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ANALYSIS & COMMENTARY

More Patients, Less Payment: Increasing Hospital Efficiency In The Aftermath Of Health Reform

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ABSTRACT A major issue for the US health care system will be accommodating the needs of the estimated thirty-two million Americans who will gain insurance coverage under the Affordable Care Act by 2019. For hospitals, a traditional response to this increased demand might be to add resources, such as more staff and beds. We argue that such actions would be unaffordable and unnecessary. Research has demonstrated that large gains in efficiency can be made through streamlining patient flow and redesigning care processes. We argue that once managed efficiently, US hospitals, on average, could achieve at least an 80–90 percent bed occupancy rate—at least 15 percent higher than the current level—without adding beds at capital costs of approximately \$1 million per bed. This article outlines a plan for hospitals to accommodate more patients without increasing beds or staff, and for policy makers to require hospitals to make these changes or provide incentives for them to do so.

The Affordable Care Act is expected to add an estimated thirty-two million Americans to the health insurance rolls by 2019.¹ At the same time, changes in payment rates to providers, especially under Medicare, are expected to bring new pressure on hospitals' operating margins.² Provisions of the Affordable Care Act will limit Medicare hospital payment "updates"; impose financial penalties on hospitals that have an excessive number of avoidable readmissions; and launch experiments with bundled payments for care episodes covering inpatient, outpatient, and postacute services.³

At the same time that hospitals must try to do more with constrained payments, the health of large numbers of Americans is likely to worsen in coming years. For example, obesity is on the rise, bringing with it a higher disease burden and higher treatment costs.⁴ The evidence shows that obese Medicare beneficiaries cost more to care for than beneficiaries who are not obese, in large part because of a higher hospitalization rate that accompanies their higher disease burden.^{5,6}

The likely net effect of the law on US hospitals is that they will see a large influx of new patients who have health insurance, including many who are likely to be older and sicker than current patients. At the same time, hospitals may face greater financial pressure than ever before, including a need to bring their operating budgets in line with tightly limited Medicare, Medicaid, and possibly even private payment rates.⁷ In this time of financial uncertainty, hospitals may also have increasing difficulty borrowing money in the capital markets to finance additional expansion.⁸

The financial outlook, therefore, suggests that it will be difficult, if not impossible, for hospitals to add beds or to increase staffing to care for the influx of sick patients.⁹ Offsetting the pressure somewhat may be experiments with bundled payments, as well as penalties for avoidable readmissions, which are likely to pressure hospitals to reduce overall hospitalization rates.¹⁰

It is not clear at this point what the net effect on hospitalization will be from these different trends. However, if hospitals are forced to effec-

tively increase their capacity to care for patients, they will have little if any money for expansion. Thus, it is likely that US hospitals will need to become more efficient in order to lower costs and increase capacity to care for patients without adding beds or staff.

US policy makers, moreover, may have an interest both in reducing excess hospital capacity and in forestalling the creation of new capacity. Some research suggests that capacity drives unnecessary and inappropriate use of resources, including money.^{11,12}

We explore one approach—managing patient flow—that could enable hospitals to achieve these seemingly contradictory results of treating more genuinely sick patients with ever more constrained capacity.

Managing Patient Flow

Published research has shown that it is possible to increase the number of patients treated in hospitals without expanding capacity.¹³ A critical concept is “throughput.” In the language of health care, throughput means the number of patients who are served in a unit of time (week, month, year).¹⁴ Serving more patients may therefore be seen as the hospital equivalent of increasing throughput.

To illustrate this further, imagine a restaurant that has decided to increase its throughput. There are a limited number of ways in which the restaurant could proceed: serve customers faster with the existing staff (that is, make the cooks and waiters perform more efficiently); require that each customer eat faster (the restaurant equivalent of reducing the duration of service); install more tables to serve more customers; increase table occupancy (increasing the efficient use of the current capacity); hire more cooks to cook more food; or hire more waiters to serve more customers.

Similarly, there are various ways in which hospitals could increase patient throughput.

REDUCE PATIENT LENGTH-OF-STAY For nearly three decades there have been attempts to reduce the length of hospital stays.^{15,16} The average length-of-stay for Medicare patients with heart failure, for example, declined from 8.81 days in 1993 to 6.63 in 2006.¹⁷ Although length-of-stay could be reduced further, it is hard to imagine much more progress toward that goal. Length-of-stay levels are already low,¹⁷ and the forthcoming efforts under the Affordable Care Act to reduce avoidable hospital readmissions seem likely to extend initial hospital stays.

EXPAND CAPACITY Hospitals’ capacity can be expanded by adding new beds to meet incremental patient demand. Each additional hospital bed

requires approximately \$1 million in capital costs¹³ and more than \$250,000 per bed annually for operating costs.¹⁸ Even if one assumed that the nation was willing to spend billions of dollars to increase bed capacity, it would probably not be feasible to do so in a relatively short period of time. What’s more, research shows that although areas of the country that have increased bed resources are providing more bed days and procedures, the higher costs associated with these increases do not always lead to better health or outcomes.¹⁹ In the final analysis, in an era of constrained payments, it seems likely that hospital capacity will not be expanded but, to the contrary, will be allowed to shrink.

EXPAND STAFF Staff can be expanded, specifically by adding more nurses. Efforts are under way as a consequence of the Affordable Care Act to increase the nurse workforce.²⁰ Here again, pressures on hospital payments and operating margins make it unlikely that hospitals will dramatically increase their payrolls.

INCREASE BED OCCUPANCY The most likely outcome is that hospitals will rely on the same number of beds, and probably the same or a similar number of staff, to serve more patients. Simply put, the current system of using hospital capacity is not as efficient as it could be. The average bed occupancy rate for American hospitals is 65–67 percent—the lowest among all industrialized countries, according to the American Hospital Association and the Organization for Economic Cooperation and Development (Exhibit 1).²¹

Bed Occupancy: A Closer Look

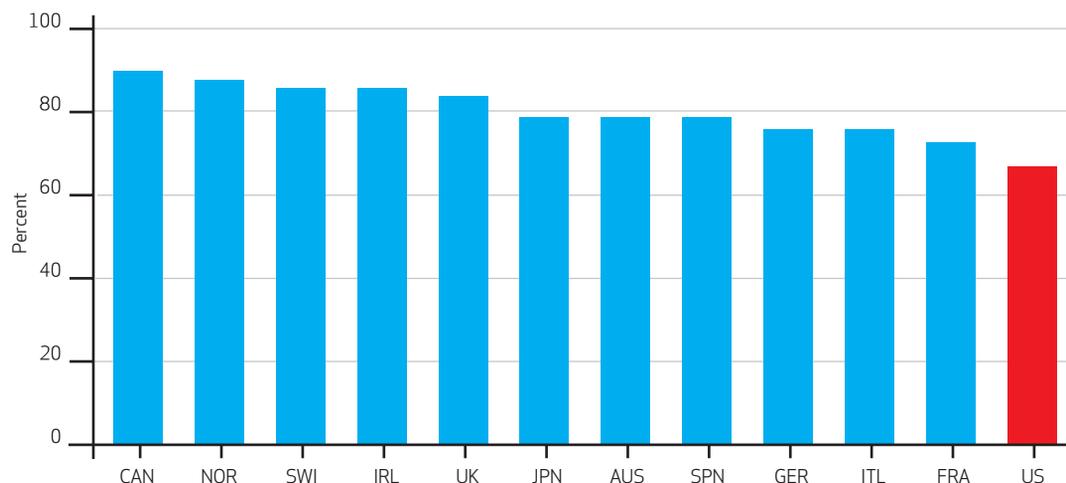
Why is hospital bed occupancy just 65 percent and not 100 percent? Why are hospitals frequently overcrowded if occupancy rates are so low? The source of this counterintuitive effect is the presence of periodic swings—artificial peaks and valleys—in hospital bed occupancy, caused by peaks and valleys in elective or scheduled admissions.²²

For example, one of the first published studies on this topic examined how these various peaks and valleys occurred at a large, urban children’s hospital.²³ This year-long study focused on the hospital’s eighteen-bed medical-surgical intensive care unit. The study’s main finding was that the presumably controllable flow of patients scheduled to come in for elective procedures was in fact more variable from day to day and week to week than the unpredictable flow of patients being admitted as a result of emergencies.

Because of these ebbs and flows of patients, the intensive care unit was frequently filled, and patients who genuinely needed to be in the intensive care unit were denied access and were

EXHIBIT 1

Acute Care Bed Occupancy In 12 Organization For Economic Cooperation And Development (OECD) Countries, 2005



SOURCE OECD Health Data 2005. Adapted from Green Vaswani S. Presentation at Institute of Medicine workshop, The Healthcare Imperative: Lowering Costs and Improving Outcomes. Washington, D.C. 2009 Jul 17.

placed instead in other hospital units, where the level of care was suboptimal for their needs. To accommodate the peaks in demand created by elective admissions, hospitals would have to add more beds to the intensive care unit. The alternative to this costly and unnecessary expansion is revising the surgical schedule to prevent these peaks in admission.¹⁸

Several studies have shown that these hospital admission peaks and valleys have important damaging effects on the quality of care and patient safety and that they create an excessive workload for nurses.¹⁸ When beds on the floors were full, patients who came in through the emergency department could not be admitted in a timely way. As a result, backups occurred in the emergency department, and many patients were “boarded” in hallways.²⁴ On other days, when the physicians had scheduled no or few elective patients, there were no backups in the emergency department, but the staff was underused.

In other words, when these peaks and valleys occur, one or more things happen. As bed occupancy approaches 100 percent and backups occur in hospital emergency departments, for example, ambulances may be diverted to other hospitals.²⁴ Stress on hospital personnel may increase, resulting in more medical errors.^{25,26} In contrast, in the case of care valleys, where there are relatively few patients to be treated or housed, hospital resources are in effect wasted. The hospital plant is operating, and the hospital may be fully staffed, but these resources are not generating any revenue or providing any value

for the nonexistent patients.²⁷

An alternative to the multiple peaks and valleys would be optimizing bed capacity, or “smoothing out” the peaks and valleys. This would make it possible to provide care to additional patients without adding more beds or more nurses. Central to optimizing capacity is reducing and managing the variable flow of patients through a hospital. Proper management can dramatically improve hospital throughput and, by extension, the quality of care provided.^{18,22} We argue that once managed efficiently, US hospitals, on average, could achieve an 80–90 percent bed occupancy rate—at least 15 percent higher than the current level—without adding beds at capital costs of approximately \$1 million per bed.¹⁸

Examples Of Managing Patient Flow

To illustrate managing patient flow, we offer an example of what could be done in the case of a hospital in which elective surgeries were being bunched together and performed on just a few days per week.²² This type of bunching, or inefficient patient flow, stems from the fact that hospitals have traditionally evolved around individual medical or surgical specialties as well as the preferences of particular doctors. For example, a given hospital may derive much of its revenue from cardiothoracic surgery and therefore may be deferential to its cardiac surgeons, who may wish to perform surgery only on certain days of the week. On these peak surgical days, then, when large numbers of elective surgical patients

compete for beds with emergency patients, unnecessary overcrowding may be the result.

CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER At Cincinnati Children's Hospital Medical Center, for example, as in most other hospitals, surgeons typically scheduled elective surgeries unevenly on different weekdays. Interventions based on variability methodology¹⁸ aimed to smooth the flow of patients, and these surgeries were spread out over days. As a result of this and other interventions (for example, streamlining the discharge process), surgical volume at this facility rose 7 percent annually for at least two years, with no increase in staff. The hospital anticipates generating more than \$137 million annually in additional revenue as a result of the higher patient throughput. It realized additional savings of \$100 million in avoided capital costs from not having to expand capacity and by being able to treat more children over time with the same staff.^{28,29}

Overall, as a result of these interventions, the hospital's quality of care improved even as the occupancy rate grew from 76 percent to 91 percent.³⁰ Doctors and nurses were able to focus on more patients in less time, and the staff benefited from having more regular schedules. Hospital officials say that the changes have improved overall safety for patients by reducing stress on the doctors and nurses who treat them.²⁸

PALMETTO RICHLAND HOSPITAL An additional example comes from Palmetto Richland Hospital, in South Carolina, which has greatly improved patient flow and generated substantial efficiencies. Faced with the problem of variable patient admissions, the hospital streamlined its patient flow by performing scheduled and emergent surgeries in different operating rooms. In less than one year, Palmetto experienced a 3 percent increase in surgical volume and a 38 percent decrease in weekday waiting times for nonelective surgeries. Anticipated efficiencies could add \$8 million to its annual margin while improving services to patients.¹⁸

BOSTON MEDICAL CENTER By applying the same methodology, Boston Medical Center, a large, academic safety-net hospital in Massachusetts, reduced its number of postponed or canceled surgeries by 99.5 percent.³¹

IMPACT ON US HOSPITALS If, through improved patient flow, America's 5,700 hospitals achieved only 10 percent of the financial improvement that Cincinnati Children's Hospital Medical Center achieved, there would be \$57 billion just in avoided capital costs associated with building

new facilities. Assuming that the uninsured population is distributed geographically similarly to the insured population and that the rate of hospitalizations per 100,000 lives for the uninsured is similar to that of the insured, we estimate that the increase in average hospital bed occupancy from 65 percent to more than 80 percent¹⁸—in other words, a more than fifteen-percentage-point increase in capacity—would be sufficient to provide hospital care for forty million Americans who currently lack health insurance.

Simultaneously, hospitals would benefit from reduced or eliminated emergency department overcrowding and ambulance diversions; reduced patient waiting time for services; reduced nursing stresses and shortages; reduced patient mortality,¹⁸ and improved quality and lower cost through optimal patient placement.³²

Policy Steps That Can Be Taken

How could federal and state policy makers provide the appropriate incentives to US hospitals to take these steps to increase throughput and overall efficiency?

REGULATION One option would be federal regulation that required hospitals to make these changes. One way to do this is through the payment system (such as through payment bundles), which effectively forces health care providers to operate within a budget. They will conclude that they have no choice but to improve efficiency.

ACCREDITATION Hospitals could be required to increase throughput or to maintain an average census of no less than 80 percent as a condition of achieving certification by the Joint Commission. These goals could be achieved either by serving unsatisfied patient demand or by downsizing hospital capacity if such demand does not exist. Such requirements could be phased in to allow hospitals time to adjust.

TECHNICAL ASSISTANCE At the same time, there is a need to create a counseling body that would provide hospitals with the necessary technical expertise in operations management and data analysis to achieve the above goals. At present, hospitals are largely unfamiliar with these methodologies.

With improved efficiency in US hospitals, we can accommodate increased patient demand likely to result from expanded health insurance coverage, while also reducing staff stress, lowering rates of medical error, and making hospitals safer for the patients they treat. ■

\$ **57** billion

In Avoided Capital Costs

If US hospitals achieved only 10 percent of the financial improvement of Cincinnati Children's Hospital Medical Center, there would be \$57 billion in avoided capital costs alone.

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NOTES

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