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# **Introduction and Executive Summary**

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Hospital length of stay (LOS) varies markedly and persistently across geographic areas in the United States. This phenomenon is the most striking of all the variations in health service use that have been observed. For example, since 1965 the Northeast census region has maintained an average LOS that is about 2½ days longer than that of the West (130). In 1979, Medicare average LOS varied from a high of 13.1 days in one New Jersey Professional Standards Review Organization (PSRO) area to a low of 6.0 in a California PSRO area (74).

Policymakers have been tempted to conclude that it is the longer lengths of stay that are inappropriate and should be curtailed. The potential

economic significance of these variations is large, and this fact has not escaped the attention of those charged with the administration of public health care programs such as Medicare and Medicaid. If all four census regions had experienced the West's age-specific lengths of stay in their own hospitalized populations in 1980, patients in regions outside the West would have spent some 44.3 million fewer days in the hospital, a saving of 16 percent (129). Patients 65 years of age and over would have spent 20.6 million fewer days, a reduction of 20 percent. Of the remaining three census regions, the Northeast accounted for 42 percent of the "excess" days, the Northcentral for 36 percent, and the South for 22 percent.

## BACKGROUND

As the search for solutions to rising health care costs has intensified over the past few years in both the public and private sectors, the implications of geographic variations in LOS have assumed greater importance. Concern over the costs of the Medicare program has led policymakers and researchers to examine the underlying reasons for the variations with the hope of cost containment. Yet before determining whether variation in LOS can provide the basis for policies to contain Medicare costs, several key questions must be addressed. First, are the LOS differences simply the result of differences in demographic characteristics or severity of illnesses among the different populations? Second, if the populations are comparable, what do physicians do differently that leads to different lengths of stay? Finally, and perhaps most important, do the differences in LOS lead to differences in patient health outcomes?

As background to its deliberations over Medicare costs, the Senate Finance Committee's Subcommittee on Health requested that OTA examine the evidence on variations in lengths of hospital stay and their relation to health outcomes. This

case study presents the results of this examination. It was prepared as part of OTA's project on *Medical Technology and Costs of the Medicare Program*. The entire project is being conducted in response to requests by the House Committee on Energy and Commerce and its Subcommittee on Health, and the Subcommittee on Health of the Senate Committee on Finance.

On April 20, 1983, Public Law 98-21 provided for extensive changes in Medicare reimbursement policies for hospital-based care. Under the statute, whose provisions will be phased in over 3 years, hospitals will receive a flat fee per patient, set prospectively, on the basis of patient diagnosis in one or more of 467 Diagnosis Related Groups (DRGs). \* Because the payment for any DRG will not increase as an individual patient's LOS increases, answers to the questions raised above are even more critical.

\*A recent technical memorandum by OTA entitled *Diagnosis Related Groups (DRGs) and the Medicare Program: Implications for Medical Technology* examines the incentives for medical technology adoption and use, for hospital admissions, and for increasing or decreasing length of hospital stay under the new payment system.

## ORGANIZATION AND BOUNDARIES OF THE CASE STUDY

The case study continues in chapter 2 by reviewing and analyzing what is known about geographic variations in hospital LOS in the United States, including a review of the magnitude of these differences and their trends over time. Chapter 2 also discusses how these variations are affected by population differences and reviews how various researchers have tried to explain them. Chapters 3 through 6 and appendixes A and B take a different approach. Each of these sections analyzes the medical literature relating to a specific clinical condition, attempting to ascertain whether research has established in a scientifically rigorous fashion that a particular LOS produces the best health outcome for that condition. Such an optimal LOS could serve as a standard against which geographic differences could be evaluated. Chapter 7 summarizes the findings across clinical areas and discusses future research needs and the policy implications of these geographic LOS variations for the Medicare and Medicaid programs.

This case study is specifically concerned with the relationship between hospital LOS and health outcome. Several important, related areas are not exhaustively reviewed. A comprehensive study of the cost implications of LOS variations and different methods of reducing LOS is beyond the scope of this study. Cost or charge data are discussed if they are part of studies that assessed outcome. But no attempt is made to measure directly how much various scenarios of LOS reduction might be worth. This is a complex question. Some of the problems one encounters in trying to address it have recently been reviewed (93).

A brief review of the relationship between LOS and health care costs may illustrate some of these complexities. Most hospital admissions incur greater costs at the beginning of a stay than toward the end when patients are nearing discharge and no longer require the intensity of diagnostic and therapeutic measures employed at the outset of their illnesses. If LOS is shortened by decreasing days at the end of a stay, the cost saving may be small. In fact, it may even be close to zero. At the end of a stay, most of the services consumed by patients represent fixed costs to the hospital: housekeeping, dietary, and laundry.

Minimal nursing or ancillary service are provided. If LOS decreases, these fixed costs are still incurred by the hospital and must simply be distributed over a smaller number of patient days, thus increasing the average per diem room and board charge. In addition, if patients leave the hospital earlier, they may incur outpatient costs that they would not otherwise have. They may see their physicians more frequently or obtain more intensive home care. These factors too would reduce any savings realized as a result of early discharge. Further, if patients are discharged too early from a medical point of view, they may deteriorate at home and require readmission to the hospital, thus increasing total costs.

Another set of issues arises when one considers the likely effects of decreasing LOS for some patients on the rest of the hospital. If LOS were decreased for some patients, others might fill their beds, thus negating all or part of any savings that might be realized by the group that experienced fewer hospital days. For example, patients leaving early might be replaced by patients awaiting beds for elective surgery, thus reducing waiting time for these procedures. Since elective surgery patients will be likely to use more services per day on average than those discharged early would have had they stayed, total health care costs might easily rise, despite a reduction in LOS.

On the other hand, a decrease in LOS might lead to decreased occupancy without a rise in other admissions. Persistently low occupancy rates might cause some hospitals to close entirely or to convert wings to other, less expensive uses, such as long-term care. In this latter scenario, considerable cost savings might accrue. It is thus impossible to predict the effect on society's health care costs of decreasing LOS. The effect will depend ultimately on precisely how LOS is reduced, what the other relevant characteristics of the local health care market are, and whether any incentives have been established to facilitate the conversion of acute hospital beds to other uses.

Another important issue beyond the province of this case study is a full discussion of the most

appropriate place for various kinds of medical treatment. What sorts of procedures should be done in physicians' offices? Which kinds of patients must be treated in hospitals, and which could be managed safely as outpatients? These questions are important ones, with important economic implications of their own, but equally outside the realm of the present study. This decision rule also excludes clinical areas such as the treatment of drug addiction. This area has seen many studies, including some randomized clinical trials (RCTs), on the most effective LOS (37,97,134, 175). Because treatment of this kind ordinarily takes place outside the acute care hospital, it is outside the scope of this case study.

Each of the selected clinical areas was chosen because of the existence of at least one meth-

odologically sound RCT that attempted to test the effect of changes in LOS on health outcomes. Each of these clinical areas is reviewed in depth. Some studies have assessed the effect of various modifications in medical practice and included measures of LOS in the assessment (38,85,105,146). Studies of this type have not been systematically sought. Each of the clinical studies reviewed here focused on the problem of the effect of changes in LOS on health. Evaluations of the efficacy of specific forms of medical technology or treatment are not within the purview of the present study. This review does, however, intensively analyze each clinical area in which researchers have sought to change LOS and to measure the effects of such a change on health.

## EXECUTIVE SUMMARY

Eastern hospitals exhibit lengths of stay that are about 40 percent higher than western hospitals. These differences have remained remarkably consistent over the past 15 years. They are unexplained by differences among regions in age, sex, or race distributions. Current research has also been unable to demonstrate that differences in severity of illness across regions explain any of the variations. This possibility must remain at least somewhat open, however, since there has been little research at the most detailed clinical level to find subtle, but clinically important differences in case mix among regions within specific disease categories. Available evidence suggests that physicians in different regions treat patients with the same illnesses differently with respect to LOS.

As mentioned earlier, the potential economic significance of these LOS differences is very large. If all patients 65 years of age and older had experienced the West's LOS in 1980, those hospitalized in regions outside the West would have spent 21 million fewer days in the hospital, thus reducing total days in the hospital for this age group by 20 percent. How much of the potential savings could actually be realized depends entirely on how LOS is reduced, whether admission rates rise in compensation, and whether hospitals

remove acute care beds from service in response to decreased occupancy. There is almost no research in this area.

Before designing new programs to reduce LOS, however, one must ask whether these regional differences in LOS are associated with differences in health outcomes. Are patients in the East harmed because they stay in the hospital longer than their western counterparts? Or are patients in the West suffering because they leave the hospital too early? Either, both, or neither of these possibilities may be true.

A great deal of research has addressed the association of LOS with factors such as hospital ownership, area hospital bed supply, teaching status, occupancy rate, and other hospital characteristics with varying results. Very little research has been done on the relationship between regional LOS differences and health outcomes. Very little attention has been devoted to ascertaining precisely how physicians manage the same kinds of illnesses in different regions of the country, trying to explain regional LOS differences by finding differences in physician practices.

This case study attempted to find data in the medical research literature clearly establishing a particular LOS for specific illnesses that produces

the best health outcome. Regions above the standard could be judged as having lengths of stay that were too long. Those below the standard could be judged too short.

Studies with scientifically sound methods were found in five clinical areas: acute myocardial infarction, elective surgery, low risk newborn deliveries, low birth weight infants, and psychiatric hospitalization. Studies in the first four areas uniformly concluded that shorter lengths of stay had no different outcomes from the more traditional, longer lengths of stay. None of the studies was large enough to rule out statistically the possibility that early discharge causes a small, but significant negative health impact. Many of the studies excluded the elderly. In the area of psychiatric hospitalization, the evidence is

stronger that patients hospitalized initially for shorter periods do better than patients kept longer. Even in this area, however, the studies each assessed different patient groups and employed widely varying definitions of early (11 to 86 days) and late (24 to 179 days) discharge. Thus, the medical literature failed to establish clear LOS standards for any clinical condition.

Because the economic benefit of decreasing LOS to western levels is unclear and because the possibility of such a program having a negative health impact has not been excluded, the case for eastern lengths of stay is not definitive. Further research will be necessary to establish the relationship between length of hospital stay and health outcomes. The potential value of such research is very high.