

**Ruling Out TB:
Three Days in an Isolation Room**

I am sure most House Officers think the opportunity to rest for three days in a comfortable private room with your food being delivered sounds pretty good about now, right? Unfortunately, not all patients see it that way. Our job is to make the experience as painless as possible.

To do that, we must understand a bit about the AFB processing system at Boston Medical Center. Each day, each negative pressure room at BMC is permitted to send down one sample per patient.

Why just one? Actually, it is not because one cannot rule out TB faster. It is because each sample must be processed and reviewed by a single technician for 15 minutes/slide before it may be called a negative. These samples are processed in the morning with the readings being completed by lunchtime. Given that there are eight negative pressure rooms on medical-surgical units and they take so long to process, each patient is only allowed to submit one sample per calendar date.

If your patient needs three negative AFBs to get out of isolation, here are a few tips that may help you navigate with the fewest mishaps:

- 1) Collect the first sample immediately once the patient is in the negative pressure room. Remember, if the sample is collected at 11pm the first day the patient arrives, you can still collect another one the following morning and that will count for 2 separate days.
- 2) Speak to the nurses directly and remind them that you want the samples collected early in the morning so they make it **to the lab** by 11am.
- 3) When you order the “AFB\3,” write in the nursing comment section “please collect sample by 9am if possible” so that the nurses on the 2nd and 3rd day also know the plan.
- 4) Put sample cups at the bedside so the patient has it when a sample is produced.
- 5) Tell the patient that your goal is to have a sample for the nurse by breakfast time and that the patient should ring the nurse bell as soon as one is produced.

These tips will help the patients get out as soon as possible.

J Greenwald

**PICC Lines:
A Change in Ordering Procedures**

Since 11/29 the Ultrasound Guided PICC Line placement ordering process has undergone an improvement. We are generally doing well but some clinicians are calling for a PICC Line without putting an order in SCM. To order an Ultrasound Guided PICC (which should only happen after an unsuccessful attempt by the IV Team):

1. Obtain consent
2. Place the order in SCM and check the appropriate indications and that the consent is complete

This is the only way that a PICC can be ordered. Telephone requests will not be accepted.

Patients will be put into the queue based on IR's prioritization criteria.

J Chessare

THE INPATIENT TIMES

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**Better Living Through (the Right) Chemistry!
Medication Reconciliation – a National Patient Safety Goal**

The patient was admitted for CHF and changed him from lisinopril and atenolol to metoprolol and then transferred the patient to the ICU for decompensated disease and then transferred out to a different team which sent him home on enalapril and Toprol XL. The patient came back 2 days later with a blood pressure of 78/52 and a heart rate of 45 because he took his lisinopril, enalapril, atenolol, and Toprol XL...as he thought he should. Sound familiar? Fortunately, this story does not sound too familiar but it certainly happens more often than it should. Or, what about the patient who goes to a community health center to see his PCP and to BMC to see his cardiologist who does not get access to the Logician at the health center? Do you think there may be medication problems.? Of course! In fact, errors like these occur quite frequently – so frequently that the Institute of Medicine (IOM) and the Joint Commission on Accreditation of Hospital Organizations (JCAHO) have identified the issue of reconciling patient medications across transition points (e.g. home to the hospital and the hospital back home) as an issue that requires attention. For 2005, all hospitals in the country must develop a medication reconciliation system.

At Boston Medical Center, a taskforce will be coming together over the next several weeks begin planning a system wide mechanism to attempt to decrease such medication related problems. It will be comprised of a multidisciplinary team of doctors, nurses, pharmacists, and administrators.

In the meantime, here are a few things all doctors and nurses should think about when working with patients around transition times (especially admissions and discharges):

- 1) Recognize that ***this transition is a very risky point in time*** for the patient. Medication errors occur frequently right around this point.
- 2) ***Take the time*** to be sure that the medications you prescribe reflect the medications the patient is taking at home with adjustments where appropriate.
- 3) ***Communicate changes to the medication regimen to the Primary Care Physician*** clearly. This communication may occur via Logician (if the PCP is at BMC), via phone, or via written communication such as the discharge summary, recognizing that this document does not always get to the PCP in a timely fashion if the PCP is not located at BMC.
- 4) ***Doctors, nurses, and pharmacists ALL own responsibility for educating the patient*** about his/her new or changed medications at the time of discharge. You should make sure that this education is performed at a level and in a language that the patient understands. Engage the help of other family members/friends, if possible, to learn about the patient's medications as well.
- 5) Proactively ***re-review the admission medications at the time of discharge*** – especially if you did not admit the patient yourself – to identify possible areas of confusion (e.g. the atenolol → Toprol XL example above) and point out those changes clearly to the patient.
- 6) Always put discharge medication lists in Logician, including for the purposes of writing prescriptions. Medication related errors are common and often preventable. Preventing them, however, takes time and effort but these efforts will pay off in better and safer care for your patients.

J Greenwald

The Inpatient Fall: Not Just an Incident Report

You have doubtless received the RN call stating that Mr. Nameless fell while escaping from his posey vest, and that -you need to examine him and fill out the incident report. Importantly, the workup for the fall does not end here. Falls are a symptom, not a diagnosis. Understanding why someone fell is the first step to prevention.

Falls are common in the elderly:

- 1/3 of community dwelling elders fall yearly
- 50% of nursing home elderly fall yearly
- Falls account for 89% of inpatient incident reports
- Rate of falls in inpatient elders: 1.5 falls per bed annually
- 50% of inpatient fallers fall repeatedly

Falls increase the length of hospital stay. Elders who have fallen once are 3-20 times more likely to require a skilled nursing facility admission. Fifty percent of elders hospitalized for a fall will be dead within one year.

Falls occur when environmental demands exceed a person's ability to compensate. Therefore, both intrinsic and extrinsic risk factors need to be addressed. Interventions can occur as early as the admission assessment by identifying high-risk patients. Risk factors for falls include:

- age 65 yrs or older
- past falls history
- cognitive impairment (i.e. dementia, delirium)
- urinary/fecal incontinence
- balance problems, lower extremity weakness, arthritis
- psychotropic drug use
- ETOH

PT/OT evaluation of all high-risk patients on admission allows early identification of modifiable risks, gait retraining, or balance training.

Review medication lists to remove unnecessary medications or choose less dangerous alternatives. Medications known to increase falls risk are:

- Diuretics
- Antihypertensives
- Tricyclic antidepressants
- Sedatives
- Hypoglycemics

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Orthostatic hypotension is a common cause of falls. Hospital rooms are quite risky, therefore identify and remove environmental hazards for the visually, hearing, physically, or cognitively impaired patient. Restraints worsen the risk of delirium and falls. Participating in a restraint-free care plan reduces the risk of falls.

Despite excellent fall prevention efforts, falls do occur. Always obtain a history of the fall. Examination needs to evaluate both causes and outcomes of the fall:

- Vitals (orthostatics too)
- ABCs
- Neurologic exam
- Neck exam: if direct trauma to neck or if point tenderness over cervical spine or new neurologic findings then place cervical collar to immobilize neck and consider imaging
- Search for soft tissue injury and fractures
- Reexamine in 1 hour (very important for picking up concussive symptoms, slow bleeds, etc)

A fall in an inpatient facility is an incident and by law has to be reported to a physician. The incident report is available online at www.internal.bmc.org/incidents/incidentreport.html and will need to be filled out immediately after your acute exam. If the patient allows, notify the patient's health care proxy or family. Be honest about the nature and probable etiology of the fall. Share with the patient and family the identified fall prevention plan. If a complicated or serious injury occurs, discuss the case ASAP with the primary medical team, nurse manager, and legal department (8-RISK).

The primary team needs to reevaluate the patient the day after and intervene as appropriate:

- Why did the patient fall?
 - What were the outcomes of the fall?
 - Consult (or re-contact) PT/OT
 - Repeat Neuro exam (subdurals may be missed initially)
 - The entire health care team (medicine, nursing, rehab, social work, care management) needs to participate in implementing a fall prevention plan
- Inpatient falls are deadly. Identifying high-risk patients and developing an intervention plan can prevent falls. When a fall occurs, use it as an opportunity to intensify risk factor amelioration.

E Bernstein

Improving Rationale Antibiotic Use: Introducing the Antibiotic Management Team

In 2004, Boston Medical Center began a new initiative designed to encourage the appropriate use of antibiotics. For decades, studies have demonstrated that a significant proportion of physician's use of antibiotics is inappropriate, and that such use increases healthcare costs and promotes the emergence, persistence and transmission of antibiotic-resistant bacteria. Annual hospital costs in the U.S. associated with drug-resistant hospital-acquired bacterial infections have been estimated to exceed \$1 billion, and estimates of total costs related to antimicrobial-resistant infections range from \$100 million to \$30 billion.

Professional societies, interagency and expert panels, and national collaboratives have advocated comprehensive programs to improve antibiotic prescribing in hospitals. Hospitals that have instituted such intensive programs have demonstrated them to be effective at controlling antibiotic costs and resistance, improving patient outcomes, and reducing treatment failures. Boston Medical Center has had some form of antibiotic oversight for many years. Components have included a specialized pharmacist, a restricted formulary, and an infectious disease approval process for certain antimicrobials. In 2004, the decision was made to institute a new multifaceted program in an effort to further improve appropriateness of antimicrobial use.

Our first step was to shift much of the burden of antibiotic stewardship from the prescribing clinicians to the antibiotic management team (AMT). We have reduced the number of restricted agents and eliminated stop orders. Instead, the AMT performs brief chart reviews for patients on antimicrobials of interest e.g. those patients on agents currently approved by infectious disease fellows such as piperacillin-tazobactam, agents being dosed inappropriately, or combinations of agents that we question. After review, we may write a note in the chart if we have questions or suggestions.

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It is important to document why patients are on antimicrobial agents. In particular, the physicians should document what purpose *each* agent is serving and why alternatives are not preferable. The AMT has also adopted a program of automatic conversion from intravenous to oral preparations for certain agents such as fluconazole, metronidazole and the fluoroquinolones, if patients meet established guidelines.

Our second focus has been education. Two methods of education – academic detailing and use of physician leaders – have been shown to be most effective in altering clinical practice. Academic detailing, in this situation, is the case-specific discussion between the prescribing physician and the AMT. Our chart notes and discussion with prescribing physicians perform this function by making teaching points and real-time suggestions about antimicrobial choices in the context of a specific patient. Other studies have shown that the use of physician leaders can help improve clinical practice. We have begun working with physicians and other healthcare professionals from different services to create treatment algorithms. Those physicians can then help promote those clinical pathways.

Our program is attempting to accomplish several goals. First, to make antibiotic use more appropriate overall resulting in improved patient outcomes and decreased antibiotic resistance and costs. Second, to try to improve prescribing through different educational approaches. We hope to work towards a true change in practice, even when the AMT isn't looking over physicians' shoulders. Third, we would like the AMT to be seen as a positive resource for the hospital. Dana Whitney, PharmD and I are happy to hear suggestions for improvements in the program. Please feel free to email me – Tamar.Barlam@bmc.org - with your questions or comments.

T Barlam

**The Inpatient Times Salutes
all the Nurses, Physicians and Students
who came to work
during the blizzard of 2005!
You showed true commitment
to patient care. *STRONG WORK!!***

Transitioning to Subcutaneous Insulin from the Drip

Insulin infusion is the mandatory treatment for patients with severely decompensated type 1 diabetes (+/- DKA) and in type 2 diabetes with Hyperglycemic Hyperosmolar Syndrome. Once metabolic control is achieved, and the patient is ready to eat, the challenge of maintaining glycemic control with subcutaneous insulin looms large.

Choosing the glycemic goal is important. We agree with the position statement put forward by the American Association of Clinical Endocrinologists last March (*Endocrine Practice* 2004, Vol 10, Supp 2). They recommend an upper limit blood glucose (BG) of 110 mg/dl in the ICU; on the wards: 110 mg/dl preprandial and 180 mg/dl on a random test. Although every patient is unique, there is a general consensus on how best to transition patients from an insulin drip. To start, the patient should have demonstrated the ability to drink fluids without a problem, unless he/she is on enteral or parenteral nutrition, which requires an individualized insulin treatment plan (not discussed here). The transition is best done before the patient has had their first meal, but can be done while they are eating (see "For patients who are going to eat" below) ***In order to do this well, the doctor needs 6-8 hours of foresight to plan for the drip to be stopped.*** The following steps should be followed:

- 1) Make sure the patient's BGs have been within goal range while at a stable insulin rate (+/- 1 unit/ hour), during the past 4-6 hours.
- 2) Order an appropriate diet (if liquids, NCS; if solid, ADA 1600-2000 Kcal + Cardiac NCS).
- 3) Calculate the amount of insulin received in the last 6 hours, and multiply by 4 to approximate the 24 hour insulin requirement (this is often an underestimate because patients typically receive low doses of dextrose for nutrition while in the ICU... but this is a safe estimate).
- 4) Calculate the sc insulin doses as follows:

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Total Daily Dose (TDD) = 80% of the 24 hour requirement.

Basal Dose (Lantus QHS or NPH split qAM 2/3 dose and qHS 1/3 dose)=50% of the TDD. Bolus Dose (Humalog or NovoLog insulin recommended) = 50% of the TDD, divided among the 3 meals (usually 6-8 units per *full* meal, and you can write this as a sliding scale for "meals only" to prevent hypoglycemia, holding if BG is <80 premeal).

- 1) For hyperglycemia between meals, you can calculate an appropriate dose using a correction factor (CF): $CF = 1700/TDD$. The correction dose is the $(BG - 100)$ divided by the CF. The correction dose should be given at least 3 hours after the last dose of rapid acting insulin to prevent "stacking" of insulin action.
- 2) **Give the sc basal insulin dose (Lantus or NPH) 2 hours before stopping the drip.** You can also give the rapid acting insulin at the same time if the patient is about to eat a meal. It is exceedingly important to overlap coverage by giving sc insulin before the IV drip is discontinued, given the very short half-life of IV insulin (4-10 minutes).

For patients who are going to eat, but who are still on >4 units per hour of insulin, keep them on the drip at a basal level and use subcutaneous insulin for their meals. This is a good way to treat the highly insulin resistant patient who is otherwise doing well. First slowly stop all dextrose-containing IV fluids and adjust the drip as needed. Give a dose of fast-acting insulin with every meal the patient eats while still on the drip. If the patient is small (<60 kg), start with 2 units; if the patient is medium build (60-80kg), start with 4 units; for large and obese patients (>80kg), start with 4-6 units depending on the meal size. This will help you learn about the patient's **nutritional (prandial) insulin** needs before they head to the floor.

Remember that insulin requirements are dynamic and can be affected by correction of the insulin resistance from ketoacidosis and glucotoxicity. In type 2 diabetic patients who present with DKA, there might even be recovery of beta cell function to varying degrees (e.g. "Flatbush" Diabetes).

*M McDonnell
E Sternthal*

Improving Patient Safety:

BMC Risk Management @ 31-RISK

Medical professionals have always stated that a primary objective of patient care is safety. At Boston Medical Center this objective is supported by the Risk Management Department. Risk Management is a mandated program that helps us make and implement decisions that prevent adverse events. It also works to minimize the effects of accidental losses by providing loss prevention guidance and education.

Risk identification is a key process. All employees have a responsibility to report events that are inconsistent with the routine care of the patient or the routine operation of the facility. These are by definition, "Adverse Events", events that adversely affect or threaten to affect the health, life, safety or comfort of patients or visitors coming to the facility.

Boston Medical Center requires all employees who are involved in, witness, or are first on the scene of an event to file an Incident Report. Incident Reports are found on the BMC Intranet under the @ Work section. There are also paper forms available throughout the Medical Center. These reports serve several purposes. They allow us to trend activity within BMC, identify areas for performance improvement initiatives, and identify areas of potential exposure to liability for the Medical Center and its employees. BMC has adopted a non-punitive approach to adverse event reporting. The purpose of the report is not to assign blame or discipline to the reporter, but to identify areas for improvement to provide a safe environment for our patients and staff.

Some examples of events that should be reported include but are not limited to; burns of any kind, unexpected adverse drug reactions resulting in the need for medical intervention, suspected or actual malfunction of a device that may contribute to a patient injury, retention of foreign objects, any invasive procedure performed on the wrong patient or body part, cardiopulmonary arrest during an inpatient

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admission and/or following a procedure, and all cases of unanticipated outcomes or complications that result in life threatening, significant, or permanent injury, or require significant intervention.

In the event of legal proceedings related to patient care provided by Boston Medical Center staff, your Risk Management Department will work closely with you in the investigation of potential claims as well as the investigation and management of the defense of an actual claim or suit.

There is always a Risk Manager on Call, available 24X7 via the page operator at 31-RISK (31-7475). There are guidelines for reporting available to you on the BMC Intranet, Policy and Procedure Manual Section 4, Quality Improvement. You should contact us via the page system as soon as possible when an adverse event that affects patient care has occurred or when a potential situation is identified. The main department number is 414-5580. We also have a web site available on the BMC Intranet, under the directory heading General Counsel/Risk Management. There is a wealth of information available here including: answers to frequently asked questions regarding general risk management and your professional liability coverage. Moonlighting forms and insurance information requests are also available on the web.

Patient Safety has always been and will remain at the forefront of the Boston Medical Center mission. At Boston Medical Center the Risk Management and Quality Improvement Departments partner hand in hand in the effort to help create a high quality patient centered environment. Employing Root Cause Analysis (RCA) of identified adverse events we are able to analyze outcomes, identify system weaknesses, and proactively review potential vulnerabilities to improve our systems of care.

Please feel free to contact me directly with any questions, concerns, or risk situations that you have identified at extension 8-7887, pager 4058 (617-638-5795), or via email kathleen.murray@bmc.org. Please remember there is always someone available via pager at 31-RISK (31-7475).

K Murray

Partnering with Radiologists: Making Smart Diagnostic Choices

The practice of medicine is changing at an exponential rate. Hand in hand with this change is the public expectation of the medical community, which is higher now than ever before. The economic cost of these expectations is of increasing concern particularly to administrators and policy makers. Health care costs to society now runs into billions of dollars. Central to this evolution in medicine is the explosion in imaging. The increase in imaging comes from two sources: first, from increased use of imaging by referring physicians and second, from an enormous increase in self-referral imaging. Increased use of imaging from referring physicians is often justified given the way the practice of medicine is changing.

To rein in the spiraling costs of imaging, however, at least one of three things need to happen. These are: decreased use of imaging, decreased self-referral, and improved use of imaging facilities. The first of these is unlikely to happen given the increasing dependency on imaging for diagnosis and guiding management. Self-referral (e.g. a cardiologist performing an echo or an emergency physician performing a ultrasound) is unlikely to decrease any time soon given the vested financial interests involved. Optimizing the resources available is where the radiologist comes in. The role of the radiologist not only includes image interpretation and intervention but also increasingly includes directing the course of patient imaging. To do this well requires input from both radiologists and referring physicians.

Referring physicians require three things from the radiologist: availability, affordability, and ability. The referring physicians, for their part, must understand that there is intense pressure on scant imaging resources. In directing patient imaging, it must be remembered that if a radiologist suggests an alternative imaging modality than that requested, there is an excellent reason. For example, sometimes it is more cost effective to go directly to a more expensive imaging modality that

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provides a definitive answer than to repeatedly perform a cheaper test. There are a limited number of patients who can be imaged on a CT or MR scanner per day. In simple terms, if an inappropriate request is imaged, this results in an increased waiting time for other patients to be imaged. As radiologists, we understand the frustration of referring physicians waiting for their patients to be imaged yet unnecessary or inappropriate imaging prolongs the waiting time for patients that do require imaging.

In the current economic climate, the way medicine and radiology are practiced is changing but greater changes are required. Given the increased requirements for imaging and the high costs associated with imaging, it is imperative that better use be made of the resources available. The radiologist is in the best position to direct the imaging algorithm of patients and must collaborate with referring physicians to see that the most appropriate studies are done expediently. It is important that the radiologist and referring physician work closely together to optimize the use of imaging facilities to the benefit of all our patients.

B Lucey

Don't forget to use the pathways!!!

- **ACS**
- **Chest Pain**
- **Heart Failure**
- **Community Acquired Pneumonia**

Don't forget to discharge your patient from the pathway at the time of discharge!!!

Questions about the pathways? Contact Jeff Greenwald or Deborah Whalen.

GPIIb/IIIa Inhibitors in ACS

Acute coronary syndromes represent a spectrum of states ranging from unstable angina (UA) to non-ST segment elevation myocardial infarction (NSTEMI) to ST-segment elevation myocardial infarction (STEMI), affecting over one million Americans per year. The pathophysiologic basis for these syndromes is the development of atherosclerotic plaques within the walls of the coronary arteries – caused over years by a complex interaction between low-density lipoprotein, macrophages, collagen, tissue factors, and oxidative stress, all resulting in the creation of an atheroma covered by a fibrous cap. The rupture of this fibrous cap, which exposes the underlying plaque to intraluminal blood, causes the activation of platelets; these platelets in turn aggregate additional platelets through the synthesis of thromboxane A₂, the release of adenosine diphosphate (ADP), the activation of the coagulation cascade via thrombin, and the conformational change on their surface glycoprotein IIb/IIIa (GPIIb/IIIa) receptors. Whether the patient presents with UA, NSTEMI, or STEMI is determined by the degree of platelet aggregation and thrombus formation – i.e whether the thrombus is occlusive or not.

Strategies for reducing thrombus formation have focused on each of the pathways of platelet aggregation. Aspirin works by blocking the production of thromboxane A₂, heparin (unfractionated or low-molecular weight) is used to block the coagulation cascade by inhibiting generation and activity of thrombin, thienopyridines, such as clopidogrel, are used to block the ADP receptors on platelets. Ultimately, however, all three of these mechanisms act through the common final pathway of platelet activation – the conformational change in GPIIb/IIIa receptor, which ligates fibrinogen and crosslinks platelets. Blockade of the GPIIb/IIIa receptor, therefore, represents an additional and more mechanism for reducing platelet

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aggregation. There are three commercially available GPIIb/IIIa receptor antagonists in the US: abciximab, eptifibatide, and tirofiban.

The use of GPIIb/IIIa inhibitors in UA/NSTEMI has been studied in a number of trials: ESPRIT studied 2064 patients with UA/NSTEMI going for percutaneous coronary intervention (PCI), and showed that the primary end point (composite of death, MI, target-vessel revascularization and “bailout” GPIIb/IIIa antagonist therapy) was reduced from 10.5% to 6.6% with eptifibatide. PRISM-PLUS enrolled 1069 patients with UA/NSTEMI in whom early PCI was not planned, and found that in the subset of patients with TIMI score >4, tirofiban use lowered the incidence of death, MI, or refractory ischemia at 30 days, whether or not they underwent PCI.

On the basis of the most recent ACC/AHA guidelines for UA/NSTEMI and several recent clinical trials, GPIIb/IIIa inhibitors are recommended in the following patients (with no contraindications to GPIIb/IIIa inhibitor therapy):

1. Patients with ongoing or recurrent ischemia despite good medical therapy (aspirin, heparin, beta blockers, nitrates)
2. Patients with positive cardiac markers
3. Patients scheduled for cardiac catheterization and PCI
3. TIMI risk score >3
4. Other high-risk features including LVEF <40%, widespread ischemic changes on EKG, diabetes

Contraindications: Increased bleeding risk, Cr >2.0, platelets <100K, hematocrit <30%.

Precautions: Check Hct/platelets q4 hours after initiation and each day thereafter. If platelets drop by 24% of baseline or to <100K contact cardiology and consider discontinuation of infusion.

GPIIb/IIIa inhibitor therapy may be started on telemetry floors including telemetry floors on MP, and do not require a CCU transfer. Cardiology consultation should be obtained when GPIIb/IIIa inhibitor therapy is being contemplated in order to discuss management of these high-risk patients and to consider cardiac catheterization.

*M Ali
G Philippides*

Rehospitalization Rates by Discharge Day of the Week: Food for Thought

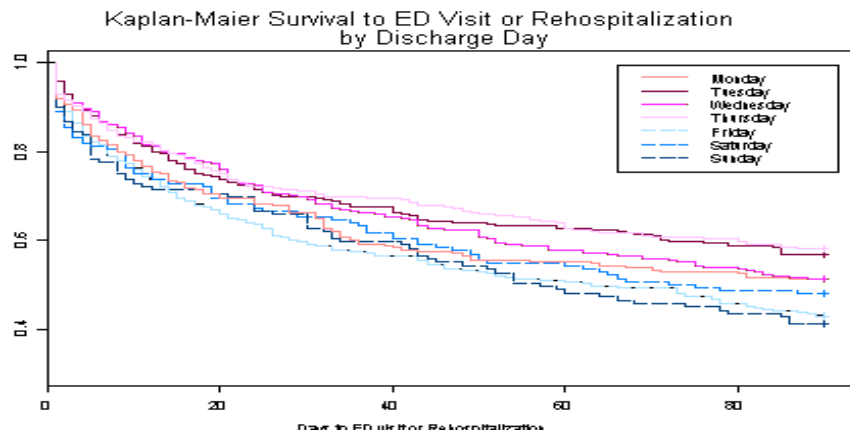
Medical patients discharged from the hospital are frequently still recovering from illness and have to adapt to new treatments, medications, diagnoses, and limitations. At the time of discharge, there is frequently a change in responsible care providers, and the enlistment of new services such as home care. Repeated hospital utilization, defined as rehospitalization or Emergency Department (ED) use following discharge, is a common outcome for medical patients. Among the general medical population, 23% of patients have a non-elective rehospitalization within 90 days of discharge. Furthermore, 19% of older patients discharged from the Emergency Department and 20-28% of medical patients discharged from the hospital visit an emergency department within 30 days.

To investigate these issues further, David Anthony MD, a Family Medicine/General Internal Medicine Academic Research fellows conducted a secondary analysis of data from the patients admitted from the Boston HealthNet Community Health Centers. David showed that patients discharged on Friday, Saturday and Sunday were 30% more likely to be rehospitalized or seen in the emergency department within 90 days than those discharged other days. (Propensity adjusted hazard ratio was 1.3 for patients discharged on the weekend as compared to those discharged on weekdays, $p < 0.001$.) Kaplan-Maier curves stratified by day of discharge are shown in the figure. The three curves with the lowest survivals are Friday, Saturday and Sunday. The increased risk persisted after adjustment for potential confounders including age, sex, length of stay, number of prior admission, comorbidity, and admitting diagnosis. What could possibly explain this finding?

There are several possibilities: (1) hospital staffing is lighter on the weekends possibly presenting a strain on discharge processes by sheer volume; (2) Friday is the busiest discharge day (20% more common than the next most common day, Tuesday) perhaps adding stress to discharge processes on those days; (3) possibly, the patients ready for discharge on weekends are somehow different than those discharged on other days of the week; (4) patients may be discharged prematurely on weekends (either due to physician or patient preference); (5) weekends discharges are more likely to be arranged by cross-covering physicians, who may not be as familiar with the complexities of each patient; (6) perhaps this is related to the community health centers generally closed on weekends, and finally (7) it may be more difficult to arrange home services and hospital follow-up appointments on weekends as many agencies and physicians' offices are closed.

Most likely, a combination of these factors contributes to the poorer weekend outcomes. An important commonality among these explanations is the presence of a strain on the discharge process on weekends. We certainly do not recommend that physicians not discharge their patients on the weekend, if doing so is medically appropriate. Rather, these results should prompt further research into processes of discharge, sources of discharge error, and subsequent improvements in quality with careful monitoring of key patient outcomes.

B Jack



Preventing Patient Falls

The Division of Nursing has a comprehensive nursing plan with regards to falls prevention at Boston Medical Center. A year and half ago, we reviewed our existing falls prevention plan and surveyed other local hospitals on what they were doing in the area of falls prevention. We collected information from several hospitals as well as experts in the field and any articles on the subject.

A small group then came together and developed a nursing assessment tool to help the staff RNs objectively assess patients upon admission and a corresponding policy. The policy can now be found on line—**3.58 Clinical Care/Patient Rights Adult Falls Prevention Policy**. In addition, we also updated our nursing interventions for the staff RN and both the assessment tool and intervention lists are in every bedside book on the inpatient units.

Staff on several units piloted the assessment tool and the Nursing Documentation Committee, Nursing Practice Committee as well as the Hospital Policy Roundtable Committee reviewed our plan for the new policy/program and it was approved in the Fall 2003. At that time, all inpatient RNs completed a one-time competency on the new policy as part of their unit-based training. Continually, the Falls Prevention Program is reviewed at Nursing Orientation and Nursing Competency Day.

We have also introduced several new products to aide the staff. Body alarms were purchased for each unit and the Vail Bed and Low Boy Bed (MP only) were brought into service. At ENC, all inpatient units now have new beds, which can be locally alarmed to signal staff if a patient tries to get out of bed. Eventually, MP will also receive new beds.

With the addition of the new nurse call system and wireless technology, we will soon be able to centrally alarm beds which will allow an ALL STAFF page to be sent to notify all unit caregivers if a patient is attempting to get out of bed.

As part of tracking our progress, we audit all

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charts of any patient who has fallen and this information is compiled by unit by month. Separately, we track our fall rate as a percentage of patient days on a monthly basis. Currently, we are averaging 2.7 falls/1000 patient days, which is well below the national average.

In addition, our falls data is also segmented on severity of falls and in this area we are also well below the national average (NDNQI benchmark data) in the ICUs, acute rehab, and the surgical units. Like the national data shows,, our highest incident of falls is on the general medical units.

What you can do to help!

- Physicians may be asked to participate in a falls prevention plan depending on the interventions the RN feels are needed, some of which may require a physician order.
- Please also assess your patients. If you determine they are at risk for falling, please collaborate with the staff to place the patient on falls precautions and determine a plan of care.
- When rounding, if you see a patient who is attempting to get out of bed and needs assistance, please help the patient and call the nurse from the bedside.
- When seeing/examining your patients, make sure that there are not any obstacles left in their path to the bathroom and also place the bed in the **lowest position** after you examine a patient.
- Preventing patients from falling requires a teamwork approach and we appreciate your assistance in this important patient safety concern.

L Guy

If you have a patient that needs an HIV test, contact the HIV Inpatient Testing Service! Beeper: TEST (8378) Text page: your name, the patient name, and the room number. They offer rapid HIV tests with results taking only 20 minutes!

Fentanyl PCA: A New Addition to the BMC Formulary

Prior to December 2004, three agents for PCA pump administration were available at BMC: morphine, hydromorphone, and meperidine. Last month, fentanyl PCA was added to the formulary and can currently be ordered for patients located on H4W, H5W, and H5ICU; in the future it will be available on all floors. Fentanyl belongs to a class of synthetic opioids that are chemically distinct from morphine and hydromorphone allowing it to be used in patients with true allergies to the latter agents. The addition will allow for the further decrease in use of meperidine which is restricted at BMC due to its inferior analgesic effect and neurotoxic potential due to the accumulation of the active metabolite, normeperidine. Fentanyl is dosed in micrograms (mcg or µg). It should be noted that on a mg per mg basis, fentanyl is 100 times for potent than morphine. Table 1 compares and contrasts the four agents available for PCA administration.

Table 1: Comparison of Opioids Available for PCA Administration

Drug	Use	Kinetics	Equianalgesic IV Dosing
Morphine	<ul style="list-style-type: none"> • Hemodynamically stable patients as histamine is released and hypotension may occur (pruritus also) 	<ul style="list-style-type: none"> • Onset*: 10-20 mins. • Hepatically metabolized • Active metabolites renally excreted 	10mg
Hydromorphone	<ul style="list-style-type: none"> • No histamine release, therefore, can be used in hemodynamically unstable patients 	<ul style="list-style-type: none"> • Onset*: 10-20 mins. • Hepatically metabolized and excreted 	1.5mg
Meperidine	<ul style="list-style-type: none"> • Prevention/treatment rigors • Pre-procedural sedation • Unmanageable adverse reactions to first line agent • Predetermined sickle cell patients <p>Contraindications:</p> <ul style="list-style-type: none"> • Use >48 hours (600mg/24hrs maximum) • CrCl <30 mL/min • Monoamine oxidase inhibitor (e.g. selegiline, tranylcypromine, phenelzine) use within 14 days 	<ul style="list-style-type: none"> • Onset*: 10-20 mins • Hepatically metabolized to active metabolite (normeperidine) • Normeperidine renally excreted 	75mg
Fentanyl	<ul style="list-style-type: none"> • True allergy to morphine/hydromorphone • Acute on chronic pain exacerbations 	<ul style="list-style-type: none"> • Onset*: 7-15 mins. • Hepatically metabolized and renally excreted 	100µg

*Parenteral onset

When ordering a PCA, an appropriate PCA dose, lockout interval, one-hour limit, and basal rate will need to be determined. The PCA dose is the dose of opioid that the patient will receive when activating the pump. The lockout interval is the amount of time between PCA doses; at BMC the minimum lockout interval is 6 minutes. In patients with high opioid requirements (sickle cell and cancer), a basal rate or continuous infusion of opioid may be ordered. The one-hour limit is the maximum amount of opioid a patient can receive in a one-hour period and is the sum of the basal and PCA dose over one hour; a lower hourly limit can also be ordered. Table 2 contains guidelines for PCA dosing at BMC.

Continued →

Table 2: Suggested Guidelines for Dosing PCA

Drug	Usual PCA dose	PCA dose range	Lockout interval (mins.)	Usual 1 hour limit	Suggested starting basal rate	Available Concentrations
Morphine	1-3mg	0.5-5mg	6-10	4-20 mg	0-1 mg/hr	<ul style="list-style-type: none"> • 1mg/mL • 5mg/mL^o
Hydromorphone	0.1-0.3mg	0.1-0.3mg	“	1.2 mg	0-0.2 mg/hr	<ul style="list-style-type: none"> • 0.1mg/mL • 1mg/mL^o
Meperidine	10-15mg	10-30mg	“	50-75 mg	0-10 mg/hr	• 10mg/mL
Fentanyl	10-30µg	5-50µg	“	50-200µg	0-10µg/hr	• 50µg/mL

^oHigher concentrations should only be used in fluid restricted patients and in those receiving >30mg of morphine or >2.5mg of hydromorphone per hour.

Additional information and resources relating to PCA use and pain management are available as follows:

1. Pharmacy Medication Guidelines located on the BMC intranet homepage which include:
 - a. Adult Patient-Controlled Analgesia
 - b. Pediatric Patient-Controlled Analgesia
 - c. Pain Management (Adult)
 - d. Sedation and Pain Control
 - e. Meperidine Use in Adult Patients
2. PCA guidelines from the Institute for Safe Medication Practices (ISMP) found at <http://www.ismp.org-articles/guidelines>.
3. Pain consult groups at BMC
 - a. The Pain Management Group which focuses on acute and chronic pain treatment (EN 88456, MP 45256)
 - b. The Anesthesia Interventional Pain Management Center located on EN (86965)

*D Kedadjian
G Burniske*

Flu Season is Upon Us!!!

Fortunately, BMC *still* has flu shots.

Don't forget to immunize your patients against the flu. The restrictions have been lifted so any patient who is willing to receive one should get it.

Any physician, nurse, or student who wants one should go to occupational health.

Remember to contact your patient's primary care physician:

- 1. On admission**
- 2. On discharge**
- 3. With any significant change in the patient's status**

It's important for patient care!