Appropriate Admissions to the Appropriate Unit: A Decision Tree Approach

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An intermediate care decision tree tool was developed to meet the demand for intermediate care beds. Concurrently, a charging process was developed to support the acuity adaptable model of care, allowing the patient to remain in the same bed from admission to discharge, regardless of level of care required, adjusting nurse-to-patient ratios as acuity changes. Since beginning this pilot, 96% to 100% of the patients admitted to intermediate care from the emergency department met the criteria. Wait time from request to admission was reduced from 5.5 hours to 2.5 hours. A reduction in nursing costs was noted. The average number of patients waiting daily in the emergency department for an intermediate care bed has been reduced by approximately 80%. A significant difference in length of stay was not noted. (Am J Med Qual 2005; 20:90-97)

Keywords: intermediate care; admissions; decision tree; acuity adaptable; intensive care

Christiania Care Health Systems, located in Newark, Delaware, is the largest health system in the state. Included in the system are 2 acute care hospitals: Christiana Hospital, with a total of 650 beds, and Wilmington Hospital, with a total of 150 beds. There are a total of 94 medical intermediate care (IMC) beds between both hospitals, which are designed to provide an intermediate level of care that requires more skill than the general floor beds and less than the intensive care unit (ICU) beds. The levels of care are the following:

- ICU: the highest acuity patient requiring a 1:1 or 1:2 nurse-to-patient ratio;
- IMC unit: the next level after ICU and requiring a 1:4 or 1:5 nurse-to-patient ratio;
- floor monitored: general medical and/or surgical patients who are telemetry monitored, requiring a 1:6 nurse-to-patient ratio; and
- floor nonmonitored: general medical and/or surgical patients who are not telemetry monitored and with a level of care that requires a 1:6 or 1:7 nurse-to-patient ratio.

PURPOSE

The IMC beds were in great demand but short supply. Most of the IMC patients were admitted from the emergency department (ED). The average wait time for a bed was 5.5 hours. An audit revealed that, on average, only 42% of the patients admitted to an IMC bed from the ED actually met basic InterQual criteria. Thus, our nursing resources were being overused in terms of nurse-to-patient ratios. There was a need
to better match patient acuity to our nursing resources.

In addition, there were patients who had to be transferred because they were not initially placed in the appropriate bed. The transfers occurred as early as 1 hour after admission because the patient should have been admitted to the ICU. We also transferred patients to a floor level of care when they no longer met IMC criteria. The cost to transfer patients from the IMC to a medical/surgical floor was estimated to be $200 per patient transfer. We averaged 77 transfers per month at a cost of $15 400 per month. All patients in the IMC were automatically charged the IMC rate regardless of the level of care required, as this was the charge for a room on that unit.

Although IMC admission criteria had been written years ago, they were kept on the units in a policy manual and not widely used. This allowed physicians to subjectively interpret the need for IMC admissions. Also, some physicians favored the nursing staff on the IMC and admitted to those units whether or not that level of care was required. All of the nurses on the IMC unit were certified in advanced cardiac life support and arrhythmia interpretation. They were trained to administer specific intravenous medications as designated by hospital policies. The nurses on the medical/surgical units did not have this level of knowledge.

Our other challenge was finding a billing methodology that would allow us to modify the accommodation code, which is used to charge for the skill level required, without changing the patient’s physical location. Our original charging methodology was by the unit type, not by the bed. Specific units were identified as IMC and charged the IMC rate with no methodology available to change the rate as the level of care changed. For example, if a patient was admitted to a double room as an IMC patient, but then the level of his or her care changed to medical/surgical, we could not modify the accommodation code unless the patient was moved to a room on a unit designated as medical/surgical. We needed a methodology that provided the capability to charge for the appropriate level of intensity of care regardless of the bed the patient occupied. This would allow the patient to stay in the same bed from admission to discharge. We agreed to test this concept on the IMC units and then expand it throughout the institution by training all nurses in the advanced skills necessary to provide an IMC level of care.

The purpose of our pilot was to

1. decrease the inappropriate use of the IMC beds so they would be available for patients who required that level of care,
2. promote greater clarity concerning those conditions and circumstances that required IMC admission,
3. provide an easy tool for the ED and other caregivers to use when considering the level of care required by each patient, and
4. redesign our billing methodology to charge by individual bed, not by unit type.

REVIEW OF THE LITERATURE

A review of the literature to search for other institutions that had developed a decision tree for appropriate admissions to various levels of patient care was completed. The keywords used included admission, step-down unit, step-down admission, and intermediate care admissions. The review revealed a paucity of available literature.

Lenox and New did report a 13% Medicare denial rate at a loss of approximately $20 000 per month after opening a clinical observation unit. The loss was due to missed opportunities for admissions, inappropriate admissions, and extended length of stay past the normal 48 to 72 hours that is customary for an observation unit. The facility adopted measures to improve the appropriateness of admissions to the beds and implemented corrective measures, which led to a 0% denial rate and steady increases in revenue.

Clarke and Normile reported a study designed to examine the length of stay in the ED prior to admission to a critical care unit. The purpose of the project was to assess (1) if holding critical care patients in the ED after admission was due to nursing shortages or lack of resources in the ED and (2) if delays in admission orders or tests occurred. A Likert-type scale survey was sent to directors of critical care and emergency services areas. A total of 109 responses were received. The responses revealed a positive correlation between an increased length of stay in the ED and delay in treatment. In addition, 81% strongly agreed or agreed that there is a lack of space, staff, and available critical care expertise in the ED. They reported that the critical care units lacked clear admission criteria and assigned physician coverage. The inappropriateness of admissions resulted in use of expensive technology and a high use of nursing resources, leading to unnecessary expenses that increased health care costs without improving quality.
A multidisciplinary team was formed to develop an IMC decision tree to be used by the ED as a guide for admissions to the IMC units. The team included physicians and nurses from the ED and IMC units, administration, information services, the finance department, and the utilization management department. The decision tree was developed based on InterQual criteria and “Guidelines for ICU Admission, Discharge and Triage,” as published by the Society of Critical Care Medicine (Figure 1). The draft was reviewed and approved by the Critical Care Committee, Cardiology Section, IMC nursing leadership, ED physicians, and physician leaders. Clear definitions were included. The guideline was formatted as a checklist for ease of use.

A physician champion in the ED instructed other ED physicians how to use the tool as a guide for admission decisions, with the understanding that the admitting physician could override the guidelines based on appropriate and reasonable clinical judgment. The ED nurses also were trained, with particular emphasis on the triage nurses, so that they could assist with the appropriate assignment of patient transfers/admissions. The IMC charge nurses and staff also were educated about the criteria. The IMC staff performed weekly audits to monitor admission appropriateness.

Working with Information Services, charges were changed from being room based to bed based. Accommodation codes were assigned to provide a charge for IMC, general floor, and general floor monitored. Using the approved decision tree, each evening, the charge nurse reviews patients’ charts to ensure the codes are correct and makes changes as needed. The revised form is then faxed to our bed board, where the accommodation code is entered into our information services network for charging.

Our pilot initially focused on 2 units at Christiana Hospital, 2C and 5C. The 2C unit is a 41-bed IMC unit with a primary focus on cardiovascular patients. However, about 30% of the admissions are noncardiac, medical patients with other disease entities such as gastrointestinal bleed, renal disease, and diabetes. Cardiac telemetry is housed on the 5C unit.

Both of these IMC units were modified to function as acuity adaptable units to reduce patient transfers by keeping the patient in the same room from admission through discharge. The literature revealed several institutions that use this model for patients admitted to the critical care unit. Hendrich et al described how this was accomplished at Methodist Hospital, part of Clarion Health Partners, Inc, in Indianapolis, Indiana. Patients admitted to the critical care unit remained in the same room until discharge. Adaptable equipment was changed as the patient’s condition improved. Rather than moving the patient, adjustments were made to the nurse-to-patient ratio based on the patient’s condition. This resulted in reduced transfers, efficient use of the budgeted nursing care hours, and a reduced length of stay.

We could not find literature describing institutions that initiated this model on an IMC unit. Because only 42% of the patients on the IMC unit actually met criteria on admission, we decided to redesign the cardiac telemetry unit (5C), which originally was entirely IMC, to be a more flexible unit. We budgeted nursing care hours for 8 IMC beds, with the remaining being floor monitored or nonmonitored beds for medical patients. This reduced our daily nursing hours of care from 9.2 to 8.5. Unit 2C remained entirely IMC. The IMC decision tree was initially piloted on 5C, and revisions were made prior to expanding the pilot to 2C. The charge nurses of both 2C and 5C were given guidelines to help them decide how to adjust staffing, depending on the level of care required. Intermediate care patients generally required a 1:4 nurse-to-patient ratio; medical patients required a ratio of 1:6. This approach was taken to reduce nursing care hours required by allocating staff based on the needs of the patients, rather than traditional nurse-to-patient ratios based on the type of unit.

Outcome Measurements

The following outcome measures were used to evaluate the success of this pilot:

1. appropriateness of admission from the ED to IMC beds,
2. average time (in hours) from request for an ED patient to be admitted to an IMC bed compared to the actual time the patient arrived on the IMC unit (we felt this was a good measure as delays were documented by the coordinators daily as “patients waiting in the ED for an IMC bed”; we knew delays were not related to transport as the ED has dedicated staff for transfers),
3. average length of stay on the IMC unit,
4. nursing care hours and dollars on units 2C and 5C,
Figure 1. Guidelines for intensive care unit admission, discharge and triage.
5. number of patients waiting daily in the ED for an IMC bed.

RESULTS

The pilot was begun in October 2003. Data were collected from May 2003 through September 2003 and revealed that only 42% of the patients admitted to either of the 2 IMC units met IMC criteria. This improved immediately and has continued (Figure 2). Since beginning this pilot, 96% to 100% of the patients admitted to IMC from the ED meet the criteria.

The appropriateness of level of care also was monitored 48 hours after admission. Initially, there was poor compliance with changing the accommodation status; approximately 60% of the patients were inappropriate for IMC 2 days after admission, and the status had not been changed. Through education of the nursing staff, there has been a gradual improvement to 96% appropriateness at the 48 hour postadmission mark.

The average time from bed requested to the patient being admitted to the IMC unit from the ED was 5.5 hours in October 2003. In November, approximately 3 weeks after initiating the pilot, this wait time was reduced to 2.5 hours. Although we had a slight increase in wait time in early 2004, we reeducated the staff and immediately saw a reduction as evidenced in Figure 3. We have continued to see a decline in wait time (Figure 3).

There was an overall reduction of 2025 hours of care from October to November for both units combined after initiating the pilot (Figure 4). This represents a cost reduction in regularly paid hours of approximately $56,862 (based on an average hourly pay rate of $28.08; Figure 5). These reductions were not sustained but remained within budget. This can be explained by the fact that prior to initiating the project, we staffed for an IMC level of care regardless of patient needs. Immediately after we initiated the project, our hours of care dropped significantly because the percentage of patients that actually met IMC criteria was low. This was not sustained because, rapidly, 96% to 100% of the patients were true IMC patients requiring higher nurse-to-patient ratios.

We initially saw a significant drop in the number of patients waiting daily in the ED for a bed in the IMC.
after an admission decision was made from a total of 97 in October 2003 to 39 in November 2003. This did fluctuate temporarily in December 2003; however, as indicated in Figure 6, it has continued to decrease. We feel this was a positive result of having the appropriate admission criteria available.

We did not see a significant change in the length of stay on either unit (Figures 7 and 8). We do feel this is an opportunity to pursue in the future.

**Barriers**

As with any new project, we experienced some initial challenges. Our first barrier was building a comfort level for the physicians and nurses so they did not feel we were trying to control their practice. Sharing the guidelines with the ED staff was an essential part of the process. During the first few weeks, there were daily morning meetings, reviewing patients admitted...
to the IMC from the ED the previous day to discuss appropriateness. Within several weeks, IMC admission criteria were met 96% to 100% of the time. In addition, the beds were more readily available when needed as demonstrated by the reduction in wait time for IMC beds. Anecdotally, the IMC nurses told us they felt more satisfied because the patients admitted to the unit belonged in the unit and because they now had a concrete tool to use when discussing reasons a patient should not be admitted to the unit or should have a change in the level of care.

Our greatest challenge has been changing the way we charge for level of care. The current system has been in place since 1991. Our institution’s reimbursement source is approximately 65% Medicare and 35% commercial payor or self-pay. The finance department initially felt that we could not change from charging by room to charging for a bed because it may
lead to denials or investigations if the codes were incorrect. We tested our new methodology prior to finalizing it to ensure that all patients were coded appropriately by working with the utilization management and the unit nurse managers. Our test revealed our daily codes were correct. There also were concerns that appropriate charging would affect revenue or increase denials. Our initial pilot revealed we were charging appropriately 100% of the time.

An unexpected outcome was the difficulty in implementing an acuity adaptable model. We quickly found that this would not work well unless a majority of the floors used this model. We reduced transfers, but were not able to eliminate them because of the need to vacate beds on IMC to admit true IMC patients. If all the units in the hospital (except ICU) provide the same level of skilled nursing, we could admit IMC patients throughout the hospital. We discovered that we needed to train the entire cadre of medical and surgical unit nurses to be able to care for IMC level of care patients. Then the patient could remain in the same room regardless of level of care required.

**Future Implications**

As we move forward, our goal is to expand the decision tree model for admission criteria to all levels of care. We are planning to take the tool to the physician offices so that direct admissions will be assigned to the correct unit and level of care. We are developing a plan that will empower the nurse to change the level of care from IMC to floor or floor monitored based on the criteria. We will continue our goal of developing an acuity adaptable model throughout the institution.

**REFERENCES**

1. McKesson Health Solutions, LLC. InterQual Level of Care—Adult. Available at: www.interqual.com.