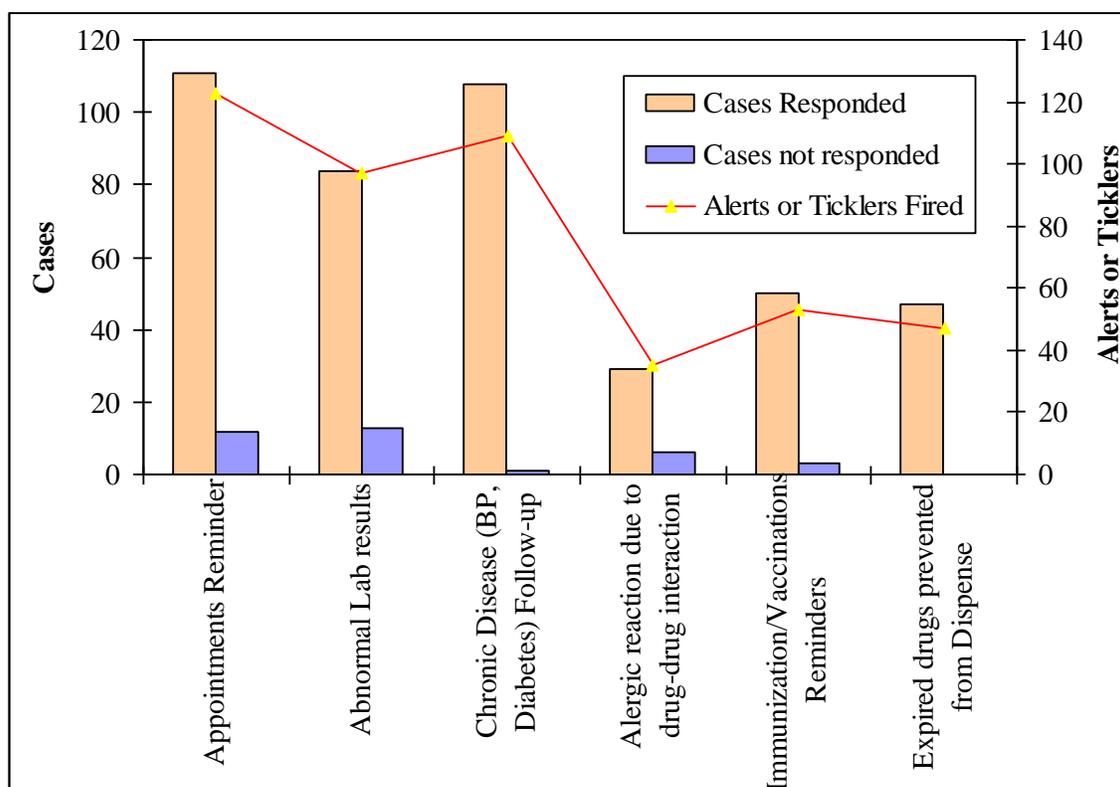


Figure 7: Cases Responded Versus Ticklers Fired

**2.4. Financial Indicators****(High Risk)****Bed Occupancy Rate**

- Bed occupancy rate is found to reduce drastically during 2007 and 2008, there is a greater rise observed during the year 2009, an 11.5 % increase in the Bed Occupancy rate has been observed during the process of Accreditation (2007-2009).

This increase could be attributed to the improvement in the quality of services such as Improved Bed Management, Allocation of various pricing packages for rooms and creation of Temporary Beds in case of peak loads.

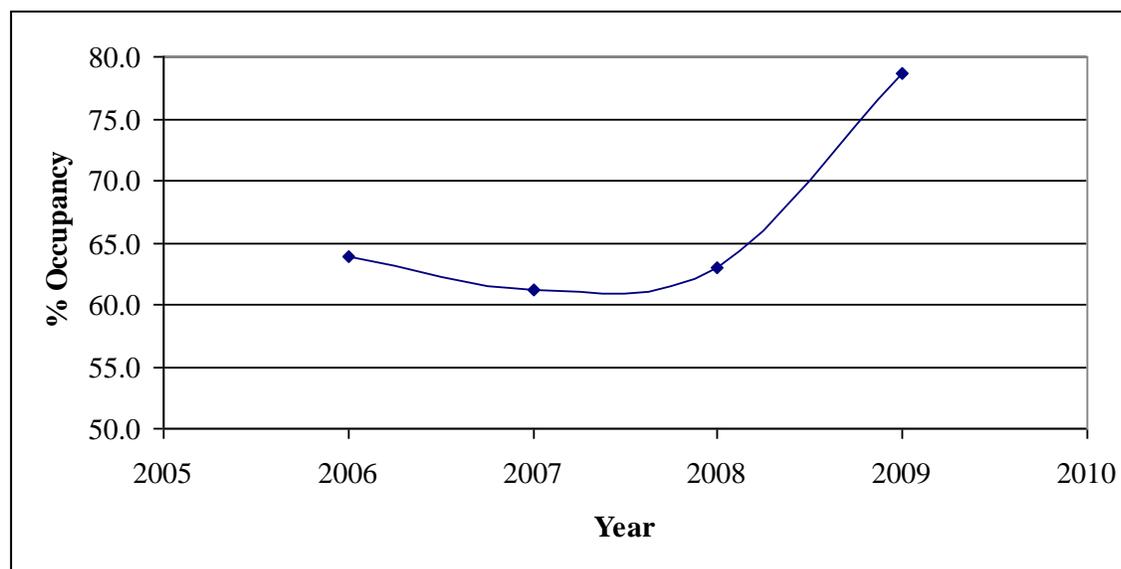


Figure 8: Bed Occupancy Rate during the Accreditation Period

**Average Length of Stay**

- A 16% reduction in the Average length of Stay has been observed during the process of Accreditation.

This can be attributed to improvement in the quality of services such as Improved Medication Management, Monitoring & Supervision of patient's condition including vital signs, enhanced decision making, speedy reporting of medical procedures through HMIS (MEDICA PLUS).

**Duration of Claims & Bills Processing**

- Reduction of more than 80% has been observed in the time duration associated with the revenue collection processes during the period of Accreditation.

**Cost Per Patient per Day**

- Reasonable reduction of 45% has been noted in the cost per patient per day from 2007 to 2009.

Process improvements enabled by HMIS will impact the average length of stay (ALOS), a key indicator of efficiency and a major driver of savings in the HMIS. Approximately 35 percent of net benefits are attributed to ALOS efficiency gains. Individuals familiar with hospital operations will recognize that many manual paper-based processes sustain delays in information flow.

The following reasons contribute to the improvement in improved worker productivity and efficiency, elimination of costly data entry errors, expedition of test ordering, specimen collection and lab results, reduction in capital and operational expenditures with the elimination of multiple devices and reduction in support services cost.

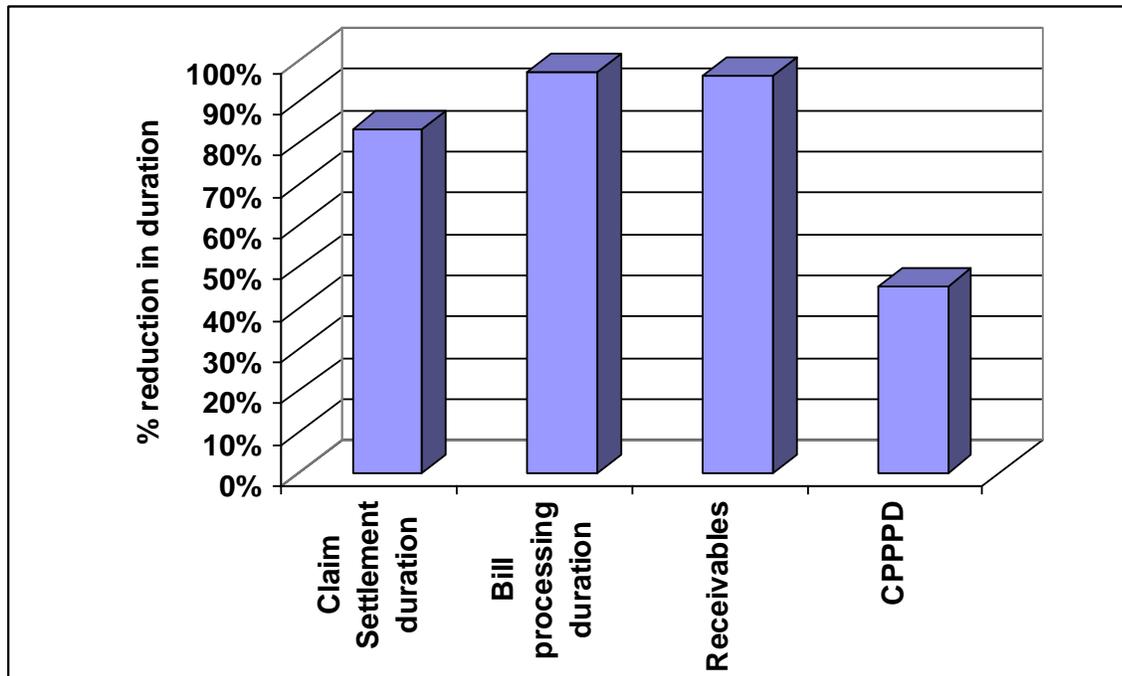


Figure 9: % Reduction in Duration in Settling of Claims

## 2.5. IT Department Indicators

### IT Requests Duration

- More than 350 % increase in the number of requests completed is observed that in turn points out to the remarkable improvement in the efficiency of the IT department.
- Turnaround time for Lab Results has reduced by 83%.
- Pending Requests have decreased by 91% while request processing time have decreased by 99%.

The remarkable improvement has been due to the development and implementation of tracker software where by the status of each request could be tracked. Moreover regular follow-up of issues both by the user and IT personnel have led to such an improvement.

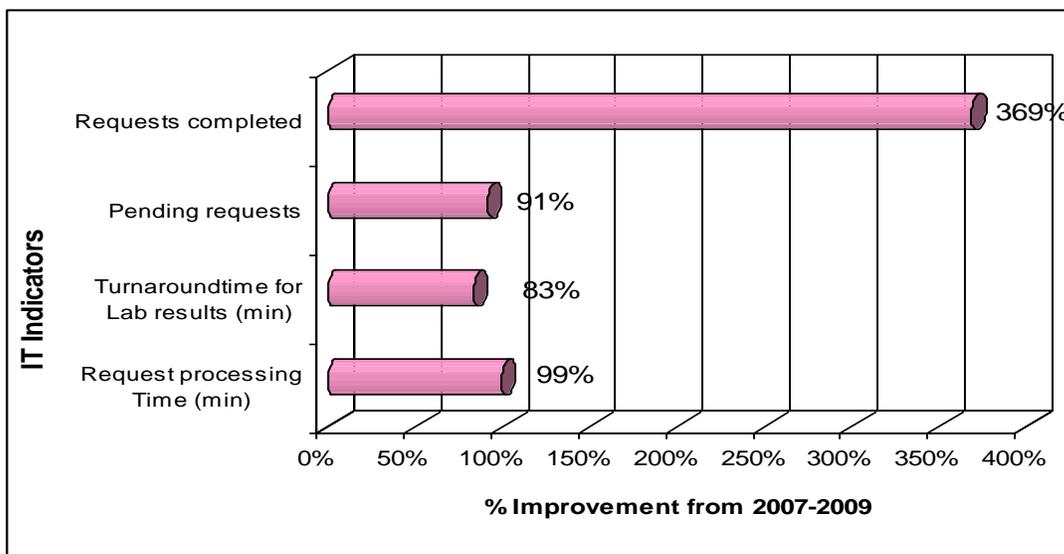


Figure 10: IT Department Efficiency during the Accreditation Period

**IT Projects**

- 90% of the IT Projects have been accomplished the pending projects are mostly due to Financial Constraints.

The maximum duration was recorded for the Installation and Configuration of New servers and secondly Improving IT Support which is a continuous Process and thirdly implementation of COGNOS, PACS and PBX software.

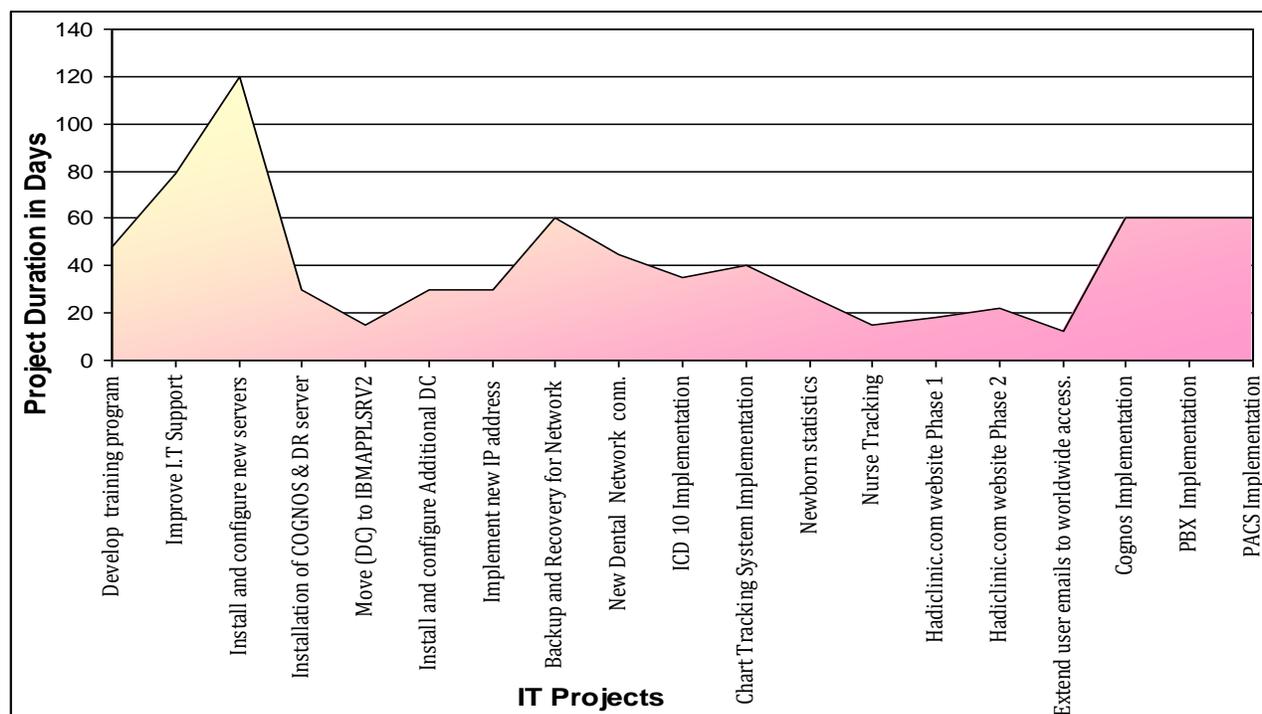


Figure 11: IT Projects Duration

### 3. Conclusions

#### Service Delivery

1. Waiting Time - Remarkable reduction in waiting times (>50%) has been observed for all OPD Points including Reception, Cashier, File room, Nursing, Radiology and Laboratory. There has been also reduction in waiting times for other categories though less than 50%.
2. HMIS Usage - Maximum use of HMIS in OPD is by Physicians then by Receptionists/Cashiers and then by Nurses. In case of IPD the maximum use is by Nurses then by Physicians and finally by Receptionists/Cashiers.
3. Operational Ease - Operational ease in critical tasks in the form of Clinical Decision Making, Access to Patient Information and Clinical Documentation is observed through efficient use of HMIS.

#### Medical Record

4. Medical Record's Management - Remarkable reduction in the files lost, breach of confidentiality & merged files has been observed owing to introduction of file tracking system of HMIS.
5. Quality of Medical Records – The Quality of Medical records have improved considerably with regard to completeness, clarity both for OPD as well as IPD.
6. EMR Compliance – More than 70% EMR compliance is observed for departments and was found to be a function of patient load. The strict compliance of accreditation standards with regard to confidentiality, security and proper access has enabled higher EMR compliance rates.

#### Patient Safety

7. Medication Errors – Considerable reduction in administration of drugs, prescription & dispensing errors.
8. Adverse Drug Reactions – Near 100% success in preventing abnormal lab results, allergic drug to drug interaction, follow-up for immunization and dispensing of expired drugs from pharmacy.

#### Financial Indicators

9. Bed Occupancy – Increase in bed occupancy due to efficient bed management.
10. Average Length of Stay – Reduction in length of stay have been observed due to improve service delivery, medication management and effective monitoring & supervision of patients condition.
11. Duration of Claims & Bills Processing – More than 80% reduction in Claims, Bills Processing and Receivables.
12. Cost Per Patient Per Day – Sizeable reduction in Cost per patient day (45%) is observed resulting in win-win situation for Hospital, Old and New patients.

#### IT Department Efficiency

13. Requests Processing – 350% completion of requests have been phenomenal including near 100% completion of work requests. The pending requests have reduced by 90%, Turnaround time for lab results by 83%.
14. IT Projects – More than 90% of the projects have been accomplished.

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