# Editorial

# A Delicate Balance

## Physician Work Hours, Patient Safety, and Organizational Efficiency

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The Accreditation Council for Graduate Medical Education (ACGME) recognized the importance of housestaff in the provision of hospital care when it regulated housestaff duty hours to improve patient safety. ACGME intended to create a better balance between the management of resident fatigue and the continuity of patient care, but the shorter hours mandated by duty hour reform have created more frequent patient handoffs, which may interfere with the continuity of care.[1–4] Concern about handoffs and recent work examining how outcomes vary in accordance with organizational factors such as the level of staffing on weekends have bought renewed attention to the issues of the effect of organizational factors in care delivery on outcomes and the efficiency of patient care.[5,6] Two articles, one in *Circulation* and one in *Circulation: Heart Failure*, provide information about these concerns.

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**See *Circ Heart Fail*. 2008;1:50–57**

Schuberth and colleagues[7] studied 218 patients with acute heart failure who were admitted to the Nashville VA Medical Center during the 2 years ending in June 2005. They compared the length of stay for patients admitted to short call residents, who admitted patients during the day, handed off these patients to other residents, and left the hospital without spending the night, with the length of stay for patients admitted to long call residents, who admitted patients and spent the night in the hospital. Patients admitted to short-call residents stayed 1.3 days (44%) longer than those admitted to long-call residents. Death rates were not different between the 2 groups. Short-call patients received fewer diuretic doses and waited longer for the second dose of diuretics. There were, however, no differences in weight after 48 hours, and the differences in diuretic dosing were small, so the mechanism for the observed differences in length of stay remains unclear.

Fonarow and colleagues[8] studied 48 612 patients admitted during the 22 months ending in December 2004 to 259 hospitals participating in the Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with Heart Failure (OPTIMIZE-HF). They found that length of stay was shortest for patients admitted on Tuesdays (5.4 days) and longest for patients admitted on Fridays (5.9 days), and that day of admission did not affect patient death rates.

These results suggest that organizational factors affect the efficiency of hospital care but not the rate of patient deaths. These analyses were observational studies, however, and thus require closer scrutiny. Both studies used the day of the week to assign patients to comparison groups, which could be a problem if patients admitted on different days had different characteristics. The study by Schuberth et al[7] found no differences in the characteristics of short-call versus long-call patients, and data used in the study by Fonarow et al[8] indicated no differences in the characteristics of patients admitted on weekdays versus weekends. Unobserved differences in patient characteristics could bias the results, though the researchers did a careful job of collecting extensive clinical and demographic data on patients and there was no hint of any systematic differences in observable characteristics between groups. Unmeasured confounders other than patient characteristics might also affect the results, but it is not obvious what such factors might be. One possibility is that discharge planning might be more effective on weekdays because more staff are available, and the process of discharge planning might be different for patients admitted on short-call versus long-call or on different days of the week. Neither study provided information about discharge planning, and the results of both studies would be more compelling if we understood the mechanisms for the observed associations.

Both studies reported no differences in death rates, but sample sizes limit the meaning of those reports. For example, although the study by Fonarow et al[8] had a sample size of 48 612 patients, it was unable to detect a 52% increase in the odds of death comparing weekends with weekdays. The ability to detect clinically significant differences in process of care measures and complications (including death) is even less in the study by Schuberth et al,[7] given the sample size of 218 patients. Both studies also used in-hospital death as an outcome, which is a potential problem because patients who have longer lengths of stay have more opportunities to die in the hospital than do patients who have shorter lengths of stay,[9] although the study by Fonarow et al[8] did examine posthospital discharges in a subset of patients.

That said, these 2 articles remain important contributions that help us understand how the organization of care affects the efficiency and outcomes of care. For example, several

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other studies have found worse outcomes for patients admitted on weekends.[5,10–12] Although some studies have not shown this relationship, including some studies with narrow confidence intervals, it seems likely that the level and type of physician staffing does, in many cases, affect patient outcomes and the efficiency of care. A finding of no change in outcomes but a relative increase in length of stay among patients admitted to short-call residents or entering a weekend would suggest that we are trading off efficiency of patient care for better patient safety resulting from reduced fatigue among physicians and other staff, as well as the convenience of reduced staffing on the weekends. Findings of worse outcomes and longer lengths of stay at times with lower staffing levels would suggest we are trading off both efficiency and outcomes in exchange for reduced staffing. However, although there is certainly lots of room for improvement in patient safety,[13] we also need to recognize that the same individuals cannot continuously provide care without jeopardizing both their own safety and that of their patients.[14–16] Transitions of care and handoffs have always been a problem,[6] though this topic received relatively little attention until the duty hour rules came into play. Regardless of what system is used for scheduling either trainees or staff physicians, we need to figure out how to optimize transitions of care in ways that increase patient safety and preserve the ability of individuals to work hours that respect physiological realities regarding short- and long-term sleep deprivation[2] without introducing avoidable inefficiencies, because inefficiency adds to the already high cost of care. Ultimately, the optimal patterns of staffing should be determined on the basis of assessment of the relative cost effectiveness, and alternative models of staffing that recognize the high level of acuity of patients in hospitals and that reduce staffing at night or on weekends to a smaller degree may be more cost effective than approaches commonly used at present.

When you get right down to it, however, we don't know enough to be confident about what to do. Most studies have found that resident duty hour reform has not had much effect on patient deaths,[17–20] but those studies don't say much about the effect of duty hours on the process of care, on outcomes other than mortality, or on the educational experience of trainees. Although duty hour reform may have stimulated some innovation in models of physician staffing, it has also undoubtedly heightened existing stresses in the staffing of teaching hospitals at night and on weekends.

Understanding the relative cost effectiveness of different staffing models will be an important next step in determining which approaches to favor. We cannot confidently design a system that provides better patient safety without this information. Although there is some evidence about how different models of resident staffing, for example, shift work and mandatory naps, affect patient outcomes,[21,22] there have been no multisite randomized trials on the relative cost effectiveness of different models of physician staffing. Therefore, we know little about the value of staffing models using different mixes of physician assistants, nurse practitioners, residents, fellows, and attending physicians; different call and coverage schedules; or different work hour regulations. When it is not possible to conduct multisite randomized controlled trials, careful assessment using a mixture of single site studies, administrative data of large populations, and clinical registry data will help to answer these questions.

The studies by Schuberth et al[7] and Fonarow et al[8] are important steps forward, but they are just the beginning. The organization and financing of healthcare delivery greatly influence the effectiveness of the care received by millions of patients, and yet the volume of high-quality studies that have assessed these issues is far smaller than that of studies that have assessed the efficacy of specific treatments. We need more and better studies to understand how to optimally structure staffing within hospitals in ways that increase the likelihood (1) that patients receive high-quality care, (2) that staffing models are sustainable and consider the well-being of the workforce, (3) that residents are effectively trained, and (4) that the care we provide that meets objectives 1 to 3 is reasonably efficient and cost effective.

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## Disclosures

None.

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