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PERSPECTIVE

The Declining Demand for Hospital Care as a Rationale for Duty Hour Reform

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The regulation of duty hours of physicians in training remains among the most hotly debated subjects in medical education. Although recent duty hour reforms have been chiefly motivated by concerns about resident well-being and medical errors attributable to resident fatigue, the debate surrounding duty hour reform has infrequently involved discussion of one of the most important secular changes in hospital care that has affected nearly all developed countries over the last 3 decades: the declining demand for hospital care. For example, in 1980, we show that resident physicians in US teaching hospitals provided, on average, 1,302 inpatient days of care per resident physician compared to 593 inpatient days in 2011, a decline of 54 %. This decline in the demand for hospital care by residents provides an under-recognized economic rationale for reducing residency duty hours, a rationale based solely on supply and demand considerations. Work hour reductions and growing requirements for outpatient training can be seen as an appropriate response to the shrinking demand for hospital care across the health-care sector.

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The regulation of duty hours of physicians in training remains among the most hotly debated subjects in medical education in both the US and Europe.[1–3] In the US, the Accreditation Council for Graduate Medical Education (ACGME) instituted a series of national residency duty hour reforms in 2003 and 2011, establishing an 80-h work week, increasing attending supervision, and progressively limiting shift length for physicians in training. These reforms were chiefly motivated by rising concerns about medical errors attributable to resident fatigue, though they also took into account declines in resident well-being, safety, and learning secondary to long work hours.[4–6] Duty hour reforms in the U.S. have been mirrored by even more stringent work hour requirements for physicians in training in the European Union, as mandated by the EU-wide European Working Time Directive.[2]

Surprisingly, the debate surrounding duty hour reform has infrequently involved discussion of one of the most important secular changes in hospital care that has affected nearly all developed countries over the last 3 decades: the declining demand for hospital care and, by extension, the declining demand for inpatient services provided by physicians in training. Consider, for example, as late as 1980, patients with bacterial infections were routinely hospitalized for up to 2 weeks while intravenous antibiotics were administered. In 1982, outpatient parenteral antibiotics became available.[7] Today, hospitalized patients commonly receive intravenous antibiotics for only 2–3 days prior to being discharged with visiting nurse assistance. Similarly, patients hospitalized with myocardial infraction in 1980 had limited treatment options; care was mainly supportive and stays were prolonged. The ensuing decades introduced thrombolysis and percutaneous coronary intervention, advances that improved outcomes and decreased hospital length of stay (LOS). Today, patients with uncomplicated ST-segment elevation myocardial infarction may be discharged with as few as 2–3 days of hospitalization. These examples are by no means select; across diseases, hospitalization lengths have declined.

Figure 1 highlights these trends using data from approximately 400 major teaching hospitals surveyed by the American Hospital Association from 1980 to 2011. During this period, mean LOS declined dramatically from 9.4 days on average in 1980 to 6.0 days in 2011, a 36 % reduction. Although the annual number of hospital admissions to US teaching hospitals increased slightly during this period, the total number of inpatient days (defined as the product of annual hospitalizations and annual mean LOS) declined dramatically, primarily because of these large reductions in LOS. For example, total inpatient days declined from 57.5 million in 1980 to 45.1 million in 2011, a reduction of nearly 22 %. Across Europe, similar patterns emerge. For example, from 1986 to 2006, data from the World Health Organization demonstrate that the

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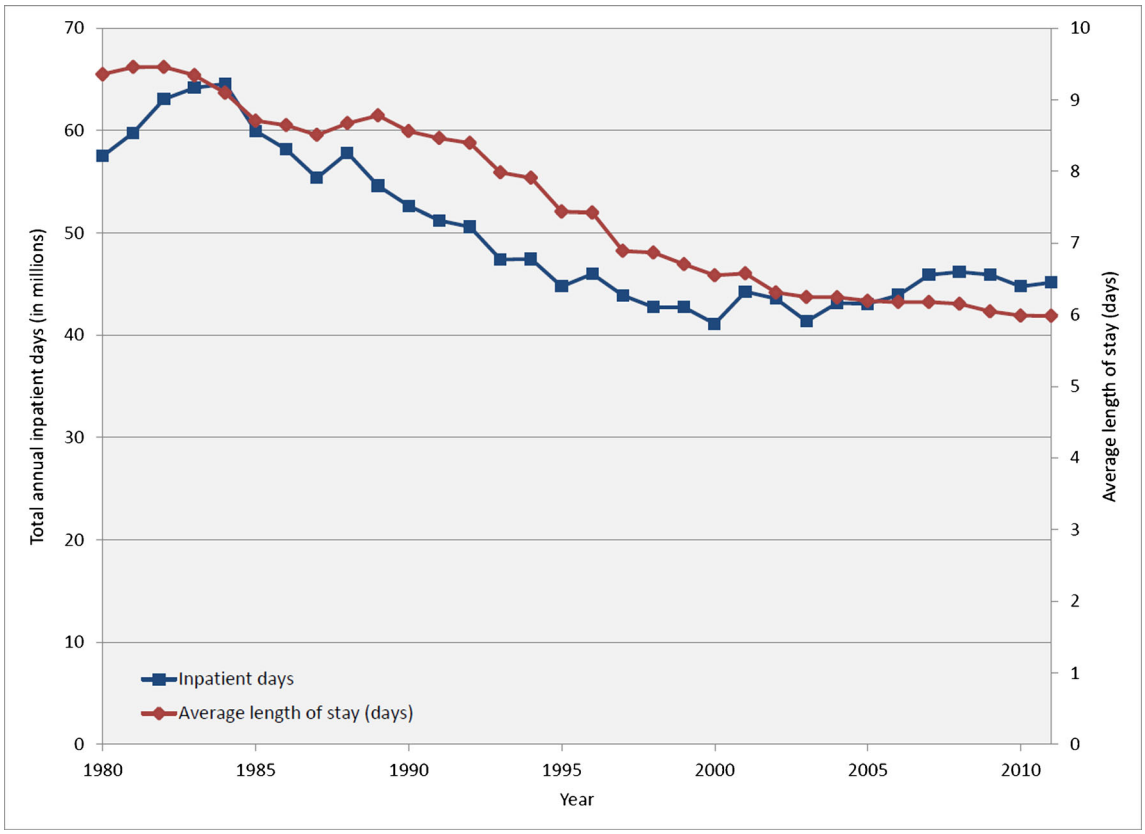

Figure 1. Trends in length of stay and total inpatient days in US teaching hospitals

average LOS in EU member states declined from 12 to 8 days, an approximately 33 % decline.[8] Meanwhile, the annual rate of hospital admissions declined slightly over this period as well, suggesting a large decline in the total number of inpatient days in Europe since the 1980s.

Figure 2 provides additional evidence of a decline in the demand for hospital care provided by resident physicians. The figure plots the annual number of hospitalizations as well as inpatient days in US teaching hospitals divided by the number of full time resident physicians employed by these hospitals in each year. In 1980, the demand for hospital care by resident physicians was greatest, with hospitals admitting an average of 139 patients per resident physician. By 2011, this number fell by nearly 40 % with hospitals admitting an average of 99 patients per resident. Dramatic declines in the total annual number of inpatient days per resident physician occurred during this period as well. For example, in 1980, resident physicians in US teaching hospitals provided, on average, 1,302 inpatient days of care per resident physician compared to 593 inpatient days in 2011, a decline of 54 %.

What are the take away lessons from this 30,000-ft view of hospital care by physicians in training? First, considerable declines in the demand for hospital care–as measured by the number of inpatient days in US teaching hospitals–provide an under-recognized economic rationale for reducing residency duty hours both in the US and Europe, a rationale based solely on supply and demand considerations. Fewer inpatient work hours and a shift towards greater outpatient exposure in residency training, as advocated by the ACGME, may be, in part, a natural byproduct of the large decline in inpatient days per resident physician. Put differently, work hour reductions and growing requirements for outpatient training can be seen as an appropriate response to the shrinking demand for hospital care across the health-care sector.

Second, though the decline in the number of inpatient days cared for by the typical resident suggests a declining inpatient workload, these reductions are likely partially offset by an increasing complexity and acuity of hospital care, a growing diversity of tasks performed by residents, and a greater burden of "non-educational" work performed by residents (e.g., transporting patients, making follow-up appointments, documentation). However, we feel that this countervailing trend is unlikely to fully mitigate the secular reduction in workload reflected by the number of inpatient days cared for by each resident physician. Indirect evidence of this claim is the growing portion of time residents spend documenting care, nearly 40 % in some studies.[9] Requirements to devote so much time towards this activity may be

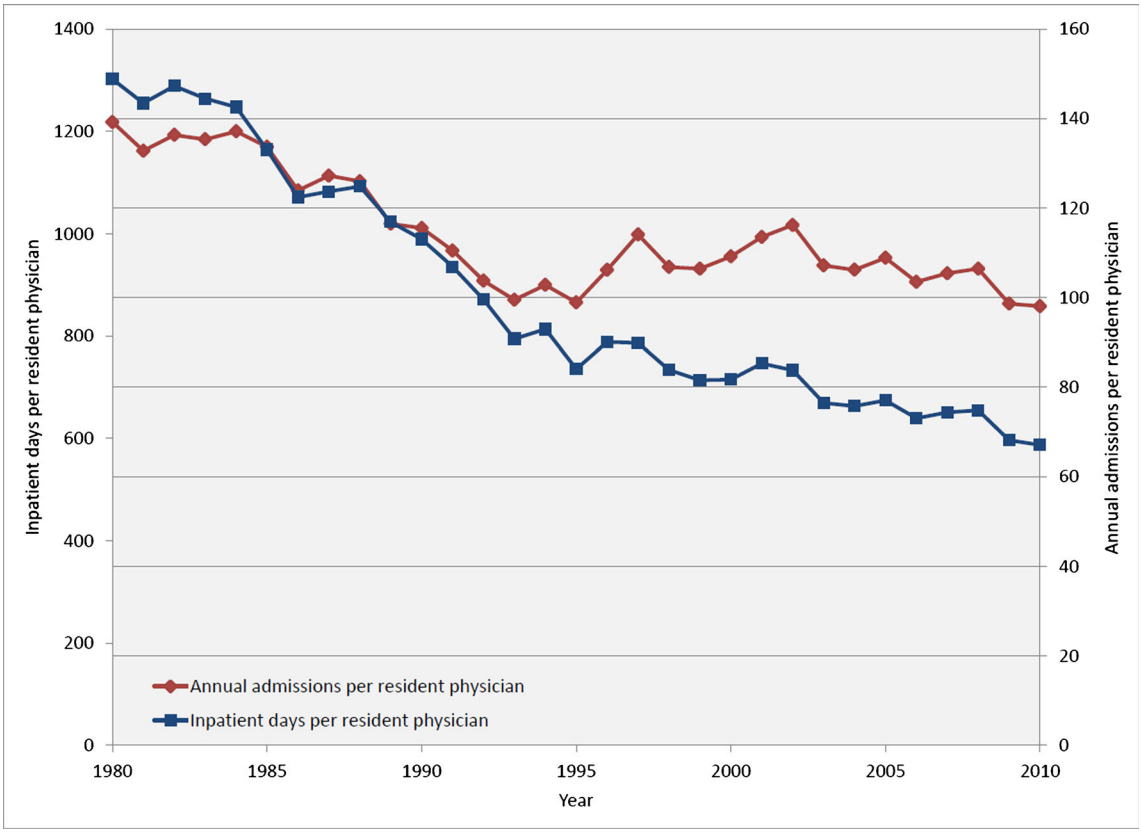

Figure 2. Trends in annual admissions and inpatient days per resident physician in US teaching hospitals

a product of an excess supply of work hours. This concept may seem counterintuitive, as the modern residency is oft faulted for work compression;[10] however, empirical data and subjective perceptions may rightly differ.

Third, studying trends in hospitalization forces us to revisit the fundamental question of medical education: what do we want residents to be doing? Residents should see patients, interpret data, advocate diagnostic tests and treatments, follow the course of illness, and study the evidence base for all of these activities. We want residents to participate in conferences, grand rounds, and informal discussions with master clinicians. We need residents to help the hospital function by coordinating the practical aspects of care, and we want them to accurately document patient care. In order to move towards this vision, we must have an accurate assessment of resident workload, and the nature resident work. While researchers have documented the latter,[9] the former remains understudied. Broad international trends provide observations that may initially be counterintuitive, but objective data must serve as the basis for educational reform.

As we continue to examine, study, and debate graduate medical education in both the US and Europe, it is essential to broaden the discussion to capture the fact that hospital care has changed in a myriad of ways in the last 3 decades, with a clear de-emphasis of inpatient care. Debates over work hour regulations must take place within the new medical landscape.

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