

The Hospital Discharge: A Review of a High Risk Care Transition With Highlights of a Reengineered Discharge Process

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Abstract: The hospital discharge is a handoff, ripe embedded structural risks and hazards that can result in passive or active failures among “sharp end” providers. These failures can result in medical errors and an array of postdischarge adverse events. There are now emerging data to suggest that postdischarge-related adverse events and rehospitalizations can be reduced through interventions at the time of hospital discharge. This article reviews the modifiable components of the hospital discharge process related to adverse events and rehospitalizations, including those relating to the characteristics of the hospital, patient, and clinician. Using multi-method analysis, our group described the principles thought to be important to the discharge process and delineated what we now call the reengineered discharge, a set of 11 discrete and mutually reinforcing components that we believe should be consistently part of every hospital discharge. Finally, we discuss the work of the National Quality Forum Consensus Standards Maintenance committee who, in 2006, added the hospital discharge as one of its “safe practices for better healthcare.”

Key Words: hospital discharge, medical errors, rehospitalization

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The hospital discharge is poorly standardized and is characterized by discontinuity and fragmentation of care. Lack of coordination in the handoff from the hospital to community care, growth of the hospitalist movement that contributes to handoffs,¹ gaps in social supports, high rates of low health literacy, and poor delineation of discharge responsibilities among hospital staff (often those early in training)—all place patients at high risk of postdischarge adverse events (AEs) and rehospitalization.^{2–4} These problems are compounded by the length of the typical primary care visit in the United States, which is 18 minutes, and do not allow adequate time to become familiar with the details and issues of the recent hospitalization.⁵ These visits must be added to already overbooked schedules at the time of

discharge and frequently occur without access to a discharge summary or to diagnostic and procedural reports.^{6,7}

Thus, the hospital discharge is a handoff, ripe with embedded structural risks and hazards that can result in passive (i.e., latent conditions or system failures) or active failures among “sharp end” providers. These failures can result in medical errors⁸ and an array of postdischarge AEs^{9,10} including the development of new or worsening symptoms and unplanned rehospitalizations, and expose patients to iatrogenic risks and increased costs. There are now emerging data to suggest that postdischarge related AEs and rehospitalizations can be reduced through interventions at the time of hospital discharge.¹¹

Any attempt to improve the hospital discharge with the aim of reducing AEs and rehospitalizations even by a few percent would have profound effects on the financing of health care.^{12–15} There were over 38 million discharges in the United States in 2003 at a cost of over 753 billion dollars,¹⁶ with patients requiring recurrent hospitalization accounting for 13% of the total population of hospitalized patients but using up to 60% of resources.¹⁷ Eliminating 4.7% of hospitalizations, a conservative estimate of the rate of inappropriate hospitalization, would save \$5.1 billion annually.¹⁸

This article reviews the modifiable components of the hospital discharge process related to AEs and rehospitalizations and discusses the development of a package of discharge services that has been designed to minimize discharge failures. Finally, the recently released National Quality Forum (NQF) Safe Practice on the Hospital Discharge is discussed.

STUDIES RELATED TO PATIENT SAFETY AT HOSPITAL DISCHARGE

Factors which contribute to medical errors at the time of hospital discharge can generally be divided into 3 types: (1) those relating to the characteristics of the hospital care system, (2) those relating to the patient’s characteristics, and (3) those relating to the clinician’s characteristics (Figure 1).

Hospital Care Systems Issues

Hospital care systems issues that address the discharge process include the following: (a) processes put in place to facilitate communications between the patient’s data and those involved in aftercare, most notably the primary caregiver; and (b) those systems built to support the therapeutic aftercare of the patient. A major component of the latter surrounds the need for reduction of AEs,

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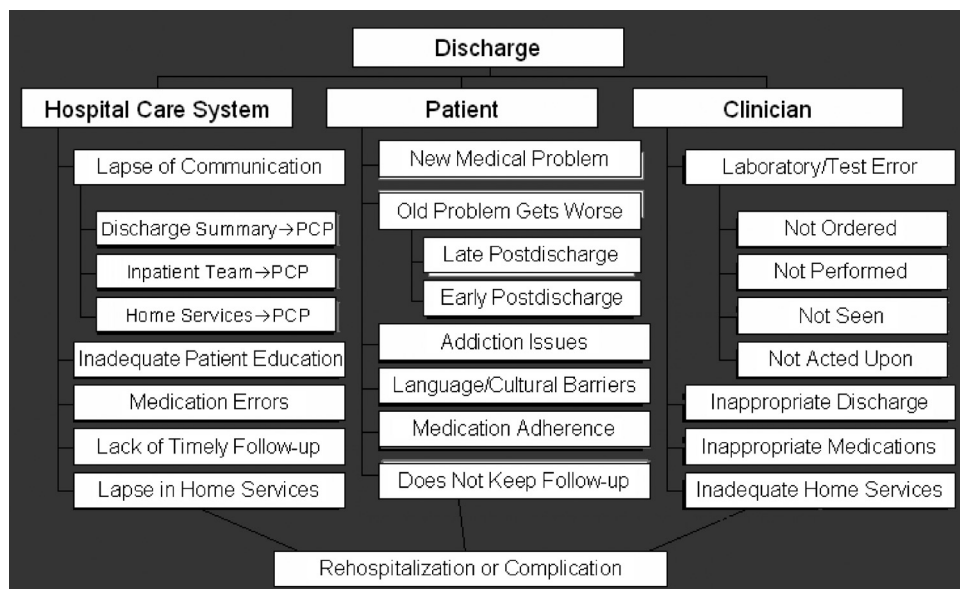


FIGURE 1. Discharge process and factors that lead to rehospitalization and/or complications.

particularly with respect to medications, ensuring the availability of medications to patients and facilitating follow-up with providers of health care, tests, and home services.

The importance of the continuity and quality of discharge patient information has been well described. Although the discharge summary is not the only tool for discharge communications, it does function as a significant portion of it. In a Canadian cohort of over 4600 patients, there was a trend toward lower rehospitalization rates if the primary care physician (PCP) had received a copy of the discharge summary before the posthospitalization visit.⁶ Other authors corroborate the deficits in the information transfer between the inpatient and outpatient settings.^{19–21} A systematic review of information transfer from inpatient to outpatient caregivers by Kripalani et al²² revealed that discharge summaries varied in structure, might take up to a month to arrive at the PCP's office, and were frequently incomplete. In addition, at least two thirds of patients saw their physicians in follow-up before the summary was received.

These deficiencies raise the question of whether it would be useful for the inpatient caregiver to provide the initial posthospitalization care personally or whether close and frequent follow-up by primary caregivers can trump the communication issues above and reduce unplanned rehospitalizations. To address the first question, van Walraven et al²³ examined the impact on readmission if a patient was seen after discharge by the inpatient physician as opposed to a specialist or community physician. Using an administrative database, 938,833 discharges were screened and revealed a 5% relative decrease in death, and nonelective readmissions occurred in patients seen by their inpatient caregiver.

The latter issue of whether increased access to primary care providers after discharge could improve rehospitalization rates was addressed by Weinberger et al²⁴

in a study of Veterans Administration patients. In this study, nearly 1400 patients were randomized to usual care versus having a nurse and PCP visit the patient near the end of the hospitalization and then within the first week after discharge. Despite these interventions, there was a higher monthly rehospitalization rate in the intervention group (19% versus 14%; $P = 0.005$) and more days spent in the hospital (10.2 versus 8.8; $P = 0.041$). Although there was no clear improvement in their reported quality of life, they did note increased patient satisfaction with the intervention group. Nonetheless, this was a single study of a veterans' population, so its applicability to a broad general population remains in question.

In a study of the importance of planned follow-up postdischarge, Einstadter et al²⁵ evaluated the impact of having a nurse case manager arrange postdischarge follow-up appointments. Although more patients left the hospital with an appointment (63% versus 46%; $P < 0.001$) and attended the follow-up (32% versus 23%; $P < 0.03$), the intervention did not demonstrate any benefit on emergency department use or unplanned rehospitalizations at 30 days.

Another major hospital system issue, central to creating a successful discharge, is the prevention of AEs after discharge. Forster et al¹⁰ reviewed medical charts and conducted structured telephone interviews with patients 3 weeks after discharge and concluded that between 20% and 25% of patients experienced an AE during the transition from the hospital to home. Furthermore, approximately one third of AEs are associated with disability, and half of them are associated with the use of additional health services. One third of the AEs were deemed preventable. As Lilford et al²⁶ pointed out, measuring error rates by tracing back from AEs likely underestimate error rates because most errors do not lead to AEs. Improving discharge systems requires an understanding of the types of errors that occur so that systems

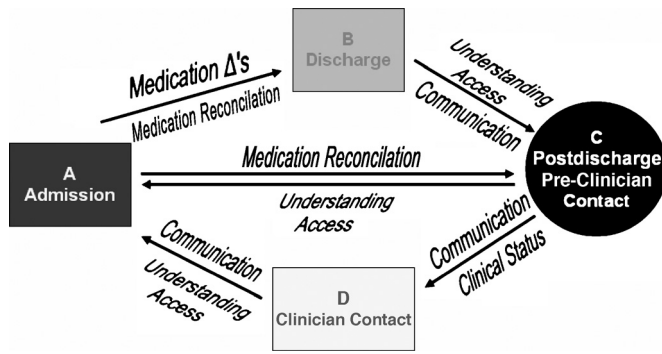


FIGURE 2. Medication reconciliation process.

can be designed or modified to prevent or minimize the potential harm that can result from those errors.²⁷

The most prevalent postdischarge AEs are medication related, also known as adverse drug events (ADEs) (Figure 2). The flow of medications through and after a hospitalization is complex. At admission, a care provider creates an accurate list of the patient’s prehospitalization medications. If an accurate list is not compiled, the correct medications may not be given during the hospitalization, and the patient may have medications at home which he/she independently restarts after discharge. During the hospitalization, medication changes may occur because of clinical conditions, formulary issues, and so on. Medication reconciliation at the time of discharge should adjust for these changes. After discharge, the accuracy of patient’s medication-taking habits is dependent on his/her understanding of which ones to take and which not to and his/her access to obtaining them. Failure of medication-taking habits can lead to readmission before or at the time the patient is seen by his/her physician. If medication changes at the outpatient physician contact are not communicated to the patient and/or are not in an accessible medical record, an accurate medication list may not be readily compiled by the inpatient team at admission, leading to reconciliation errors.

Two thirds of ADEs are caused by an error in drug ordering or prescription filling,²⁸ reinforcing the need for systematic approaches to reducing this form of error. Computerized physician order entry (CPOE) may improve prescribing accuracy and reduce errors,²⁹ especially if it includes decision support,³⁰ although not all published studies are conclusive about CPOE’s benefit,³¹ with some errors being occasionally caused by CPOE.³² No studies evaluate CPOE’s effects after discharge, although computerized prescription generation reduces the known handwriting-associated errors that occur.³³ Additionally, certain medications seem to confer particularly high risk of postdischarge ADEs. Corticosteroids, anticoagulants, diabetic medications, antibiotics, and narcotic analgesics are associated with higher risk of ADEs and therefore demand close attention.²⁸

One of the mechanisms for beginning to address some of the systems issues above and some of the patient- and clinician-related issues (see below) is the institution of

discharge planners, which began in the United States in 1983.³⁴ The discharge planning role may include addressing postdischarge services, medications, and equipment needs; setting up follow-up appointments; coordinating with families; and providing some education to patients about the transition home. Despite this role, the literature on the impact of discharge planning is variable.

According to the Cochrane Review of discharge planning,³⁵ the impact of this program on general medical or surgical populations, with respect to readmission prevention, is small if it exists at all [readmission odds ratio, 0.91 (95% confidence interval, 0.67 to 1.23)]. This review excluded discharge planning studies that involved postdischarge interventions. Additionally, length of stay and mortality also did not seem to statistically change with discharge planning, although costs associated with hospitalization may be lower.

Despite this sanguine analysis on discharge planning, numerous authors have evaluated more advanced interventions that incorporate some of the roles of the discharge planner and extend the connection to the posthospitalization period using various adjunctive techniques to bridge this vulnerable transition.

For example, Dudas et al³⁶ implemented a postdischarge follow-up phone call after discharge. In this randomized trial, general medical patients received a phone call from a pharmacist approximately 2 days after discharge. In this interventions group, the authors demonstrated that 19% of patients had not filled all of their prescriptions, and the pharmacists were able to intervene. They also demonstrated improved patient satisfaction with medication education and reduced emergency department visits (10% versus 24%; *P* = 0.005). There was a trend toward fewer rehospitalizations at 30 days as well (15% versus 25%; *P* = 0.07).

In another study on the impact of pharmacists on discharge, Schnipper et al³⁷ developed a randomized trial comparing pharmacists counseling general medical patients pre-discharge and postdischarge to prevent medication-related problems versus usual care. This study revealed a reduction in preventable ADEs in the intervention group (1% versus 11%; *P* = 0.01) and preventable medication-related readmissions or emergency department use (1% versus 8%; *P* = 0.03), although there was no difference in overall hospital use.

Home visits postdischarge by a pharmacist have demonstrated mixed results. In the HOMER trial,³⁸ pharmacists made home visits to recently discharged patients older than 80 years and made interventions on approximately 1 of 5 to prevent drug reactions or interactions, and they averaged 2.58 recommendations per patient visited. Nonetheless, the intervention group had 30% more readmissions than the control group (*P* = 0.009). In a similar study of follow-up by pharmacists’ home visits, Nazareth et al³⁹ failed to show any harm or benefit of this intervention. In a study by Al-Rashed et al,⁴⁰ which focused more on pre-discharge pharmacist-based counseling of elderly patients, with a follow-up visit by a research pharmacist postdischarge, revealed fewer unplanned visits to the patient’s general practitioner and rehospitalizations.

Nurse- and physician-based follow-up interventions have also been reported. Naylor et al,⁴¹ found that geriatric nurse specialists, who were involved during the hospitalization of geriatric medical patient and after discharge with home visits, effectively reduced acute rehospitalizations (4% versus 16%; $P = 0.02$). Cumulative data until 6 weeks showed a reduced rate (10% versus 23%; $P = 0.04$) predominantly because of this early effect; these differences disappeared by 12 weeks. Patients with acute strokes benefited from physician visits postdischarge with lower rehospitalization rates (26% versus 44%; $P = 0.028$).⁴² Coleman et al¹¹ have shown improved outcomes by using a “transition coach” nurse to assist the elderly patients through the discharge period. This study will be further explored below (see Patient-Related Issues section).

Additional interventions to improve discharge success rates are described in other disease-specific studies. Elderly patients with heart failure also seem to benefit from discharge planning with postdischarge-continued interventions according to a metaanalysis by Phillips et al.⁴³ At a median of 8 months of follow-up, intervention patients were 25% less likely to be readmitted and reported having improved quality of life. Blue et al⁴⁴ also demonstrated decreased readmission rates in heart failure patients with a specialist nurse-based postdischarge intervention. Conversely, Kwok et al⁴⁵ failed to demonstrate readmission benefits from nurse home visits in elderly patients with chronic lung disease.

Patient-Related Issues

Although there are a number of trials examining nonmodifiable patient factors that contribute to readmission,^{46–49} there is less available data examining patient-related factors that can be targeted for potential safety improvement at discharge time. Two such areas that have been looked at in the literature are levels of literacy and adherence rates to treatments and follow-up.

A patient's level of literacy (both general and health literacy) may contribute to the risk of hospitalization.⁵⁰ Although it has been shown that lack of follow through with discharge treatment plans results in an increased incidence of rehospitalization,^{51,52} there is only limited literature directly investigating the contribution of literacy on readmission rates. Baker et al⁵³ studied 3260 patients enrolled in a Medicare-managed care plan. During the 2-year study, approximately 30% of patients were admitted to the hospital at least once. Individuals with inadequate or marginal literacy were more likely to be readmitted after an index admission than those with adequate literacy skills (19.9%, 17.8%, and 14.0%, respectively; $P < 0.001$). An earlier study of a public urban hospital demonstrated inadequate literacy as a risk factor for readmission, whereas moderate and adequate literacy were not.⁵⁴

Data also suggest that patients poorly prepared for discharge might have more AEs.⁵⁵ Additionally, patients who are unable to remember a discussion with their care provider about the side effects of their medications are at a three-fold greater risk of experiencing an AE than patients who recall such information.⁵⁶ These factors, however, may have more

to do with physician communication skills and the patient's cognition than strictly literacy.

As previously noted,^{36–45} (see Hospital Care Systems Issues section), interventions to assist the patient in bridging the transition from hospital to aftercare have had variable outcomes. One recently published patient-centered success was by Coleman et al¹¹ entitled the “Care Transitions Intervention” (see www.caretransitions.org). The central principle of this intervention in elderly medical patients transitioning from the hospital to either a nursing facility or home with home care is that patients and their caregivers need to be assisted in and empowered to take charge of their medical care as active participants. To do so, patients in the intervention group were provided with a “transition coach” who was a nurse whose job was to assist the patients in 4 primary areas called the “4 pillars.” These include the following: medication self-management to facilitate adherence, maintenance of a personal health record, timely follow-up with their primary care and subspecialty caregivers, and knowledge of complications to look out for and manage them if they occur. This intervention was operationalized through the creation of a personal health record and with visits and follow-up phone calls. Note that the coach's job was to facilitate the patient's getting the services and care needed, not to perform care activities for the patient. In this randomized controlled trial, Coleman et al¹¹ were able to reduce rehospitalization rates at 30 and 90 days, including rehospitalization for the same diagnosis as on the index admission, and decrease hospitalization costs at 180 days.

Clinician-Related Issues

Potentially modifiable clinician-related issues related to discharge focus on the quality and effectiveness of patient communications and the efficient transfer of patient data and information to subsequent caregivers. For example, discharge resumes for which there is no widely accepted standard of form or content, frequently lack critical data that are available but not transmitted to the PCP.⁵⁷ The resultant gaps and fragmentation in discharge information transfer may contribute to medical errors and may lead to rehospitalization. Additionally, the comprehensibility of the clinician's discharge instructions to the patient may also have impact on the success of the discharge, although data surrounding this specific question are lacking. It is clear, however, that patient recall and understanding of their discharge medications and diagnoses are suboptimal.^{58,59} If adherence to prescribed treatment plans is at least in part dependent on patient understanding of their illness and treatments prescribed, it is logically hypothesized, but not clearly proven in the inpatient literature, that poor patient comprehension may result in poor adherence, which may lead to preventable rehospitalization.

Contributing to this lack of understanding may be a differential perspective of how much caregiver time and effort is being put into educating the patients about these critical issues at discharge. Calkins et al⁶⁰ studied 99 patients and their physicians at an academic center to assess if there was an agreement as to the amount of time the physician spent

talking about discharge issues with the patient. According to this study, physicians overestimated—relative to the estimates of the patients—the amount of time spent in these discussions. Physicians also overestimated the patient’s understanding of their medications.

Inpatient-to-outpatient clinician communication is important to prevent handoff errors. The use of hospitalists, or other clinicians who are not the primary care providers for the patient, on the inpatient service leads to the increased need for personal and systematic vigilance to avoid information loss at transitions of care like discharge.⁶¹ Moore et al⁶² addressed rehospitalization rate caused by discontinuity of care from inpatient to outpatient settings. In this study of 86 patients followed postdischarge to evaluate for medication continuity errors, test follow-up errors, and workup errors, investigators identified that 49% of patients had one or more of these types of errors. In this study, the outpatient providers did not provide the inpatient care, suggesting that a failure of continuity of care may have been partially responsible for these errors.

Roy et al⁶³ subsequently evaluated 2644 patient discharges from a medical service. They found that 41% of discharged patients had results that were scheduled to return after discharge. One third of the results were considered significantly abnormal; of these, approximately a quarter (9.4% of the original sample of results) were deemed actionable. Surveys on physicians responsible for the patients care, both inpatient and outpatient, demonstrated that 62% of physicians were unaware of these actionable results. The study, like the Moore study, however, did not directly address the impact of clinician errors on rehospitalization.

As previously noted,⁶ continuity of care across the discharge period may have impact on unplanned hospital use. Diem et al⁶⁴ addressed this question somewhat by examining the impact of a postdischarge clinic in which a member of the inpatient care team saw the patient in a clinic after discharge. Compared with usual care, patients who attended the postdischarge clinic had a lower emergency department use (20.8% versus 28%; *P* = 0.006), although readmission rates did not differ. It is unclear, however, whether it was the proximity of the postdischarge clinic follow-up or the personal knowledge of the patient’s inpatient course or both which made the difference.

When taken in their entirety, the reviewed literature supports the following conclusions: (1) the current hospital discharge process is not standardized; (2) postdischarge information transfer to the accepting provider is often inconsistent and delayed, and the quality is often inadequate; (3) providing high-quality information to the postdischarge accepting provider might lower rehospitalization rates; (4) AEs after discharge are common and up to one third are preventable; (5) tests pending at the time of discharge are often not adequately followed up; (6) the most common postdischarge AEs are medication related; (7) postdischarge telephone calls by pharmacists and nurses may decrease postdischarge AEs and hospital use; (8) patients who remember discussions about discharge medications at discharge may have fewer AEs; (9) providing information at the appropriate literacy level could reduce postdischarge hospital

use; (10) discharge planning (usually related to posthospital placement) and case managers making posthospital appointments without addressing other components of the discharge do not seem to improve postdischarge outcomes and could increase posthospital use and costs; (11) it seems important to involve the patient throughout the care transition and empower the patient to participate in his/her care; and (12) there is a paucity of data on well-designed comprehensive hospital discharge programs.

COMPONENTS OF A COMPREHENSIVE HOSPITAL DISCHARGE

With the above literature review in mind, our group studied the hospital discharge process at our institution.⁶⁵ We first used the techniques of root cause and qualitative analysis⁶⁶ to study the systems and processes related to those patients frequently admitted to the hospital. These data were used to identify specific failures of the hospital discharge system that could inform our design of a reengineered discharge (RED) process. We then used an iterative group process to produce a process map.⁶⁷ Our goal was to map the steps of the discharge process to determine what the process actually looks like. We then reviewed the map with senior administrators, physicians, residents, nurses, and ancillary staff and revised it based on their feedback. From this, we then began to investigate what worked, what did not, and how we could improve the process. We identified

TABLE 1. The Principle Themes of the RED Process

1. There must be explicit delineation of roles and responsibilities.
2. Waiting until the discharge decision is made before beginning the discharge process is error prone.
3. Patient education must occur throughout the hospitalization, not only at the time of discharge.
4. Information must flow reliably from the PCP, to the hospital team, among the hospital team, and back to the PCP.
5. Information to be included in the discharge résumé (summary) should be available when it is prepared. The discharge résumé must be completed before discharge and updated at the time of discharge. Waiting days or weeks leads to errors.
6. Every discharge must have a written discharge plan that is comprehensive in scope and addresses medications and other therapies, dietary and other lifestyle modifications, follow-up care, patient education and health literacy improvements, and instructions about what to do if their condition changes.
7. Every discharged patient should have a comprehensive discharge plan completed before discharge, and a copy should be provided to the patient at discharge.
8. All patients should have access to his/her discharge information in their language and at their literacy level.
9. Patients at risk for rehospitalization should have the discharge plan reinforced after discharge.
10. All information about the admission must be organized and promptly delivered to the PCP.
11. Efficient and safe hospital discharges are significantly more challenging if the case management staff are available only during limited daytime hours.
12. Discharge processes must be benchmarked, measured, and subject to continuous quality improvement programs.

TABLE 2. Operationalized Components of the Reengineered Hospital Discharge

1. Educate the patient about their diagnoses throughout their hospital stay.
2. Make appointments for clinician follow-up and postdischarge testing and
 - make appointments with input from the patient regarding the best time and date of the appointment.
 - coordinate appointments with physicians and for testing and other services.
 - discuss reason for and importance of physician appointments.
 - confirm that the patient knows where to go and has a plan about how to get to the appointment; review transportation options and other barriers to keeping these appointments.
3. Discuss with the patient any tests or studies that have been completed in the hospital and discuss who will be responsible for following up the results.
4. Organize postdischarge services
 - Be sure patient understands the importance of such services.
 - Make appointments that the patient can keep.
 - Discuss the details about how to receive each service.
5. Confirm the medication plan
 - Reconcile the discharge medication regimen with those taken before the hospitalization.
 - Explain what medications to take, emphasizing any changes in the regimen.
 - Review each medication's purpose, how to take each medication correctly, and important side effects to watch out for.
 - Be sure that the patient has a realistic plan about how to get the medications.
6. Reconcile the discharge plan with national guidelines and critical pathways.
7. Review the appropriate steps on what to do if a problem arises
 - Instruct on a specific plan of how to contact the PCP (or coverage) by providing contact numbers for evenings and weekends.
 - Instruct on what constitutes an emergency and what to do in cases of emergency.
8. Expedited transmission of the discharge résumé (summary) to the physicians (and other services such as the visiting nurses) accepting responsibility for the patients care after discharge that includes the following:
 - reason for hospitalization with specific principal diagnosis,
 - significant findings [when creating this document, the original source documents (e.g., laboratory, radiology, operative reports, and medication administration records) should be in the transcriber's immediate possession and be visible when it is necessary to transcribe information from one document to another],
 - procedures performed and care, treatment, and services provided to the patient,
 - the patient's condition at discharge,
 - a comprehensive and reconciled medication list (including allergies),
 - a list of acute medical issues, tests, and studies for which confirmed results are pending at the time of discharge and require follow-up, and
 - information regarding input from consultative services, including rehabilitation therapy.
9. Assess the degree of understanding by asking them to explain in their own words the details of the plan.
 - May require removal of language and literacy barriers by using professional interpreters.
 - May require contacting family members who will share in the caregiving responsibilities.
10. Give the patient a written discharge plan at the time of discharge that contains the following:
 - reason for hospitalization;

TABLE 2. (continued)

- discharge medications including what medications to take, how to take them, and how to obtain the medication;
 - instructions on what to do if their condition changes;
 - coordination and planning for follow-up appointments that the patient can keep; and
 - coordination and planning for follow-up of tests and studies for which confirmed results are not available at the time of discharge.
11. Telephone reinforcement of the discharge plan and problem solving 2–3 days after discharge.

and categorized potential failures, the likelihood of making a mistake, and potential consequences of the error. We then identified any processes that could help detect errors before they occur and suggested an action plan for each potential failure that could cause significant consequences.

The group then gathered together to redesign our discharge process. Members were instructed to use the information known in the literature, knowledge from the above analyses, and their creativity to develop a new discharge process. Each of the groups then described their new map and the themes or principles thought to be important to the discharge process (Table 1). From this list of principles, we delineated what we now call the RED, a set of eleven discrete and mutually reinforcing components that we believe should consistently be part of every hospital discharge (Table 2). The principles and processes derived from this reengineering are the subject of ongoing randomized controlled trials (Agency for Healthcare Research and Quality ClinicalTrials.gov Identifier: NCT00252057; National Heart, Lung, and Blood Institute ClinicalTrials.gov Identifier: NCT00217867).

NQF SAFE PRACTICE ON THE HOSPITAL DISCHARGE

In 2006, the NQF Consensus Standards Maintenance committee was charged with the task of updating the *Safe Practices for Better Healthcare* developed in 2003. The committee recognized the critical importance of the transition point of discharge and decided to expand a preexisting practice from a focus on promoting accurate communication about treatment and procedures to a broader comprehensive approach to hospital discharge that would be evidence based and patient centered and target existing systems failures.⁶⁷

A thorough evidence-based review of the domain was undertaken by the committee, followed by consultation of a number of subject matter experts. The Safe Practice regarding discharge systems ultimately paralleled the components of the RED that are detailed above.

A harmonization approach was undertaken by the committee to synchronize the practices across the pertinent requirements or initiatives of the Joint Commission for Accreditation of Healthcare Organizations, the Centers for Medicare and Medicaid Services, the Agency for Healthcare Research and Quality, the Leapfrog Group, and the Institute for Healthcare Improvement. This harmonization

effort coined “the 4 C’s” across each of these organizations was composed of a crosswalk of requirements, cross language or synchronized descriptions where possible, cross credit opportunities, and cross communication of common performance targets. This set of processes was undertaken to establish the new discharge practice that was ultimately developed, providing a clear road map for hospitals to follow that will satisfy a common set of requirements of major purchasing, accrediting, and quality organizations.

In summer of 2006, the practice was provided to the national health care community for review and input for revisions. Substantial input from providers and purchasers was obtained, and the practice was slightly revised. In October of 2006, the national members of the NQF voted to endorse the practice, and the NQF-endorsed practice became a national standard.

The stated objective of the practice is “to ensure that effective transfer of clinical information to the patient and ambulatory clinical providers occurs at the time of discharge from the healthcare organization.”⁶⁸

“A ‘Discharge Plan’ must be prepared for each patient at the time of hospital discharge, and a concise discharge summary must be prepared for and relayed to the clinical caregiver accepting responsibility for postdischarge care in a timely manner. Organizations must ensure that there is confirmation of receipt of the discharge information by the independent licensed practitioner who will assume the responsibility for care after discharge.”⁶⁸

Important additional specifications cited verbatim from the 2006 Consensus Report include the following:

- “Discharge Policies and Procedures should be established, resourced, and address:
 - Explicit delineation of roles and responsibilities regarding the discharge process;
 - Preparation for discharge occurring with documentation throughout the hospitalization;
 - Reliable information flow from the PCP or referring caregiver, on admission, to the hospital caregivers and back to the PCP after discharge using standardized communication skills.
 - Completion of discharge plan and discharge summaries before discharge;
 - Patient or, as appropriate, family perception of coordination of discharge care.

- Benchmarking, measuring, and continuous quality improvement of discharge processes.
- A written discharge plan must be provided to each patient at the time of discharge that is understandable to the patient and/or his or her family or guardian and appropriate to each individual’s health literacy and English language proficiency. At a minimum, the Discharge Plan must include:
 - Reason for hospitalization,
 - Medications to be taken postdischarge, including, as appropriate, resumption of preadmission, medications, how to take them and how to obtain the medication.
 - Instructions on what to do if their condition changes, and
 - Coordination and planning for follow-up appointments that the patient can keep and follow-up of tests and studies for which confirmed results are not available at the time of discharge.
- A discharge summary must be provided to the ambulatory clinical care provider accepting each patient’s care after hospital discharge. At a minimum, the Discharge Summary should include:
 - Reason for hospitalization;
 - Significant findings;
 - Procedures performed and care, treatment, and services provided to the patient;
 - The patient’s condition at discharge;
 - Information provided to the patient and family;
 - A comprehensive and reconciled medication list; and
 - A list of acute medical issues, tests, and studies for which confirmed results are unavailable at the time of discharge and require follow-up.
- Original source documents (e.g., laboratory or radiology reports or medication administration records) should be in the transcriber’s immediate possession and be visible when it is necessary to transcribe information from one document to another.
- The organization should ensure and document receipt of discharge information by caregivers assuming responsibility for postdischarge care. This coordination may occur through telephone, fax confirmation, email response, or electronic response through health information technologies.”⁶⁸

Children’s hospitals, specialty hospitals, small and rural hospitals, and outpatient testing facilities were addressed through the following: “Though small and rural hospitals are resource constrained, the transmission of appropriate discharge information is often times even more important because many patients receive part of the diagnostic workup in small communities and then require more complex care in larger centers. Such information transfer can be vital to patient safety bidirectionally—both when patients go to larger centers and when they come back to be seen by primary practitioners in their home communities. Patients must have access to their records to help with the transfer of information.”⁶⁸

All requirements of this practice are applicable to children’s health care settings. “Patients need access to medical records to facilitate the transfer of information, especially in the case of young children who cannot communicate the information to caregivers.”⁶⁸

All requirements of this practice are also applicable to specialty hospitals. "Such hospitals must transmit medical records and critical care information since patients will likely be admitted to other centers when they have conditions not addressed by specialty hospitals. Diagnostic test and procedural information can have direct and substantial impact on future treatment."⁶⁸

"Imaging and other test facilities providing services to patients receiving care by other organizations must address closure of communication loops regarding test results. Incomplete closure can lead to missed and delayed diagnosis. Incomplete access to prior tests leads to less than optimal interpretation of such studies. When such diagnostic services are provided to patients while in acute care or extended care facilities, requiring transportation off-site, significant opportunities for breakdowns in information loops exist leading to incomplete discharge information sets."⁶⁸

Recommendations by Other Groups

In 1996, the American Medical Association's Council on Scientific Affairs published an evidence-based review of the discharge process and, from this analysis, identified principles that should be incorporated in the discharge process. These include the following: (1) discharge criteria should be based on data regarding "physiological, psychological, social, and functional needs"; (2) "an interdisciplinary team is necessary for comprehensive planning to meet the patient's needs"; (3) "early assessment and planning should be organized" to ensure that services are prepared at discharge; (4) postdischarge medical care should be arranged before discharge; (5) patient and caregiver should be able to demonstrate an understanding about and capacity to perform the care required after discharge; and (6) "coordinated, timely and effective communication between all health professionals, caregivers, and the patient is essential and should be well established before discharge."⁶⁹

Since then, organizations like the Institute for Healthcare Improvement⁷⁰ and the Joint Commission for Accreditation of Hospital Organizations⁷¹ have addressed aspects of the discharge process in their statements on medication reconciliation. Neither addresses the discharge process in a comprehensive manner. In 2006, the Society of Hospital Medicine released the "Ideal Discharge for the Elderly Patient: a Hospitalist Checklist."⁷² This document represents a consensus statement of hospital medicine physicians and pharmacists; process improvement, health quality, and patient safety specialists; and care transitions researchers and was produced after extensive literature and peer review. It is intended as a best practices and practical guide to assist clinicians with improving the safety of the discharge process for elderly patients.

CONCLUSIONS

The hospital discharge is a prototypical condition for the patient safety movement. It is common and risky but nonstandardized from patient to patient and hospital to hospital. Responsibility for its implementation is fragmented among many hospital staff. Adverse events occur in

approximately 1 of 5 discharges⁹ that may lead to preventable hospital use. These factors result in extraordinarily high and unnecessary health care costs. As discussed in this paper, there is emerging data to show that providing a standardized discharge will decrease the number of postdischarge AEs and rehospitalizations. Randomized controlled trials are now underway to test the components of the RED described in this paper. These studies will be completed in 2007 and will help us to determine if improving the process and content of hospital discharge is one of the right roads to improved quality.

REFERENCES

- Pantilat SZ, Lindenauer PK, Katz PP, et al. Primary care physician attitudes regarding communication with hospitalists. *Dis Mon*. 2002;48:218–229.
- Weissman JS, Stern R, Fielding SL, et al. Delayed access to health care: risk factors, reasons and consequences. *Ann Intern Med*. 1991;114:325–331.
- Billings J, Zeitel L, Lukomnik J, et al. Impact of socioeconomic status on hospital use in New York City. *Health Aff (Millwood)*. 1993;12:162–173.
- Weissman JS, Stern RS, Epstein AM. The impact of patient socioeconomic status and other social factors on readmission: a prospective study in four Massachusetts hospitals. *Inquiry*. 1994;31:163–172.
- Woodwell DA, Cherry DK. National ambulatory medical care survey: 2002 summary. *Adv Data*. 2004;346:1–44.
- Van Walraven C, Seth R, Austin P, et al. Effect of discharge summary availability during post-discharge visits on hospital readmission. *J Gen Intern Med*. 2002;17:186–192.
- Mageean RJ. Study of "discharge communications" from hospital. *Br Med J (Clin Res Ed)*. 1986;293:1283–1284.
- Eisenberg JM. Medical errors as an epidemic. A presentation at the National Summit on Medical Errors and Patient Safety Research; September 2000; Washington, DC.
- Forster AJ, Murff HJ, Peterson JF, et al. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med*. 2003;138:161–167.
- Forster AJ, Clark HD, Menard A, et al. Adverse events among medical patients after discharge from hospital. *CMAJ*. 2004;170:345–349.
- Coleman EA, Parry C, Chalmers S, et al. The care transitions intervention. Results of a randomized controlled trial. *Arch Intern Med*. 2006;166:1822–1828.
- Burns R, Nichols LO. Factors predicting readmission of older general medicine patients. *J Gen Intern Med*. 1991;6:389–393.
- Anderson GF, Steinberg EP. Hospital readmissions in the medicare population. *N Engl J Med*. 1984;311:1349–1353.
- Friedman B, Basu J. The rate and cost of hospital readmissions for preventable conditions. *Med Care Res Rev*. 2004;61:225–240.
- Zook CJ, Savickis SF, Moore FD. Repeated hospitalization for the same disease: a multiplier of national health costs. *Milbank Mem Fund Q Health Soc*. 1980;58:454–471.
- HCUP.net. National and regional estimates on hospital use for all patients from the HCUP nationwide inpatient sample (NIS). Available at: <http://hcup.ahrq.gov/HCUPnet.asp>. Accessed July 17, 2006.
- Zook CJ, Moore FD. The high cost users of medical care. *N Engl J Med*. 1980;302:996–1002.
- Payne SMC. Identifying and managing inappropriate hospital utilization: a policy synthesis. *Health Serv Res*. 1987;22:712–769.
- Mageean RJ. Study of "discharge communications" from hospital. *Br Med J (Clin Res Ed)*. 1986;293:1283–1284.
- van Walraven C, Weinberg AL. Quality assessment of a discharge summary system. *Can Med Assoc J*. 1995;152:1437–1442.
- Bolton P. A quality assurance activity to improve discharge communication with general practice. *J Qual Clin Pract*. 2001;21:69–70.
- Kripalani S, Phillips C, Basaviah P, et al. Deficits in information transfer from inpatient to outpatient physicians at hospital discharge: a systematic review. Presented at Society of General Internal Medicine 27th Annual Meeting; May 12–15, 2004; Chicago, IL. Available at:

- http://www.blackwell-synergy.com/doi/full/10.1111/j.1525-1497.2004.S1006_5.x?cookieSet=1. Accessed October 5, 2006.
23. van Walraven C, Mamdani M, Fang J, et al. Continuity of care and patient outcomes after hospital discharge. *J Gen Intern Med.* 2004;19:624–631.
 24. Weinberger M, Oddone EZ, Henderson WG. Does increased access to primary care reduce hospital readmissions? *N Engl J Med.* 1996;334:1441–1447.
 25. Einstadter D, Cebul RD, Franta PR. Effect of a nurse case manager on postdischarge follow-up. *J Gen Intern Med.* 1996;11:684–688.
 26. Lilford RJ, Mohammed MA, Braunholtz D, et al. The measurement of active errors: methodological issues. *Qual Saf Health Care.* 2003;12(suppl 2):ii8–ii12.
 27. Joint Commission on Accreditation of Healthcare Organizations. Patient safety priorities. Available at www.jcaho.org. Accessed October 5, 2006.
 28. Forster AJ, Murff HJ, Peterson JF, et al. Adverse drug events occurring following hospital discharge. *J Gen Intern Med.* 2003;18(suppl 1):282. [abstract].
 29. Upperman JS, Staley P, Friend K, et al. The impact of hospitalwide computerized physician order entry on medical errors in a pediatric hospital. *J Pediatr Surg.* 2005;40:57–59.
 30. Bates DW, Leape LL, Cullen DJ, et al. Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. *JAMA.* 1998;280:1311–1316.
 31. Institute of Medicine. Preventing medication errors. Committee on identifying and preventing errors board on healthcare services. In: Aspden P, Wolcott J, Lyle Bootman J, et al, eds; 2006. Available at: www.nap.edu/catalog/11623.html#toc. Accessed July 21, 2006.
 32. Zhan C, Hicks RW, Blanchette CM, et al. Potential benefits and problems with computerized prescriber order entry: analysis of a voluntary medication error-reporting database. *Am J Health Syst Pharm.* 2006;63:353–358.
 33. Kaushal R, Shojania KG, Bates DW. Effects of computerized physician order entry and clinical decision support systems on medication safety: a systematic review. *Arch Intern Med.* 2003;163:1409–1416.
 34. Houghton A, Bowling A, Clarke KD, et al. Does a dedicated discharge coordinator improve the quality of hospital discharge? *Qual Health Care.* 1996;5:89–96.
 35. Shepperd S, Parkes J, McClaran J, et al. Discharge planning from hospital to home. *Cochrane Databases of Systematic Reviews* 2006; Issue 3. Available at: <http://www.mrw.interscience.wiley.com/cochrane/clsysrev/articles/CD000313/frame.html>. Accessed April 24, 2007.
 36. Dudas V, Bookwalter T, Kerr KM, et al. The impact of follow-up telephone calls to patients after hospitalization. *Am J Med.* 2001;111:26S–30S.
 37. Schnipper JL, Kirwin JL, Cotugno MC, et al. Role of pharmacist counseling in preventing adverse drug events after hospitalization. *Arch Intern Med.* 2006;166:565–571.
 38. Holland R, Lenaghan E, Harvey I, et al. Does home based medication review keep older people out of the hospital? The HOMER randomized controlled trial. *BMJ.* 2005;330:293. Available at: <http://bmj.bmjournals.com/cgi/reprint/330/7486/293>. Accessed October 5, 2006.
 39. Nazareth I, Burton A, Shulman S, et al. A pharmacy discharge plan for hospitalized elderly patients—a randomized controlled trial. *Age Ageing.* 2001;30:33–40.
 40. Al-Rashed SA, Wright DJ, Roebuck N, et al. The value of inpatient pharmaceutical counseling to elderly patients prior to discharge. *Br J Clin Pharmacol.* 2002;54:657–664.
 41. Naylor M, Broton D, Jones R, et al. Comprehensive discharge planning for the hospitalized elderly—a randomized clinical trial. *Ann Intern Med.* 1994;120:999–1006.
 42. Anderson HE, Schultz-Larsen K, Kreiner S, et al. Can readmission after stroke be prevented? Results of a randomized clinical study: a postdischarge follow-up service for stroke survivors. *Stroke.* 2000;31:1038–1045.
 43. Phillips CO, Wright SM, Kern DE, et al. Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure—a meta-analysis. *JAMA.* 2004;291:1358–1367.
 44. Blue L, Lang E, McMurray JVV, et al. Randomised controlled trial of specialist nurse intervention in heart failure. *BMJ.* 2001;323:715–718.
 45. Kwok T, Lum CM, Chan HS, et al. A randomized, controlled trial of an intensive community nurse-supported discharge program in preventing hospital readmission of older patients with chronic lung disease. *J Am Geriatr Soc.* 2004;52:1240–1246.
 46. Soeken KL, Prescott PA, Herron DG, et al. Predictors of hospital readmission: a meta-analysis. *Eval Health Prof.* 1991;14:262–281.
 47. Marcantonio ER, McKean S, Goldfinger M, et al. Factors associated with unplanned hospital readmission among patients 65 years of age and older in a medicare managed care plan. *Am J Med.* 1999;107:13–17.
 48. Rodriguez-Artalejo F, Guallar-Castillon P, Rodriguez Pascual C, et al. Health-related quality of life as a predictor of hospital readmission and death among patients with heart failure. *Arch Intern Med.* 2005;165:1274–1279.
 49. Jiang W, Alexander J, Christopher E, et al. Relationship of depression to increased risk of mortality and rehospitalization in patients with congestive heart failure. *Arch Intern Med.* 2001;161:1849–1856.
 50. Andrus MR, Roth MT. Health literacy: a review. *Pharmacotherapy.* 2002;22:282–302.
 51. Hood JC, Murphy JE. Patient noncompliance can lead to hospital readmission. *Hospitals.* 1978;52:79–82, 84.
 52. Williams EI, Fitton F. Factors affecting early unplanned readmission of elderly patients to hospital. *BMJ.* 1988;297:784–787.
 53. Baker DW, Gazmararian JA, Williams MV, et al. Functional health literacy and the risk of hospital admission among medicare managed care enrollees. *Am J Public Health.* 2002;92:1278–1283.
 54. Baker DW, Parker RM, Williams MV, et al. Health literacy and the risk of hospital admission. *J Gen Intern Med.* 1998;13:791–798.
 55. Coleman EA, Mahoney E, Parry C. Assessing the quality of preparation for posthospital care from the patient's perspective. *Med Care.* 2005;43:246–255.
 56. Pirmohamed M, James S, Meakin S, et al. Adverse drug reaction as cause of admission to hospital: prospective analysis of 18,820 patients. *BMJ.* 2004;329:15–19.
 57. van Walraven C, Seth R, Laupacis A. Dissemination of discharge summaries. Not reaching follow-up physicians. *Can Fam Physician.* 2002;48:737–742.
 58. Makaryus AN, Friedman EA. Patients' understanding of their discharge treatment plans and diagnosis at discharge. *Mayo Clin Proc.* 2005;80:991–994.
 59. King JL, Schommer JC, Wirsching RG. Patients' knowledge of medication care plans after hospital discharge. *Am J Health Syst Pharm.* 1998;55:1393–1398.
 60. Calkins DR, Davis RB, Reiley P, et al. Patient-physician communication at hospital discharge and patient's understanding of the postdischarge treatment plan. *Arch Intern Med.* 1997;157:1026–1030.
 61. Goldman L, Pantilat SZ, Whitcomb WF. Passing the clinical baton: 6 principals to guide the hospitalist. *Am J Med.* 2001;111:36S–39S.
 62. Moore C, Wisnivesky J, Williams S, et al. Medical errors related to discontinuity of care from an inpatient to an outpatient setting. *J Gen Intern Med.* 2003;18:646–651.
 63. Roy CL, Poon EG, Karson AS, et al. Patient safety concerns arising from test results that return after hospital discharge. *Ann Intern Med.* 2005;143:121–128.
 64. Diem SJ, Prochaska AV, Meyer TJ, et al. Effects of a postdischarge clinic on house staff satisfaction and utilization of hospital services. *J Gen Intern Med.* 1996;11:179–181.
 65. Anthony D, Chetty VK, Kartha A, et al. Patient Safety at Time of Discharge—An Example of a Multifaceted Process Evaluation. In: Henriksen K, Battles JB, Marks ES, et al, eds. *Advances in patient safety: From Research to Implementation.* Vol. 2, Concepts and methodology. AHRQ Publication No. 05-0021-2. Rockville, MD: Agency for Healthcare Research and Quality; February 2005.
 66. Strunin L, Stone M, Jack B. Understanding rehospitalization risk: can the hospital discharge be modified to impact recurrent hospitalization. *J Hosp Med.* In press.
 67. Anjard RP. Process mapping: a valuable tool for construction management and other professionals. *Facilities.* 1998;16:79–81.
 68. National Quality Forum. Pre-voting Review for Safe Practices for Better Healthcare—2006. Available at: <http://www.qualityforum.org/docs/safe-practices/txSafePracticesforWeb05-10-06.pdf>. Accessed July 28, 2006.

69. American Medical Association. Report 4 of the Council on Scientific Affairs (A-96) Full Text. Evidence-based principles of discharge and discharge criteria. Available at: <http://www.ama-assn.org/ama/pub/category/print/13663.html>. Accessed October 5, 2006.
70. The Institute for Healthcare Improvement. 100K Lives Campaign. Available at: <http://www.ihl.org/IHI/Programs/Campaign/>. Accessed July 27, 2006.
71. Joint Commission on Accreditation of Hospital Organizations. National Patient Safety Goals. Available at: http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/07_hap_cah_npsgs.htm. Accessed July 27, 2006.
72. Halasyamani L, Manning D, Kripalani S, et al. Transition of care for hospitalized elderly—the development of a discharge checklist for hospitalists. *J Hosp Med*. 2006;1(suppl 2):40–41. Available at: <http://www3.interscience.wiley.com/cgi-bin/fulltext/112588788/PDFSTART>. Accessed July 27, 2006.



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