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## Managing chronic disease in hospitalized patients

**Michael A. Steinman, MD and Andrew D. Auerbach, MD**

Department of Medicine, University of California, San Francisco (MAS, ADA) and the San Francisco VA Medical Center (MAS)

Hospital care plays a key role in diagnosing and treating severe acute disease. However, most older adults who are hospitalized also have multiple chronic diseases which are not directly related to the reason for admission. For some patients, hospitals offer a valuable opportunity to start appropriate management of chronic illnesses and to address preventative health issues. For many hospitalized adults, however, attempts to intensify therapy for chronic diseases can cause more harm than benefit.

Our interest in this topic was spurred by personal experience working in an academic medical center and an affiliated VA hospital. We observed that patients who had well-controlled blood pressure prior to hospitalization were being discharged on substantially escalated regimens of antihypertensive medications. In one recent example, an 83 year-old man with severe COPD and remote coronary artery bypass grafting was admitted for chest pain. Prior to admission, his blood pressure was normal without use of any antihypertensive medications. On hospital day #1, his blood pressure rose to 158/82 mm Hg, likely due to the stress of the acute illness. Although acute coronary syndrome was quickly ruled out, he was started on losartan 25 mg daily and metoprolol 12.5 mg twice daily, both of which were continued at discharge. At his first outpatient follow-up visit 3 days later, blood pressure was 85/48 mm Hg.

Changes in treatment for other chronic diseases can result in similar scenarios, with the potential to cause adverse drug reactions and contribute to confusion about the medication regimen and non-adherence. For example, intensifying glucose-lowering medications and intentionally or inadvertently continuing them at discharge – or worse yet, discharging the patient on sliding-scale regular insulin – can result in severe hypoglycemia once the patient returns home. Adding a statin or bisphosphonate is less likely to cause an adverse drug reaction, but contributes to medication regimen complexity, which in turn increases the risk of medication non-adherence.

While few studies have specifically addressed chronic disease management in hospital settings, related research suggests that medication changes are common and can have substantial negative consequences. In studies from academic medical centers, roughly half of inpatients were discharged with 5 or more changes to their home medication regimens,

Corresponding author: Michael Steinman, MD, San Francisco VA Medical Center Box 181G, 4150 Clement St, San Francisco, CA 94121, Tel: 415.221.4810 x3677, Fax: 415.750.6641, mike.steinman@ucsf.edu.

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representing modification of 50% or more of their pre-admission medications.<sup>1-2</sup> Medication changes are a major risk factor for adverse drug reactions, which affect approximately 10% of inpatients and up to 20% of patients within 30 days of discharge, and can negatively affect adherence.<sup>3-4</sup> Such problems are particularly acute for older patients, for whom multimorbidity and use of multiple medications increase the risk of medication-related problems.

Given the potential harms of changing longstanding medication regimens, why do inpatient clinicians adjust chronic medications that are not central to the patient's acute problem? We suspect a variety of factors are at play. First, these actions may arise from interpretive errors, wherein the inpatient physician incorrectly views a transient elevation in blood pressure or glucose as not meeting guideline standards, or as equivalent to the chronic elevations known to cause harms.<sup>5</sup> The inpatient clinician may not be aware of, or simply ignore, the patient's long-term success at disease control in the months and years prior to hospitalization. Second, the inpatient physician may treat an elevated parameter in response to (or to prevent) calls from consulting physicians or nurses, as can arise from nurse discomfort with abnormal vital signs and from the "call house officer if" orders typically seen in teaching hospitals. Third, the practice may be an attempt to 'tune up' the patient to assist colleagues, for example before handoff to another inpatient clinician or discharge to the outpatient clinic. A common thread underlying several of these reasons is a disconnect between inpatient clinicians and ambulatory practice. This disconnect can arise from inpatient clinicians' limited experience with ambulatory chronic disease management, poor access to the patient's outpatient health record or health system, and default to a hospital-centered approach where treatment is preferred to watchful waiting.

We believe that the best approach in most cases is for physicians to be reluctant to intensify long-term therapies in hospitalized patients. This approach will require a paradigm shift that better defines the role of the inpatient physician in chronic disease management. A central feature of this approach lies in determining whether acute control of chronic disease benefits the patient's near-term health. If the answer is yes, in most cases it is appropriate to intensify therapy. If the answer is no, in most cases it is best to leave the outpatient regimen untouched. For example, among patients admitted with acute coronary syndrome, close attention to blood pressure can help minimize acute end-organ damage, and is thus warranted. For a patient with pneumonia, tight blood pressure control in the hospital is unlikely to improve short-term outcomes and so is not indicated. In the case of diabetes, evidence supporting tight control of blood sugar outside of the ICU is weak at best. In many inpatient settings, intensifying glucose-lowering therapy may be more likely to induce harms from hypoglycemia than to improve outcomes by reducing hyperglycemia.<sup>6</sup>

These recommendations are particularly cogent for patients whose chronic disease has been well-controlled prior to admission. However, in most cases the same principles apply to patients with poor disease control at baseline. Many cases of suboptimal disease control in the outpatient setting reflect limited access to health care, prior adverse events when therapy was intensified, or medication non-adherence. In these settings, starting a new drug and sending the patient home with it will do little to improve long-term outcomes. In contrast, hospitalization can provide an excellent opportunity to address underlying barriers to long-

term disease control, for example by referral to primary care, involvement of social work services to address social and financial obstacles to care, or pharmacist teaching about proper medication use.

These actions are best done in coordination with the patient's outpatient clinician, if available, in what is truly a two-way communication. For example, a telephone or email exchange with the outpatient clinician might reveal extenuating circumstances in what might otherwise seem to be an obviously beneficial change to a patient's medication regimen. Conversely, a useful medication change initiated in the hospital may be more likely to persist long-term if the inpatient clinician explains his or her reasoning and obtains buy-in from the patient and outpatient clinician.<sup>7</sup>

Acute care and chronic disease can be a difficult fit, and can result in a mismatch between the care provided and the patient's long-term needs. A thoughtful approach to managing chronic diseases in the inpatient setting can better align inpatient and outpatient care to improve outcomes both immediately and far into the future.

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