Preventing the Preventable
Reducing Rehospitalizations Through Coordinated, Patient-Centered Discharge Processes

Jeffrey L. Greenwald, MD, and Brian W. Jack, MD

ABSTRACT
Objectives: Growing literature suggests that a significant proportion of rehospitalizations could be prevented if systems were put in place aimed at identifying and addressing some of the underlying issues that cause them. This article highlights key risk factors for unplanned rehospitalizations and illustrates a project that has successfully addressed many of the underlying issues that contribute to them.

Primary Practice Setting(s): The study illustrated herein took place at an inner-city academic teaching hospital.

Findings/Conclusions: Proactively identifying patient-, clinician-, and system-associated barriers to successful discharge transitions is critical for effective transitions of care for patients leaving the hospital setting. This process represents a culture change, requires a multidisciplinary approach to care, and mandates clear delineation of roles and responsibilities in the process, with ultimate and clear process ownership being defined. With such steps in place in a system of care, it is reasonable to expect a reduction in preventable rehospitalizations.

Key words: care transitions, hospital discharge, patient safety, risk factors

The ability to predict which patients are at high risk for rehospitalizations is an inexact science. The scientific literature has begun to introduce methods of modeling this prediction (Bowles & Cater, 2003; Coleman, Min, Chomiak, & Kramer, 2004; Lagoe, Noetscher, & Murphy, 2001). These models, however, are cumbersome and limited when applied to a general inpatient population. Several, largely retrospective, studies have examined clinical, demographic, and logistical risk factors for rehospitalization and posthospitalization adverse events, some of which may lead to rehospitalization. Caution should be exercised in applying the demographic risks because the studies were often done in small and specific populations.

Some of the major clinical parameters identified include high-risk medication use (antibiotics, glucocorticoids, anticoagulants, narcotics, antiepileptic medications, antipsychotics, antidepressants, and hypoglycemic agents; Budnitz et al., 2006; Budnitz, Shehab, Kegler, & Richards, 2007; Forster et al., 2004; Forster, Murff, Peterson, Gandhi, & Bates, 2005; van Walraven & Forster, 2007), polypharmacy (five or more medications; Campbell, Seymour, Primrose, & ACMPLUS Project, 2004), and specific clinical conditions (e.g., advanced chronic obstructive pulmonary disease, diabetes, heart failure, stroke, and depression; Bula, Wietlisbach, Burnand, & Yersin, 2001; Coleman et al., 1998; Gwadry-Sridhar, Flintoft, Lee, Lee, & Guyatt, 2004; Kartha et al., 2007; Ng et al., 2007; Phillips et al., 2004; Strunin, Stone, & Jack, 2007).

The demographic and logistical factors identified include prior hospitalization (Billings, Dixon, Mijanovich, & Wennberg, 2006; Coleman et al., 1998; Comette et al., 2005; Rodriguez-Artalejo, Guallar-Castillon, & Herrera, 2006; Smith et al., 2000; Soeken, Prescott, Herron, & Creasia, 1991), postdischarge follow-up appointment time provided prior to discharge, low income, low-educational level (Forsythe et al., 2006), low literacy (Baker et al., 2002), reduced social network indicators (Rodriguez-Artalejo et al., 2006), and unmarried/widowed individuals (Forsythe et al., 2006).

The authors have no conflict of interest.

This study was funded by AHRQ-PIPS RFA-HS-05-012 “Partnerships in Implementing Patient Safety: Testing the Re-Engineered Hospital Discharge” (grant no. 1 U18 HS015905-01; principal investigator: B.W.J.).

Address correspondence to Jeffrey L. Greenwald, MD, 801 Massachusetts Ave, 2nd Floor, Boston, MA 02118 (Jeffrey.Greenwald@bmc.org).
Adding to the importance of understanding and improving discharge transitions, the Centers for Medicare & Medicaid Services (CMS, 2008) has indicated that it will incorporate reporting rehospitalization rates as a part of its hospital quality measure reporting program starting in 2009. Of note, the literature does question whether rehospitalization is a valid marker of poor healthcare delivery, given the multifaceted etiologies for its occurrence (Ashton & Wray, 1996).

Nonetheless, it is clear that some rehospitalizations are preventable. Estimates of how many are preventable vary widely depending on patient population and definitions used for preventability (Oddone et al., 1996). In addition, it is important to recognize that hospitalizations can be upsetting, disruptive (Heiskell & Pasneu, 1991), and costly to patients and are quite costly to healthcare systems (HCUPnet, n.d.). Understanding the root causes of unplanned hospitalizations is critical for strategizing about reducing these adverse events.

**INTRODUCING PROJECT RED**

In an effort to clarify the etiologies for unplanned readmissions to the hospital, we undertook an intensive study of the discharge process using several methods such as process mapping, failure mode–effect analysis, qualitative analysis, root–cause analysis, and quantitative analysis to identify the key processes related to rehospitalization, which were then classified into one of three buckets (Greenwald, Denham, & Jack, 2007):

1. healthcare system–related issues;
2. clinician-related issues, or
3. patient-related issues.

A similar system has been used by prior authors (Oddone et al., 1996). Figure 1 shows the major classifications of reasons deemed contributory to rehospitalization in this analysis.

These pilot data served as the foundation for Project RED (ReEngineered Discharge, n.d.), which was a randomized controlled trial of usual care for adult medical inpatients being discharged home as compared with a “RED” discharge. The discharge intervention was based on core principles derived from the pilot analyses, including

- clear delineation of roles and responsibilities across the care team spectrum;
- patient education throughout the hospitalization, not simply predischARGE;
- easy and efficient information flow between members of the care team as well as with the ambulatory providers; 
- full-time case management services to ensure access to these services at the actual moments of discharge;
- all discharge information in patients’ language and literacy level; and
- a written discharge plan must accompany patients at discharge and include

![Figure 1](image_url)

FIGURE 1
Qualitative analysis of contributors to discharge. PCP indicates primary care provider.
Inpatient case managers, nurses, physicians, pharmacists, therapists, primary care physicians, emergency physicians, hospital administrators, and importantly, patients and their caregivers have an important opportunity to work together to achieve the goal of preventing unnecessary hospitalizations. Institutions must be knowledgeable about the discharge transitions literature, as well as basic process improvement skills, and be invested in improving their local system.

- easy-to-understand information about their medications, diet, and lifestyle modifications,
- clear instructions regarding all planned follow-up care,
- patient education materials regarding their illness or reason for hospitalization,
- clear instructions about what to do if their condition changes,
- postdischarge plan reinforcement is important to help patients and families bridge the transition out of the hospital during the period before seeing their ambulatory principal care providers
- information must be accurately delivered to the aftercare providers in a timely fashion, and
- this process must be measured and benchmarked with opportunities for quality control measures to be put in place.

RED Intervention Components

The RED intervention had three components:

1. The discharge advocate (DA) is a nurse whose task is to coordinate the discharge information, plans, patient service and educational needs, and aftercare requirements with the various members of the inpatient care team (nurse, case managers, pharmacists, social workers, therapists, and physicians) and transmit these in a coordinated and faithful manner to the patient/family and aftercare providers.

2. The after-hospital care plan (AHCP) is a patient-centered, low-literacy, highly pictorial document that includes information about the patients illness, medications, follow-up appointments, pending studies and laboratory tests, and contact information for key members of the care team in the hospital (including the DA) and the principal care providers after discharge. The DA creates and presents this document to the patient/family prior to discharge. Using teach-back methodology (Schillinger et al., 2003), comprehension of the material included is improved. See http://www.bu.edu/fammed/projectred/toolkit.html for an example of the AHCP.

3. A clinical pharmacist, employed by the research study for part of her time, telephoned the patients approximately 3 days after discharge. During this scripted call, the pharmacist reviewed the patient’s clinical progress, medication access, use, and complications and addressed questions regarding follow-up or other concerns. Relevant information gathered was referred back to the inpatient or principal ambulatory care providers as appropriate.

Findings

Recently published findings from Project RED demonstrated (Jack et al., 2009):

1. The DA invested about 90 min per enrolled subject. The DA work, completed throughout the course of the hospitalization, included coordinating the discharge information, producing and teaching the AHCP to the patient and the family, and facilitating communications with aftercare providers by ensuring the AHCP reached them in a timely fashion. The DA was also available via pager for patients after discharge. We estimated that about one third of the DA time was spent in research-related activities that would not be required in “real-world” implementations.

2. As described by other authors (Schnipper et al., 2006), despite medication teaching at the time of discharge, the pharmacist intervened for approximately half the patients reached by phone after discharge. We estimated that about one third of the DA time was spent in research-related activities that would not be required in “real-world” implementations.

3. The AHCP was well received and patients particularly found the simple medication list very useful. The AHCP color-coded appointment calendar was also highly rated.

4. The RED discharge appeared to have mitigated the problems associated with low literacy when stratified analyses compared high versus low literacy patients and their risk of unplanned hospitalizations or emergency department (ED) visits.

5. Patients knew their discharge diagnoses more frequently in the intervention group and were more likely to have seen an ambulatory aftercare...
professional case management may/june 2009

(138)

nonetheless, if even a small fraction of the millions of discharges occurring annually in the united states can be prevented, the healthcare system will completely eliminate rehospitalizations.

weinberger, oddone, & henderson, 1996), that no institutional discharge interventions (coleman, parry, chalmers, & min, 2006; dudas, bookwalter, kerr, & pantilat, 2001; einstadter, cebul, & franta, 1996; naylor et al., 1994; schnipper et al., 2006; van walraven, seth, austin, & laupacis, 2002; weinberger, oddone, & henderson, 1996), that no system will completely eliminate rehospitalizations. nonetheless, if even a small fraction of the millions of discharges occurring annually in the united states (hcupnet, n.d.) could be prevented, the healthcare economic impact would be profound and some patients would be saved from unnecessary rehospitalizations. the red intervention was determined to be highly cost-effective even after considering the nursing time needed to deliver the program. the red research team is now testing an automated health information technology system that will significantly reduce the amount of human time required. these results are due out in 2010.

the themes of red, however, can be applied across all institutions and incorporated into local process improvement efforts around multidisciplinary transitions of care. indeed, based largely on the work done by project red and the core principles it developed, the national quality forum (2006) adopted safe practice 11 regarding safe discharges. thus, project teams will have this national imprimatur to motivate their organizations to advance their discharge transition process to meet this new safe practice.

conclusions

inpatient case managers, nurses, physicians, pharmacists, therapists, primary care physicians, emergency physicians, hospital administrators, and importantly, patients and their caregivers have an important opportunity to work together to achieve the goal of preventing unnecessary hospitalizations. institutions must be knowledgeable about the discharge transitions literature, as well as basic process improvement skills, and be invested in improving their local system. numerous online resources are now available to help systems begin this multidisciplinary process (table 1). healthcare teams invested in improving their institution’s discharge transition process must understand that culture change surrounding hospital systems improvement is often slow, but important. healthcare dollars and, more importantly, patient care depends on it.

references


baker, d. w., gazmararian, j. a., williams, m. v., scott, t., parker, r. m., green, d., junling, r., & peel, j. (2002). functional health literacy and the risk of hospital admission among medicare managed care enrollees. american journal public health, 92, 1127–1183.


Jeffrey L. Greenwald, MD, is Associate Professor of Medicine and Director of the Hospital Medicine Unit at Boston University School of Medicine and Boston Medical Center. In addition to being a coinvestigator on Project RED, Dr. Greenwald is also a coinvestigator on Project BOOST, a Hartford Foundation–funded project through the Society of Hospital Medicine looking to improve discharge transitions for older adults.

Brian W. Jack, MD, is Associate Professor of Family Medicine at Boston University School of Medicine. He is the principal investigator for the "Re-Engineered Hospital Discharge" program for which he received the Patient Care Award for Excellence in Patient Education Innovation and was the Patient Safety Investigator of the Month for the Agency for Health Research and Quality.