Going Home on the Right Medications

Prescription Errors and Transitions of Care

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TRANSITIONS OF CARE—WHEN PATIENTS MOVE ACROSS care sites within the health system—pose both an opportunity and a threat to patient welfare.[1] These transitions are an opportunity because they provide a chance to freshly reevaluate the patient's medical needs in a new clinical setting. In the case of hospital admission, transitions also offer an opportunity to leverage an acute illness to increase healthy behaviors. To borrow a term from medical education, they are a "teachable moment" in which the threat of a medical illness may facilitate lifestyle changes, medication adherence, or other healthy actions on the part of the patient. However, transitions of care are also a threat, especially for patients with chronic diseases and complex treatment regimens. Either because of miscommunication or simple error, patients may experience unwarranted changes in treatment with potentially deleterious effects on their health.[2,3]

This reality is demonstrated by Bell et al[4] in their report in this issue of *JAMA*. The authors used a novel population-based data set containing both hospitalization and outpatient prescription records to study the incidence of potentially unintentional medication discontinuation among Canadian patients aged 66 years or older. The study group included 396 380 patients assessed continuously using 1 of 5 selected medication classes for at least 1 year. Half of the patients were hospitalized at some point during the study period, and the other half acted as matched controls. The authors then compared the frequency of medication discontinuation between hospitalized and nonhospitalized patients, controlling for patient characteristics and excluding patients for whom medication discontinuation was clinically indicated (for example, stopping an anticoagulant for a patient admitted for bleeding).

For the 5 medication classes, hospitalization was associated with high rates of medication discontinuation ranging from 4.5% to 19.4%. Moreover, compared with patients who were not hospitalized, hospitalized patients were at increased risk for discontinuing medications from all 5 medication classes, even after adjusting for important confounders. The highest risk was observed among patients admitted to the intensive care unit (ICU). These patients are more severely ill than other hospitalized patients and are subject to more care transitions. The finding of increased risk among ICU patients suggests a provocative dose effect that strengthens the putative link between care transitions and unintentional medication discontinuation. For statins and blood-thinning agents, discontinuing the medication was associated with an increased adjusted composite risk of death, emergency department visit, or emergency hospitalization. Thus, the medication discontinuations were not only common but were also associated with real health consequences.

The major limitation of this type of study is that the medication discontinuation may have been intentional. There are a number of valid reasons these medications may have been stopped during the index hospitalization. New contraindications may have arisen that were not captured in the investigators' administrative database. Physicians may have used the admission as an opportunity to rethink the original medication indication, deciding that the patient was better off without the medication. Patient preferences might also have played a role in that patients may have decided the medication's adverse effects outweighed any perceived benefits in light of their new clinical condition.

However, the authors took a number of steps to minimize these possibilities. All patients had taken the medications continuously for more than 1 year prior to their index hospitalization date, presumably providing ample opportunity for adverse effects to manifest. Almost all patients had an outpatient visit during the year prior to hospitalization, at which the medication indication could have been reevaluated. The investigators only studied medications with solid evidentiary bases and strong benefit-to-risk profiles that are unlikely to be stopped without good clinical reasons. The authors also avoided including medications with relatively soft indications and common adverse effects, such as benzodiazepines or nonsteroidal anti-inflammatory agents. Ultimately, given the high incidence of medication discontinuation in this study, even if some

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of the discontinuation was intentional, the remaining unintentional discontinuation is of concerning scope and scale.

Another concerning finding in this study was the substantial amount of polypharmacy among the patients. Hospitalized patients reportedly were prescribed a median of 12 different medications in the year prior to the hospitalizations, and 75% were prescribed 9 or more medications. New pharmaceuticals continue to transform the practice of medicine, and pharmaceutical agents now comprise a high proportion of medical care.[5] As a consequence, hospital-based physicians increasingly not only must attend to the patient's acute medical problems, but also have to manage an ever-expanding array of complex and unfamiliar medications. These medications often carry unknown adverse effects and put patients at risk for unexpected interactions between medications. Thus, for some patients, hospital care is now as much about organizing and reorganizing a litany of medications as it is managing acute disease. Given this transformation, it is not so surprising that important medications become lost in the mix.

Even with increased understanding about the importance of medication discontinuation, efforts to reduce the problem are under way. Many of these activities are limited to hospital-based medication reconciliation programs, which make use of computerized or paper checklists that match medication lists across care transitions.[6] Medication reconciliation programs are endorsed by the Institute for Healthcare Improvement, are part of the United States' Joint Commission's National Patient Safety Goals, and are part of the "meaningful use" criteria under the American Recovery and Reinvestment Act of 2009.[7,8] Yet the effectiveness of these programs is unknown, and they focus on medication use within the hospital, doing little to ensure communication among physicians across different sites of care. Medication reconciliation programs might also overstandardize the process, leading to missed opportunities to improve medication regimens and change treatment when the patient's health trajectory is off course. If hospitals are incentivized only to make sure patients' medications at discharge are the same as at admission, there is no incentive to improve the medication plan during the hospitalization.

More powerful solutions are necessary to promote overall medication quality, not just adherence to a checklist at discharge. Examples might include comprehensive electronic health records available to all clinicians within a system, or integrated health care organizations that encourage and incentivize communication across care sites.[9] These types of large-scale organizational innovations offer promise not only to reduce the harms associated with care transitions, but also to leverage the opportunities for health care improvement inherent in the transition process. The time to begin implementing these programs is now, along with conducting demonstration projects evaluating other innovative ways to improve communication across care sites. The challenge is to design, test, and implement solutions that acknowledge the complexities of modern prescription medication management and facilitate optimal medication usage at every step of the process, so that a major opportunity to improve care will not be missed.

Conflict of Interest Disclosures: All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.
Funding/Support: Dr Kahn is supported by career development award K23HL082650 from the National Institutes of Health.
Role of the Sponsors: The sponsor had no role in the preparation, review, or approval of the manuscript.

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