A New Approach to Acute Care Hospital Bed Management

A Case Study

Author
Eugene R. Boyer

Abstract
One of the most critical challenges for Health Care providers today is the management of the patient discharge process in the acute care setting. Institutions not able to effectively manage this process face increased staff time in planning and assigning patients to beds and increased costs through alternative placement of patients when beds are not ready and available when needed. Applying technology in the right manner addresses these process needs. Downey Regional Medical Center uses ArcGIS - specifically ArcView, ArcIMS, and ArcSDE running on SQLServer - to integrate the admitting and patient registration information system with other systems for bed management.

Benefits
The benefits derived are:

- Reduced need for alternative patient placement for overflow bed conditions.
- Reduced wait time for patients entering the system through the Emergency Department.
- Reduced wait time for admitting surgery patients.
- Reduced dietary costs through the elimination of food trays going to empty beds.
- Reduced Pharmacy costs by eliminating medications going to empty beds.
- Increased effectiveness in providing patient discharge services such as: Home Health transition and follow-up; physical therapy; social services such as: arranging for equipment; oxygen, wheel chairs; and other patient required services.

The Bed Management Process
The patient discharge process begins with the Physician's discharge order. The nurse completes the discharge sheet and notifies other services of the pending discharge. If required a prescription is completed along with the patient instruction sheet for the new medication. A Dietary special instruction sheet is completed as required. It is possible as many as 60% of discharged patients will need special dietary instruction. Home Health follow-up may be required for as many as 30% of discharged patients. Should Home Health follow-up be required it will be necessary to copy medical record documents for

the Home Health Agency. A patient may require physical therapy before release from the hospital. In the event physical therapy is required, the Physical Therapy department will need to be notified in order for the therapy to occur before patient release. Vendor delivery of special equipment for the discharged patient may be required prior to the patient going home. This can occur up to 90% of the time if the patient population is elderly. This equipment would consist of wheel chairs, oxygen, walkers and other durable medical equipment. Provision in the discharge planning process should also include the need for one or more physicians to visit and release the patient. Follow-up physician visit information would be given to the patient at that time.

Arrangements for patient transportation home would also be included in the discharge plan.

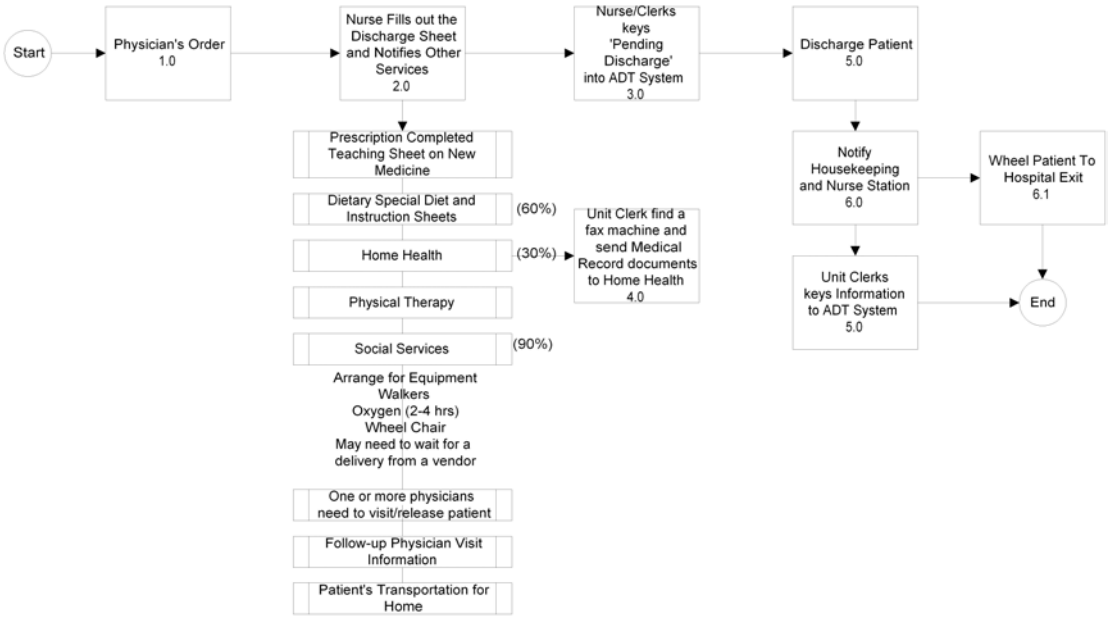

Figure 1. Bed Management Discharge Process Flow

While the discharge planning process is being completed, the nurse/clerk enters the "Pending Discharge" into the hospital's electronic Admission/Discharge/Transfer (ADT) System. After completing all the discharge services and the patient is ready to go home the patient is discharged. The nurse/clerk notifies Housekeeping, Admitting and the nurse station that the patient has been discharged. The nurse/clerk enters the discharge information into the hospital's ADT system.

The typical Admitting Department or special nurse function maintains a manual bed board process. The bed board process is used much like a hotel reservation system for planning for and displaying bed availability. Communication with this bed board function is by telephone and is prone to many errors and miscommunication. These

errors delay admission of patients from the Emergency Department and Surgery creating a bed overflow condition. Delays in patient admissions can cost the hospital up to $3500 per day per patient. From the time the Physician issues the discharge order until the time the patient is wheeled to the hospital exit and Housekeeping cleans the patient's vacated room and/or bed can take several hours. It is desirable to reduce the process time and maintain supporting electronic system information with minimum error to achieve the benefits noted above.

The Solution

The solution is to create an automated workflow process addressing the elements of patient discharge management and patient tracking. These elements are:

- A modified Pending Discharge function which captures workflow tracking elements for effective bed management and patient tracking.
- Create a Management report to be used by Admitting and Nursing Administration for early identification of problems in the pending discharge\ patient tracking process.
- Create a management report of performance metrics to track the performance of the new bed management function.
- Create an electronic Bed Board to simulate the manual bed board operation and allow visual access by nursing staff and admitting staff to the status of beds in the hospital utilizing Geographic Information System (GIS) technology.
- Integrate the GIS system with the Hospital's ADT information system to provide real time information on patient admission, bed transfer and discharge status.
- Integrate the GIS system with the Hospital's CAD\CAM electronic files to provide nursing floor views of the patient and bed status.

A Case Study on the Implementation of the Solution

A community hospital comprised of 199 licensed beds was used as a pilot to test and implement these concepts. The hospital implemented a Web based solution functioning on their Intranet Web site. The solution was implemented over a period of six months by modifying the Bed Management workflow process incorporating the following changes.

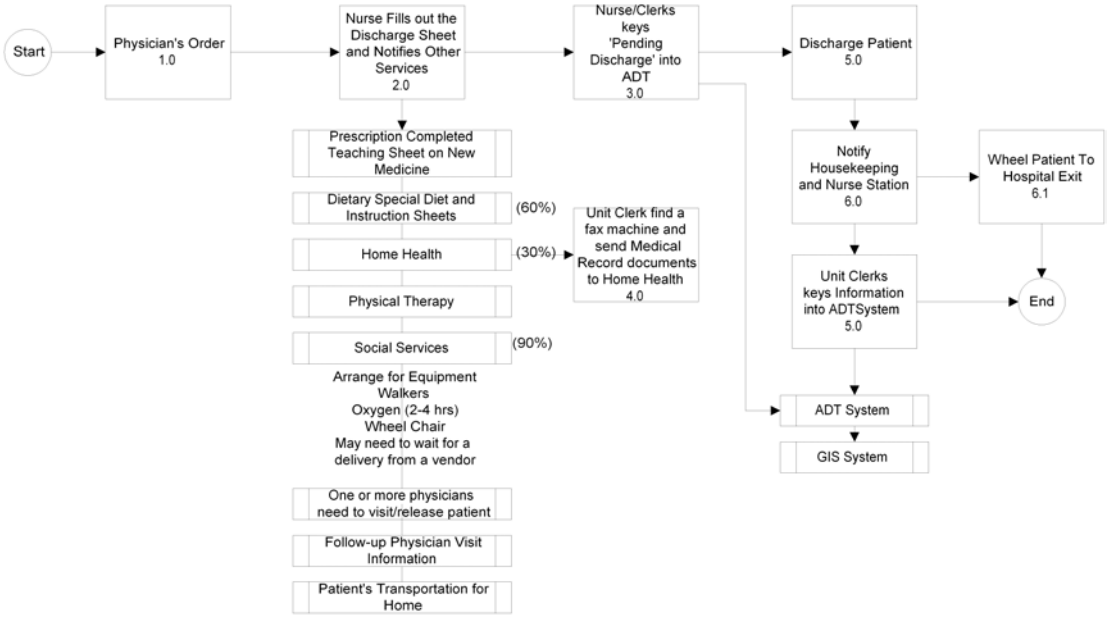

Figure 2. Modified Bed Management Process Flow

Implementation Steps

The hospital's ADT pending discharge function was modified to include the capture of Physician Order discharge date and time, Pending Discharge scheduled date and time, the Pending Discharge entry person and comments to track required special discharge services. Regulus Corporation was engaged to create a prototype of the Electronic Bed Board utilizing the Hospital's CAD\CAM electronic data files creating floor views of nursing stations and the hospital beds. Regulus Corporation used a Geographic Information System (GIS) application and tool set provided by Environmental Systems Research, Inc. (ESRI) for this purpose. The GIS system was integrated with the hospital's ADT system in a real time mode to capture patient demographic and clinical information and associate this information to the beds assigned to the patient at time of admission and/or subsequent patient bed transfer.

The Electronic Bed Board function is comprised of minimally two views. The first view represents the manual bed board process that was used by the Admitting Department and simulates its use in planning and executing patient admissions with bed assignments.

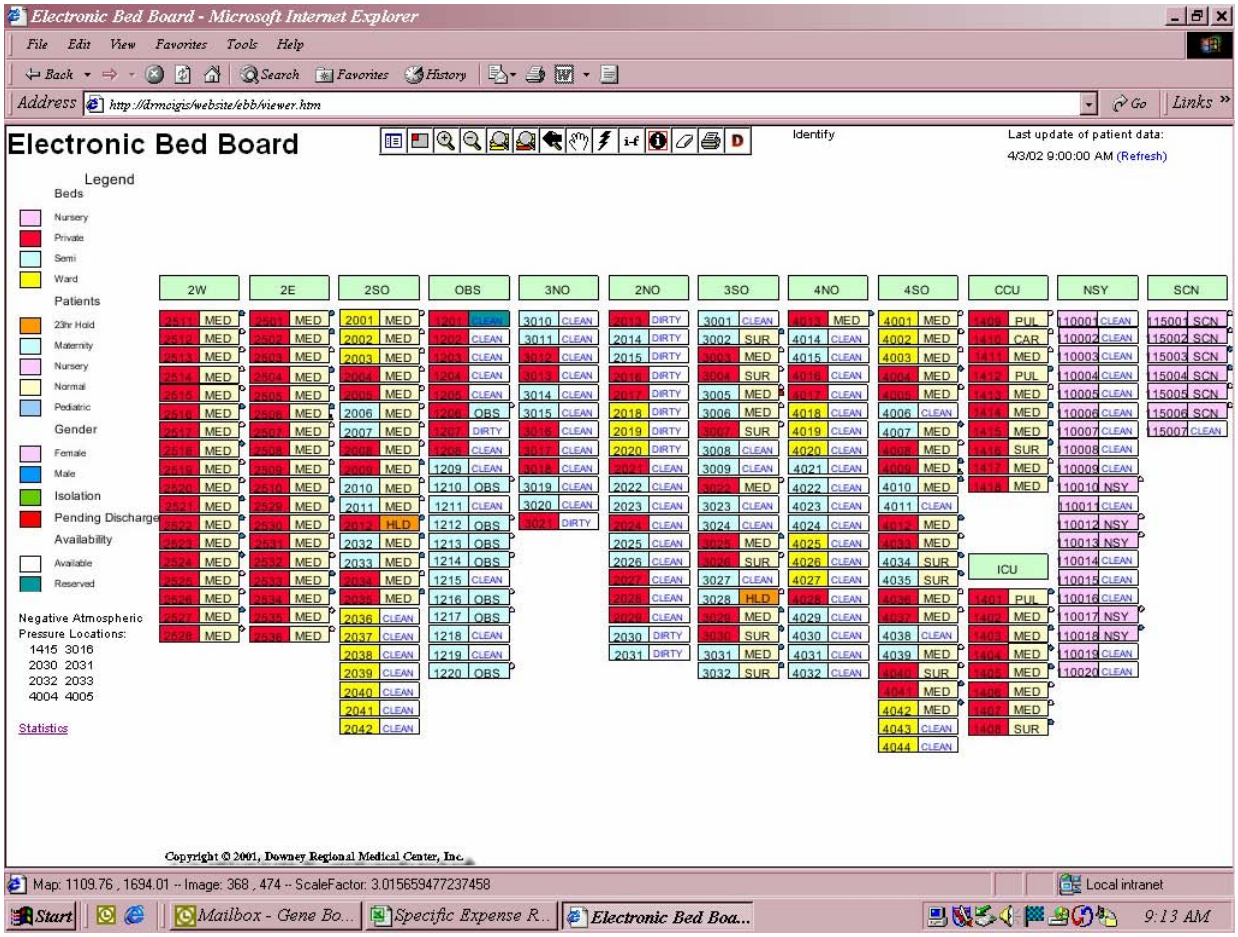

Figure 3. Admitting View

In the Admitting View the functions are:

- A tool bar allowing navigation and information processes within the view, i.e. display patient information (only accessible to individuals authorized to see this information, navigate to floor view, navigate to dummy bed view, etc.).
- A Legend which indicates bed accommodation type i.e., nursery, private, semi-private, etc., Patient types i.e., 23hr Hold, Maternity, Pediatric, etc., Patient Gender i.e., Male and Female, Isolation beds, Pending discharges, Bed availability, Isolation rooms.
- The Bed View by Nursing Unit indicating bed status (clean or dirty, Medical Service or held patient), patient status (Pending Discharge and Isolation) and gender indicators.

Data on all views is updated in real time mode and refreshed on a time sequence determined by the hospital operating policies.

The Floor View provides an easy assessment of all occupied and unoccupied beds. The tool bar provides the same functionality as the Admitting View. This view meets all HIPAA requirements for patient information confidentiality and replaces the need for the large white boards found in most hospitals today. Nursing Administration completed policy revisions and orientation and awareness training to meet the requirements of the new Bed Management function.

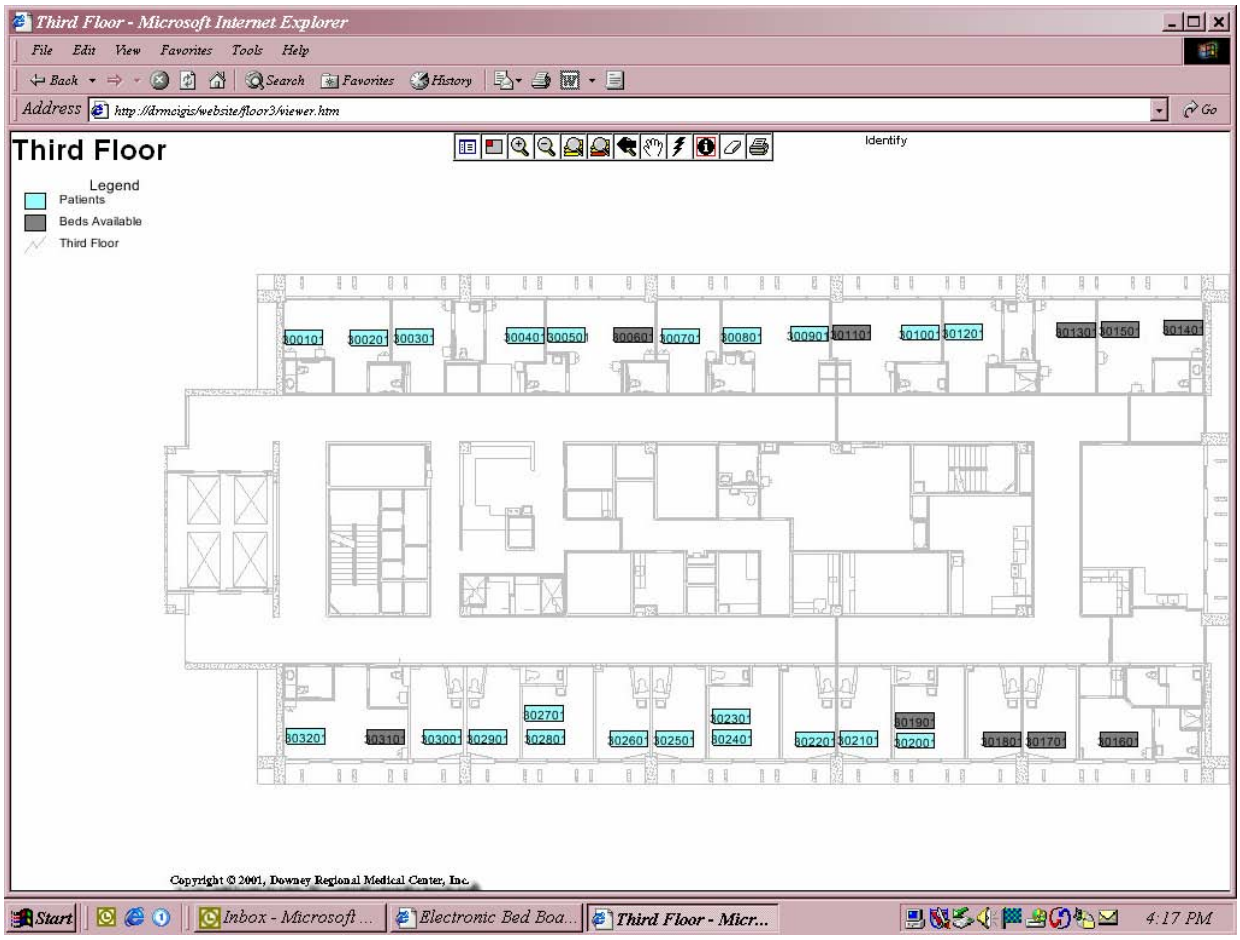

Figure 4. Floor View

Results of the Implementation

The implementation consisted of a pilot of a single nursing unit and then was followed with full rollout to all nursing units. The pilot indicated that a 35% to 50% reduction in patient discharge time from the submission of the Physician Discharge Order to patient release was feasible. Implementation of the Performance Metrics Management Report will provide management with an assessment tool to further highlight additional areas for improvement of the process.

Project Planning Considerations

The project duration and cost will vary from institution to institution, However, below are listed elements of the project to be considered.

Allow 60 days for ADT System enhancements which includes:

- Detailed specification creation
- Create Nursing policies and procedures
- Add date/time stamp to ADT
- Set up pending discharge notices

Allow 5 days for GIS training for programmers and operations personnel.

Allow 50 days for System and Programming tasks which encompasses Cad/Cam drawing mapping for room/bed identification.

Allow 40 days for pilot Nursing Unit setup and execution which includes:

- End user training
- Security implementation
- Management report approval and change control tasks.

Allow two days for system administration tasks which includes:

- Documentation of security methodology
- Audit controls
- Security administration procedures
- Escalation procedures and interface monitoring procedures.

Allow two days for roll out training for system support personnel.

Allow one week per Nursing Unit for setup and training to roll out the application.

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Endnotes

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Author Information

Eugene R. Boyer
Director, Client Services
Downey Regional Medical Center
9040 E. Telegraph Road
Downey, CA 90240
Phone 562-622-2159
FAX 562-622-2150
gene.boyer@drmci.org