

EDITORIALS

Risk After Hospitalization: We Have a Lot to Learn

Kumar Dharmarajan, MD, MBA^{1,2}, Harlan M. Krumholz, MD, SM^{1,2,3,4*}

¹Section of Cardiovascular Medicine, Department of Internal Medicine, Yale University School of Medicine, New Haven, Connecticut; ²Center for Outcomes Research and Evaluation, Yale–New Haven Hospital, New Haven, Connecticut; ³Robert Wood Johnson Foundation Clinical Scholars Program, Department of Internal Medicine, Yale University School of Medicine, New Haven, Connecticut; ⁴Department of Health Policy and Management, School of Public Health, Yale University, New Haven, Connecticut.

The immediate period after hospital discharge is dangerous. Patients' health, often marginal at best, frequently deteriorates, sending them to the emergency department,¹ back to the hospital inpatient service,² or into a period of functional decline.^{3,4} Among older patients hospitalized with heart failure, for example, death is even more common in the month following discharge than during the initial hospital stay.^{5,6} Vulnerabilities in this period are many, and patients are susceptible to deterioration in health from a broad spectrum of conditions, not just the initial illness that triggered hospitalization.⁷ This period has been labeled posthospital syndrome, as it appears that patients have an acquired, transient period of generalized risk to a wide range of medical problems.⁸ As recognition of these risks has increased, the goal of improved short-term outcomes after hospitalization has become a focus for providers, payers, and policymakers.⁹

In this issue of the *Journal of Hospital Medicine*, McAlister and colleagues¹⁰ ask whether short-term vulnerability after hospitalization is related to weekend versus weekday discharge. After examining almost 8000 patients discharged from the general medical wards of 7 teaching hospitals in Alberta, Canada, the authors found that only 1 in 7 were discharged on weekends, defined as Saturday or Sunday. Patients discharged on the weekend were younger, had fewer chronic health conditions, and shorter average lengths of stay. In analyses adjusted for patient demographics and a measure of short-term risk after hospitalization (LACE score [length of hospital stay, acuity of admission, comorbidity burden quantified using the Charlson Comorbidity Index, and emergency department visits in the 6 months prior to admission]), weekend discharge was not associated with higher rates of unplanned readmission or death at 30 days.

Most strikingly, only the healthiest patients were discharged on weekends. These results are similar to findings from the authors' previous work on patients hospitalized with heart failure.¹¹ Yet the implications

for discharge planning are much less clear, as the few analyses of discharge day from the authors¹¹ and others¹² do not account for the range of factors that may influence risk after hospitalization such as patients' clinical characteristics, the quality of both hospital and transitional care, and the posthospital environments to which patients are discharged. Not surprisingly, different methodological approaches have shown weekend discharge to be associated with a range of outcomes including lower,¹² identical,¹⁰ and higher¹¹ rates of unplanned readmission and death. Moreover, the influence of discharge timing itself is likely to involve further complexities including patients' readiness for discharge,¹³ the specific days of the week on which both admission and discharge occur,¹⁴ and the outpatient resources made available to patients by specific health insurance carriers.¹⁴

These studies illustrate a fundamental issue with our efforts to reduce short-term readmission, namely, that we do not understand which factors most influence risk.¹⁵ Prediction models have generally focused on traditional markers of risk including patients' demographic characteristics, their physical examination findings, and laboratory test results. Although models based on these variables are often excellent at discriminating between patients who are likely to die soon after hospitalization, their ability to identify specific patients who will be rehospitalized has been mediocre.^{16,17} This difficulty with prediction suggests that readmission has far more complex determinants than death in the short-term period after hospitalization. Unfortunately, we have yet to identify and model the factors that matter most.

Where should we look to find these additional sources of vulnerability after hospitalization? Previous research has made clear that we are unlikely to find single markers of risk that adequately predict the future. Rather, we will need to develop more complete understandings of patients including their dynamics of recovery, the role of the hospital environment in prolonging or instigating further vulnerability, the manners by which organizational context and implementation strategies impact transitional care, and the ways in which social and environmental factors hasten or retard recovery. For each of these categories, there are multiple specific questions to address. The following are illustrative examples.

*Address for correspondence and reprint requests: Harlan M. Krumholz, MD, 1 Church Street, Suite 200, New Haven, CT 06510; Telephone: 203-764-5885; Fax: 203-764-5653; E-mail: harlan.krumholz@yale.edu

PATIENT FACTORS

What is the role of multiple chronic conditions in risk after discharge? Are specific clusters of chronic diseases particularly correlated with adverse health events? Moreover, how do common impairments and syndromes in older persons, such as cognitive impairment, functional impairment, difficulty with walking, sleep disturbance, and frailty, contribute to posthospitalization vulnerability? Would measurements of mobility and function immediately after discharge provide additional value in risk stratification beyond such measurements made during hospitalization?

HOSPITAL ENVIRONMENT

How does ambient sound, ambient light, shared rooms, and frequent awakening for vital signs checks, diagnostic tests, or medication administration affect sleep duration and quality, incident delirium, and in-hospital complications? What influence do these factors have on postdischarge recovery of baseline sleep patterns and cognition? How does forced immobility from bed rest or restraints influence recovery of muscle mass and the function of arms and legs after discharge? How does fasting prior to diagnostic tests or therapeutic interventions impact recovery of weight, recovery of strength, and susceptibility to further illnesses after hospitalization?

CARE TRANSITIONS

What are the influences of organizational context on the success or failure of specific transitional care interventions? What is the relative importance of senior managerial commitment to improving postdischarge outcomes, the presence of local champions for quality, and an organization's culture of learning, collaboration, and belief in shared accountability? How does the particular way in which a program is implemented and managed with regard to its staffing, education of key personnel, available resources, methods for data collection, measurement of results, and approach to continuous quality improvement relate to its ability to reduce readmission?

SOCIAL AND ENVIRONMENTAL FACTORS

What particular types of emotional, informational, and instrumental supports are most critical after hospitalization to avoid subsequent adverse health events? How do financial issues contribute to difficulties with follow-up care and medication management, adherence to dietary and activity recommendations, and levels of stress and anxiety following discharge? How does the home environment mitigate or exacerbate new vulnerabilities after hospitalization?

Ultimately, an improved understanding of the breadth of factors that predict recurrent medical illness after discharge, as signaled by readmission, and the manner in which they confer risk will improve both risk prediction and efforts to mitigate vulnerability after hospitalization. Ultimately, we need to learn how to align our hospital

environments, transitional care interventions, and strategies for longitudinal engagement in ways that improve patients' recovery. The work by McAlister and colleagues¹⁰ is a step in the right direction, as it breaks with the exclusive examination of traditional patient factors to incorporate complexities associated with discharge timing. Such investigations are necessary to truly understand the myriad sources of risk and recovery after hospital discharge.

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