Computers in Medicine: Hospitals Cope with Costs, Quality Review

The hospital industry has experienced double-digit inflation lately, but few people who run these institutions have much understanding of how these increases occur. "Hospitals aren't like businesses," confesses one hospital administrator. "We don't know in detail what is going on in the wards and laboratories."

Inflation and rising concern over costs by the third-party payers—the private insurance companies and the state and federal governments—have prompted increasing numbers of hospitals to look closely at their financial and medical record-keeping to see in detail what is going on. The central problem for the future in medical care, in the view of some analysts and hospital administrators, will be to make hospital operations as efficient and cost-effective as possible.

Toward this end, two of the nation's leading teaching hospitals, the Yale–New Haven Hospital, and the Society of the New York Hospital, each of which treat about 34,000 inpatients a year, have constructed computer analyses of their operations to find out, for the first time, who is admitted, how many cases of each illness are treated, how often certain services are used, and what a given illness costs.

Economies of Scale

Among the major findings of the studies is the discovery that a hospital is not so different from a business in the sense that it can experience some economies of scale. The New York Hospital (NYH) learned that, as it treated more and more cases of any particular diagnosis, the hospital seemed to become more efficient in providing the treatment, and the cost per case dropped dramatically. In 1972, for example, the NYH treated eight cases of a certain kind of gastrointestinal cancer, each costing, on the average, $9171. However, in 1973, it treated 25 such cases, and the cost per case dropped to $4660 on the average.

The finding strongly supports an idea, current in medical planning, that hospitals can be most efficient if they specialize in treating only certain kinds of diseases. It also supports a traditional contention of teaching hospitals —that they are costlier than most other hospitals because, as referral centers for difficult and rare cases, they treat small numbers of a wide range of illnesses.

Not only do these results have general application, but the computer programs themselves, which the two hospitals are using, could be adapted for use elsewhere. "I think every hospital is going to have to be doing this. We're certainly going to be asked increasingly to justify the costs and justify what we're doing," says the Director of the NYH David D. Thompson.

The programs have two specific uses, one of which is planning and budgeting hospital resources and supplying information to third-party payers who reimburse hospitals for most of their costs. A second major use, now implemented at the Yale–New Haven Hospital, is in utilization review, which is a case-by-case review by a hospital of the services it has provided to patients. Utilization review, one form of which is called a medical audit, is required of all hospitals seeking accreditation and is a condition for some federal reimbursements. Most hospitals fill the requirements by appointing an internal committee of doctors to thumb through medical records or by subscribing to an outside data processing service.

The more advanced of the two programs—that at Yale–New Haven Hospital—began 5 years ago. It grew out of the work of a group of university researchers at what is now called the Center for the Study of Health Services, part of Yale's Institution for Social and Policy Studies, who used records from a number of hospitals to develop a diagnostic classification system that could apply to inpatients at several area hospitals. The classification system includes the patients' ages and sexes, as well as variables that are crucial to cost, such as the length of patients' stays, and the major services received, such as surgery.

The basic tool used in the study, which could be applied elsewhere, is a set of computer programs, Autogrp, which clusters individual medical records according to the Yale classification system, which has roughly 400 different categories, each with several subcategories. To this program, the hospital added its billing records, enabling the computer to say, on the average, what each diagnosis cost.

Today, the Yale–New Haven Hospital uses all these data in the work of its Patient Care Studies Committee, which includes representatives of all departments and services in the hospital. The committee has a sweeping mandate to conduct utilization review and medical audits, and to study other aspects of the hospital's activity. Aiding the committee is the Patient Care Studies Department (PCSD), which is headed up by one of the original university researchers.

Another important use of these data began in January, when the department started to feed records of current patients at the hospital into the computer program. "We put every patient in on the day of his admission," explains hospital Assistant Director Carl R. Fischer. "We put in his diagnosis. Then we use the retrospective diagnoses to say how long the patient should stay. Daily, the computer prints out a review list. 'Mr. X should be reviewed today.' " Then, he says, a nurse from the PCSD goes out on the ward to find out what has happened to the patient, whether there has been a new diagnosis, what treatment has been ordered, and when the patient will be discharged. At most hospitals doctors are rarely, if ever, questioned about current cases, especially about the length of time their patients are remaining in the hospital —a subject that has been a focus of the reviews conducted since January at Yale–New Haven.

When the NYH adopted the Yale classification system approximately a year ago, it had a different aim. Director Thompson says he wanted to test the long-held contention of teaching hospitals that they cost more because the kinds of cases they treat, that is, the patient mix, vary from year to year.

As at Yale, nonphysicians were put in charge of the job; a management consulting firm, Jones Health Systems Management, Inc., was employed to

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perform the data processing work. Richard A. Berman, an associate director of the hospital, who was previously an analyst for the Cost of Living Council, was given the main staff responsibility at the hospital.

According to Thompson, the resulting analysis proved that patient mix varied from year to year sufficiently to affect hospital costs.

But the more striking finding was that costs decreased dramatically as the number of cases of a specific diagnosis rose. As a final report said: "As physicians and hospital personnel improve their knowledge of certain illnesses and perfect their treatment procedures, it requires fewer hospital resources (as measured by gross charges) to treat the patient." In other words, teaching hospitals that get only a few cases of many kinds of illnesses are bound to consume more resources. Conversely, as a hospital standardizes its treatment of a particular illness, it often learns how to use fewer resources for such treatment.

Between 1972 and 1973, for diagnoses where the hospital treated fewer than four cases, the average charges rose in 52 percent of such cases. In contrast, when the hospital treated a large number of cases of a given kind, average charges dropped. Between 1972 and 1973, for example, the average charges dropped in 83 percent of diagnostic categories of which the hospital treated 100 or more cases.

But the specific examples of such drops in gross charges are of interest as well, all the more so in view of the fact that 1972 and 1973, the years for which the data were compiled, saw cost inflation in the health industry despite government controls. One diagnostic category, fibromyoma of the uterus with complications which involved hysterectomy, cost on the average $3382 in 1972 when NYH treated two such cases. In 1973, however, the NYH treated 95 of these cases, and the average charge per case dropped to $2015. One of the doctors at the hospital expressed little surprise at these results. "At the startup of open heart surgery we did a lot of dumb things. You learn by doing. And now, the price of open heart surgery has come down," the doctor said. So far, there have been no detailed explanations of why the drops in charges took place, since the data has only been available

to the staff for a short time and specific cases have not been investigated.

So far, the hospital has used the data in generating patient mix analysis reports and in the planning and budgeting process. Some of the findings have been presented to doctors, but the incorporation of the new analytic tool into the ongoing medical audit and the utilization review activities in the hospital are still in the planning stages.

Costs and Medical Tradition

One staffer whose background, like that of many others who are making these studies, is in management and economic analysis says that the movement to make doctors aware of costs flies in the face of a long-standing medical tradition. "The tradition is to separate these things [cost and medical care]. You don't want to burden the patient and the doctor with making economic decisions where life and health are at stake. If you asked them, most doctors wouldn't know what, for example, the tests they prescribe cost."

Critics of the nation's hospital system have contended that it contains an untold amount of waste and inefficiency, and that probably tough federal regulation will be the ultimate solution to this problem. The studies at Yale–New Haven Hospital and at NYH, for all their interesting results, have yet to uncover evidence of this waste, such as surgery that wasn't needed or beds that were wasted by unduly prolonged patient stays. Indeed, the emphasis on self-comparison in these studies bothers one medical reformer who is with a prominent firm specializing in health care analysis. "The problem is that these studies are comparative. You're drawing a comparison with what is already being done, which doesn't say anything about whether you're doing it the way you should in the first place." But, although they are not as yet addressing these questions, the staffs at these two hospitals are taking steps toward the related problem—which is whether U.S. hospitals can regulate themselves, their practices, and their costs, instead of having someone else do it for them.—DEBORAH SHAPLEY

Erratum: In Fig. 1 of "Mineral resources, economic growth, and world population" by D. B. Brooks and P. W. Andrews (page 14, 5 July 1974), the price for tungsten refers to short ton units of concentrate and that for manganese to long ton units of concentrate.

Erratum: In "Products and Materials" (page 280, 24 January 1975), the description of the PM 6 line of spectrophotometers from Carl Zeiss refers to deuterium and hydrogen light sources. The sentence should have read, "All models feature two light sources, deuterium and halogen. . . ."