

# Designing Healthcare Organisations For Excellence: Improving Bed Management Process And Strategies To Reduce The Turn Around Time

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## Abstract

### Background

Bed management in a hospital is the process of ensuring that every bed is used optimally, while also providing quality care and efficient treatment. It involves allocating beds, tracking bed availability, managing patient flow, improving patient care and improving clinical staff efficiency. The process by which patients are admitted against any hospital bed, and when they are discharged and the bills are cleared, the bed is cleaned and allotted to the next patient in line is called bed management.

### Objectives

- To understand the process flow of bed management in the hospital
- To conduct a Time Motion Study for the patients getting discharged
- To locate the problem areas in the process and give suitable solutions

### Methods

Observation at various levels of the process of bed management (Pharmacy, Billing, TPA, Floors, Front office)

### Study Frame

- Patients getting discharged
- HIS (Hospital Information System)
- Stakeholders of the system

### Findings

It was observed that incorrect time management and inefficient system usage including communication gaps and delays, manual system updates and housekeeping protocols were the main problem areas in the bed management process.

### Conclusion

Strict Vigilance of the work at the nerve cell and floors is required. The stakeholders were suggested to put ceilings on the number of beds that can be blocked for a day as well as on the time for which these beds are blocked. In addition to these, the stakeholders were also advised to replace manual system updation with some smart solutions.

**Keywords-** bed management, availability, turn around time, patient flow, admission and discharge

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## I. Introduction

Effective bed management is the practice of efficiently using beds so that the maximum number of beds are available for patients, improving patient flow – one of the most important KPIs (Key Performance Indicators) in a hospital setting. Hospital beds are a scarce resource. Lacking information on the location of hospital beds, as well as important information, such as what type of beds are available creates a huge time and cost inefficiency. Nursing staff on an average spend 21 minutes locating equipment, hospitals generally spend 25% more on equipment than required due to poor tracking. Health Services, over the years, have had hundreds of mattresses and hospital beds missing at any one time. Consider this against a backdrop of an average 95% occupancy and there becomes a clear need to invest in a solution for efficient bed management and reduced TAT in the hospital setting. This not only helps the staff to manage patient flow, admissions and discharges, as well as bed cleaning and maintenance, but also meets the Organization's need to optimize their assets and provide an improved level of patient care and patient safety.

In the hospital under study, bed management is done from the front office by using the HIS (which involves use of various colour codes to depict the bed availability status) and accordingly the beds are managed depending upon the status and the approximate time that will be required to make it available to the next patient by the bed manager (who is responsible for allotting the vacant beds to the patients against their admission request forms).

## II. Procedure And Methodology

Objective 1 - To understand the process flow of bed management in the hospital

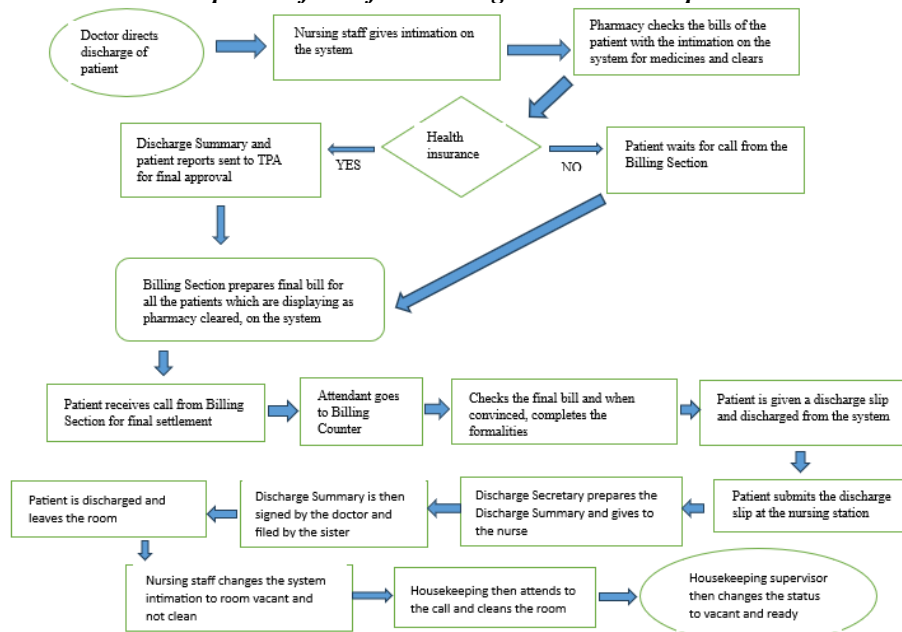
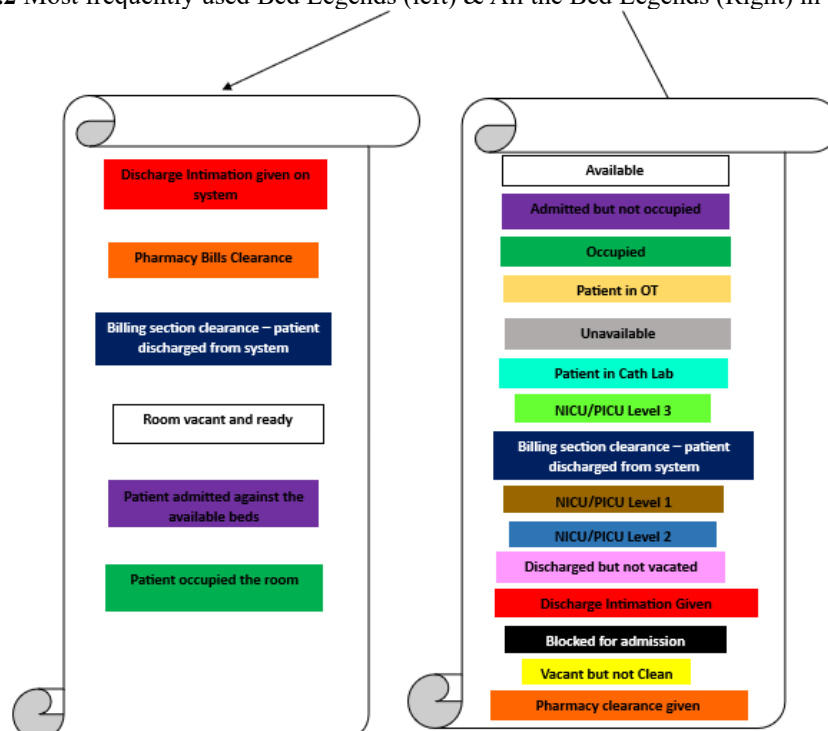


Figure 3.1: Process Flow of Discharge & Billing Process

The Figure-3.1 above shows the detailed process flow of the discharge process of patient in the hospital. The process is tracked on the HIS of the hospital. The change in the status of the patient from the first stage of getting discharge is shown in the Hospital information system by a series of colour codes called as Bed Legends that signifies the various stages of discharge process till the patient is completely discharged and the room is available for allotment to the next patient in line.

Though the hospital under study has 15 various colours as bed legends (figure 3.2 on next page shows the various colour codes that are mostly used by the HIS of the hospital to convey the bed status to the bed manager)

Figure 3.2 Most frequently used Bed Legends (left) & All the Bed Legends (Right) in the hospital



Bed Category	Total Capacity	Average Occupancy For The Week
Suite	2	48.21%
Single Room	8	77.79%
Double Bed	15	72.26%
Economy	22	75.28%
Total	47	75.27%
Critical Areas	15	65.58%

**Table 3.1:** Bed Capacity And Occupancy For A Week

The table (3.1) above shows that the average occupancy, for the week, was 75.27%. It was minimum for the Suites and maximum for Economy rooms.

Though at the front office it seemed that rooms were not being available to patients for allotment due to the occupancy and excessive demand for single room but the statistics show that the single room had low occupancy during this week whereas economy beds and standard rooms were on a higher demand. Thus, the patients who were turned down due to lack of availability of double beds in this week were due to lack of proper bed management and not due to unavailability. The reasons behind this mismanagement will be dealt in the subsequent sections of the report.

The critical areas of the blocks show an average occupancy of 65.58%.

**Objective 2: To conduct a time motion study for the patients getting discharged**

A Time motion study (TMS) was conducted for 10 patients across 3 floors of the hospital to understand the time taken at each stage of discharge process and simultaneously, the HIS was tracked for the same patients to understand and locate the gap between the real time scenario and the system updates, to calculate the Turn Around Time (TAT) at various stages and locate the areas of concern and delays that affect the bed management process and hamper the bed availability for the patients in line.

4 patients were tracked from the 2<sup>nd</sup> floor (Cardiology) and 6 patients from the 3<sup>rd</sup> floor (OBGY and Paediatrics) of the hospital from their intimation of discharge on system to their vacating the room and making it available on system for next patient.

**2<sup>nd</sup> Floor Cardiology Block**

**Patient 1**

Bed Number- 205		Type: TPA Patient
Time	Status Observed	System Color Shown
10.00 am	Discharge intimation Given on system	Red
12.20 pm	TPA clearance and Bills Settled	Red
12.28pm	Pt. Prepared to leave (Confusion over wheel chair)	Red
12.30 pm	Patient leaves room, room vacant but not ready	Red
1.08pm	Sister changes the intimation on system	Yellow
1.22 pm	Room not clean	Yellow
1.54 pm	housekeeping attends & clean the room	Yellow
2.03 pm	Patient informed at front office that room being made ready	Yellow
2.10 pm	Room is made ready	Green
3.14 pm	Allotted to transfer patient from ICU	Green
4.22 pm	Patient Left	Green
4.36 pm	Room Vacant and Not Ready, System shows Green	Green

**Patient 2**

Bed Number- 206		
Time	Status Observed	System Color Shown
3.40 pm	Patient leaves	Yellow
4.15 Pm	Housekeeping Attends, shortage of linen, staff leave without cleaning	Yellow
4.30 pm	Room is allotted to patient from front office	Green
4.38 pm	Room still vacant and not clean, system shows "Occupied"	Green

**Patient 3**

Bed Number- 208		
Time	Status Observed	System Color Shown
2.35 pm	Housekeeping cleaning the room	Yellow
2.47 pm	Room clean and vacant, Room allotted to patient from front office on admission request form, system shows white	White
4.04 pm	patient occupies room, system not yet update	White
4.10 pm	System update	Green

**Patient 4**

Bed Number- 215		
Time	Status Observed	System Color Shown
12.20 pm	Room vacant and not clean	
12.47 pm	Room vacant and still not clean, system shows vacant and clean	
2.20 pm	Room is occupied and not vacant, system shows vacant	

**3<sup>rd</sup> Floor OBGY and Paediatrics**

**Patient 5**

Bed Number- 301			Type- Cash Patient
Time	Status Observed	System Color Shown	
8.08 am	Discharge intimation Given		
10.30 am	Pharmacy cleared; Billing cleared		
11.43 am	Pt. Vacated Room Vacant and not clean		
11.52 am	Room vacant and not clean, system not update by nurse		
12.12 pm	System not update by Nurse		
1.16 pm	Room vacant and not clean, system show available		
2.10 pm	Room ready and available		

**Patient 6**

Bed Number- 305			Type- Cash Patient
Time	Status Observed	System Color Shown	
8.08 am	Discharge intimation Given		
10.30 am	Pharmacy cleared		
11.29 am	Bills cleared; Pt discharged from system		
11.43 am	Discharge Slip submitted to Nursing staff, discharge summary pending		
12.12 pm	pt. ready to leave discharge summary not prepared		
12.59 pm	Pt. leave, Room vacant and not clean		
1.54 pm	Housekeeping attends and rooms being cleaned presently, system shows Available		
2.31 pm	Patient occupied		

**Patient 7**

Bed Number- 211			Type- Cash Patient
Time	Status Observed	System Color Shown	
8.08 am	Discharge intimation Given for mother		
10.30 am	Pharmacy cleared,		
11.43 am	Baby discharge intimation		
11.52 am	Bills cleared		
12.58 pm	Baby's discharge declined by another doctor (communication gap)		
2.10 pm	patient leave		
2.50 pm	Room vacant and not ready, system not update		

**Patient 8**

Bed Number- 307			Type- TPA
Time	Status Observed	System Color Shown	
8.08 am	Discharge intimation Given		
10.30 am	Pharmacy cleared, Document in process for TPA clearance		
11.52 am	Document in process		
1.16 am	Document in process		
2.10 pm	Bills cleared and Discharge from system		
2.39 pm	Housekeeping making and cleaning the room, system shows available		

**Patient 9**

Bed Number- 210			Type- TPA
Time	Status Observed	System Colour Shown	
8.08 am	Discharge intimation Given		
10.30 am	Pharmacy cleared, Document in process for TPA clearance		
11.52 am	Document in process		
1.16 am	Bills settled patient discharge from system discharge summary not signed by doctor		
12.10 pm	discharge summary not signed		
2.20 pm	Patient leaves, Room vacant and not ready		

**Patient 10**

Bed Number- 308			Type- Cash Patient
Time	Status Observed	System Colour Shown	
8.08 am	Discharge intimation Given		
10.30 am	Pharmacy cleared,		

11.32 am	Bills cleared, Discharge from system	
12.30pm	Discharge summary not signed by doctor	
2.05 pm	Discharge summary not signed yet	
2.30 pm	patient leave room vacant and not ready	
2.47 pm	housekeeping attends and cleans the room, system no update by nursing staff yet	

**Table 3.2:** Turn Around Time (TAT) at various Levels of the Bed Management Process

S.NO.	Turn Around Time (TAT)	Average (in minutes)
1	Overall, for a bed	345.87
2	Completely discharging Patient	276.25
3	discharging patient from system	183.25
4	Room vacant	93
5	Making Room available	72.5
6	Nursing staff	76.75
7	Housekeeping staff	51.25

Table 3.2 above shows the TAT at various levels of bed management in the hospital.

Overall, TAT signifies the total time taken from the discharge intimation to the occupying of the Patient, The Time motion study shows that on an average it takes 345.87 min for the bed to come back to the revenue generation stage.

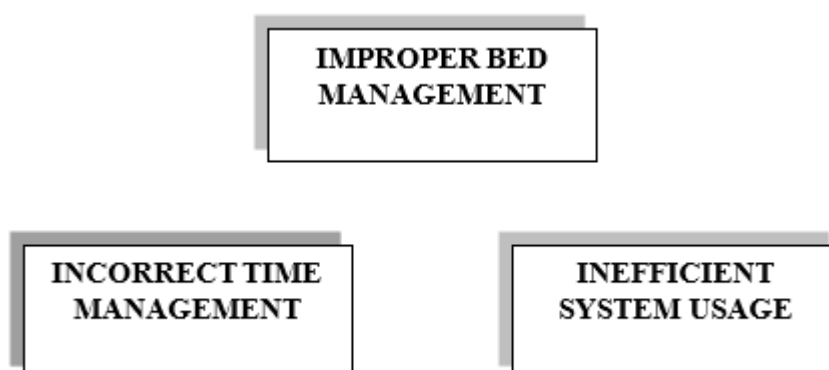
It takes on an average 276.25 min to discharge the patient completely from the bed and out of which 183.25 min is taken to complete all the billing formalities from the pharmacy and the TPA and billing discharge the patient from the system while 93 min are taken for the patient to leave and vacate the room for cleaning purpose and subsequent processes of the system. This time is mainly consumed the discharge summary preparation and doctor’s signing or the excessive delay in attending to the final procedures of discharge by the nursing staff that leads to the delay in room vacate. As per observation delay is mainly from the staffs’ side rather than from the patients or relatives.

Once the room is vacated, the time taken to make the room available to the next patient in line takes around 72.5 min. There are multiple delays in this regard from the nursing staff in generating the intimation for cleaning the room on the system.

The TAT for nursing staff to respond to the requirements for the bed management is 76.75 min while that for housekeeping staff is 51.25 min. This signifies the average time taken by both the staff to respond to the calls regarding the various procedures of discharge of patient and bed availability for patient.

**Objective 3: To locate the problem areas in process**

The problem areas can be divided under various heads as shown below:



**III. Discussion**

An organization is a system within itself. All systems have inherent active failures, like an act of omission or commission, and latent failures, like a hazardous condition or flawed process designed into policies, protocols, and procedures, which, in the correct sequence of events, will allow the system to fail. Healthcare is a complex system comprised of multiple subsystems, each of which operates independently and creates a ripple effect throughout the entire organization.

As mentioned in the previous section, the problem areas identified in this brief study can be divided under 3 main heads. The in-depth discussion of these problem areas along with the solutions and recommendations provided to the administration can be summarised as follows:

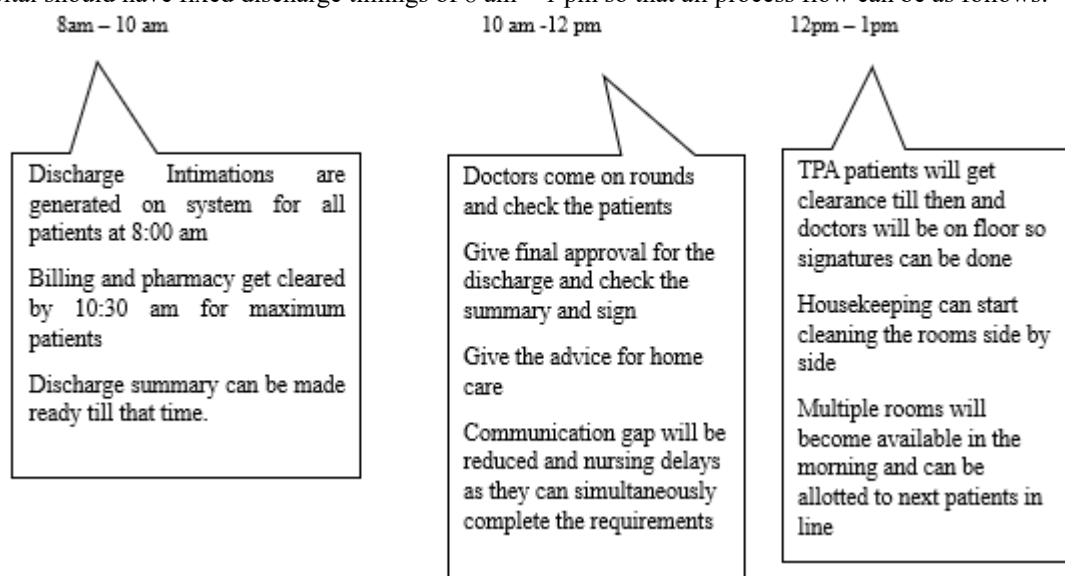
**Incorrect time management**

**Discharge Timings**

The hospital does not have any fixed timings of discharge that usually causes the beds to get vacant at various times throughout the day and consequently the beds are not available when there is a demand for any particular type of bed and doctors are also not usually present at the time of the discharge for signing the discharge summary and nurses are busy with other routine work at that time, thus delaying the process grossly at various levels.

**Recommendation:**

Hospital should have fixed discharge timings of 8 am – 1 pm so that all process flow can be as follows:



**Discharge Summary**

The delay in vacating the room by the patients is mainly due to delay in preparation of discharge summary and unavailability of the doctors to sign it before the patient is allowed to leave.

In spite of instructions from the administration for not declining cash and corporate patients for discharge summary, staff on the floor insists on making the patients wait for their summary. A good amount of time is consumed in this process for the majority and it irritates the patient in addition.

**Recommendation:**

Creating a format for the discharge summary that is uniform (minor changes can be done for customising for exceptional cases) and the treatment and medications and investigations done till date for any patient staying in the hospital for over 3 days (as ALOS is 4.3 days, so apparently patient is likely to get discharged in a day or so) can be prepared by the discharge secretary beforehand, so that the entire thing is not prepared on the day of discharge and only the updates are done and final discharge summary can be made in lesser time.

**Manual System Updates**

The major cause of delay in the process is also due to system intimations not generated on time by the nursing staff and wrong system intimations generated by the housekeeping staff does not reflect the real picture) and this compels the bed manager to make phone calls to confirm the bed status on the floor every now and then and defeats the very purpose of having the process linked to HIS and the exceptionally good idea of having the colour coding system in place to track the bed status in real time.

**Recommendation:**

Introducing the Smart Card Punching System for the patients when they occupy the rooms which automatically will update the system to occupied and punching it when leaving the room and depositing the card automatically changes the system to Vacant and not clean.

The card will be retrieved by the floor mentor and given to the housekeeping staff to punch back that will automatically convert it into Vacant and ready. This will bring the process under the observation and responsibility of the floor mentor to be vigilant in this regard.

### ***Nursing Staff Delays***

A major chunk of time management lies in the hands of nursing staff. Due to undue delay in attending to the patients getting the discharge by the nursing staff causes the process to jeopardise and patient to wait for long hours' altogether to get the discharge.

### **Recommendations:**

Specific Discharge timings can solve the problem to some extent when they can just focus on the discharge patients and having a proper time schedule for the routine work for the nursing staff can make their work more systematic and time bound.

Cannula removal and basic take home messages can be taken care of by the junior staff nurses in that sense (division of labour depending upon expertise required).

### ***Improper bed management***

#### ***Bed blocking protocol***

This protocol causes multiple beds to get blocked 12 hours prior to them being occupied making them unavailable to large number of patients who are present and have a demand for the same. Also, this protocol invites the front office staff to play with the system and hold personal office of interest and block beds out of the way (on demand from doctors or for personal interest).

### **Recommendation:**

No doubt this service is a value addition to the hospital services for its patients but it also creates an opportunity that can be exploited for personal gains. Thus, it is necessary to put a ceiling on the number of beds that can be blocked for a day and any extra bed that is urgently required to be blocked will require permit from higher authority who is then scrutinize the authenticity of the requirement of bed blockage for the rest cases and grant permit if found genuine. This will stop unnecessary blocking of beds for personal gains as any genuine case can take the matter to higher authority and invite a surprise audit for the entire system.

Also, Beds should not be allowed to be blocked for more than 3-4 hours (Ceiling on time) prior to patient arrival and every hour of blocking the bed prior to occupying should be chargeable. This will stop the unnecessary demands for bed blocking for long hours.

### ***Housekeeping Protocols***

It was observed during the study that there was a difference in the housekeeping management system on different floor. On 3<sup>rd</sup> floor, most of the rooms were left unattended for long and housekeeping staff were not under strict supervision of the supervisor either whereas on 2<sup>nd</sup> floor, housekeeping attended comparatively earlier to the calls.

The system updates made by the housekeeping nerve cell were completely wrong and were updated way before the work was actually being done by the staff and did: reflect the real time picture. They had to be called by the bed manager to confirm the status and remind them of cleaning sometimes.

### **Recommendations:**

Strict Vigilance of the work at the nerve cell and floors is required. Presence of supervisors on floors during the discharge timings is indispensable to monitor the timely cleaning of the vacant rooms and deploying staff wherever more rooms are to be cleaned at a time.

System updates through punching cards will reduce the incorrect updates from the housekeeping end.

### ***Inefficient system usage***

#### ***Excessive color code for bed legends***

The bed legends have in total 15 different colours out of which some of them are never used and as per the bed manger they have never seen those colour updates being made by the nursing staff either for the beds.

As per observation, out of the 15 colours available, only 6 colours are most frequently used while the rest are hardly used by the staff. Also, the colours used for the bed legends are not primary colours thus keeping in mind that a good number of males have difficulty in distinguishing between different shades of same colour (colour blindness) can sometimes pose difficulty in deploying any male member for the job of bed management.

### **Recommendations:**

The legends that are not required and not used by the staff should be removed. The legend colours should be simple to remember and understand by any new staff (keeping in mind the high attrition among the front office staff). Primary colours should be used to remove the problems associated with colour shade identification for the males.

There should be striking colour difference between all the status of the beds to capture the attention at first point (difference between the colour shade of discharge intimation and Pharmacy clearance goes unnoticed).

**Example: Red, Blue, Yellow, Green, Black, Violet, Orange, White**

<b>RED</b>	<b>Discharge intimation</b>
<b>Orange</b>	<b>Pharmacy Clearance</b>
<b>Blue</b>	<b>System Discharge</b>
<b>Yellow</b>	<b>Room Vacant &amp; Unclean</b>
<b>White</b>	<b>Room Available (Room clean and ready)</b>
<b>Violet</b>	<b>Room Allotted (by bed manger)</b>
<b>Green</b>	<b>Room Occupied by Patient</b>
<b>Black</b>	<b>Room blocked on request</b>

**Redesigning the dashboard for bed management**

The present dash board can be improved as per the compliance with the user.

**Recommendation:**

First filter should ask: Select the type of area: Wards / Critical areas (ICUs, HDUs etc.)

Next page displays all the wards of all the floors and not just the bed numbers and color-coded status (no details on the block) and time at which status is intimated and a side bar on the left-hand side gives the names of the patients on each bed

Clicking on the names of the patient is linked to the page that contains all the details of the Patient

There should be a provision made to know the type of patient from the snap shot of the blocks. Either by making the borders of the block BOLD or by using any other pictorial representation (a rupee symbol for cash patients) on the block (like used for room having mother and child in OBGY).

**IV. Conclusion**

In this thesis, new models to describe, analyse, and implement quality systems have been introduced. The suggested framework could be used by managers, policy makers, or researchers for establishing a baseline before an organizational change or intervention, it could also be used to evaluate the results of such changes or interventions. Health care policy makers and managers that wish to implement organizationally demanding quality systems should probably direct and lead the implementation process while assuring that the staff gets opportunities to contribute to the planning and designing of the new System. A fully documented Quality Management System will ensure that two important requirements are met:

- The customers’ requirements — confidence in the ability of the organization to deliver the desired product and service consistently meeting their needs and expectations.
- The organization’s requirements — both internally and externally, and at an optimum cost with efficient use of the available resources —materials, human, technology and information.

A QMS provides consistency and satisfaction in terms of methods, materials, equipment, etc, and interacts with all activities of the organization, beginning with the identification of customer requirements and ending with their satisfaction, at every transaction interface.

**References**

[1] Argyris C, Schön D. Organisational Learning: A Theoiy Of Action Perspective. Reading, Ma:Addison-Wesley Publishing Company, 1978.

[2] Barnard C. The Functions Of The Executive. Massachusetts: Harvard University Press, 1968 (1938).

[3] Berwick Dm. Continuous Improvement As An Ideal In Health Care. Nengi .Jmed 1989: 320(1):53-6.

[4] Blumenthal D. Pait 1: Quality Of Care--What Is It? Nengl Jmed 1996;335(12):891-4.

[5] Leape LI. Practice Guidelines And Standards: An Overview. Quality Review Bulletin 1990; 12:42-49.

[6] Lighter D.E., Fair. D.C. (2004). Quality Management In Health Care: Principles And Methods. Jones And Barlett Publisher Inc. Second Edition.

[7] Lindberg E. Continuous Quality Development By Means Of New Understanding (Ph.D. Thesis). Uppsala: Acta Universitatis Upsaliensis, 2003.

[8] Mintzberg H. The Structuring Of Organizations. Englewood Cliffs, Nj: Prentice-Hall, 1978.

[9] Ovreteit J. (2004). The Leader’s Role In Quality And Safety Improvement: A Review Of Research And Guidance. Swedish Association Of County Councils. 2004.