

---

## Hospital Cost Control in Norway: A Decade's Experience with Prospective Payment

THOMAS S. CRANE, JD, MHSA

Dr. Crane is an attorney with the Department of Health and Human Services, Office of General Counsel, Inspector General Division. The article is based on a paper presented at the 111th Annual Meeting of the American Public Health Association, November 15, 1983, Dallas, TX.

Ole Hovind, MD, Director of the Hospital Bureau, Royal Norwegian Ministry of Social Affairs, provided and arranged for extensive interviews and provided detailed financial data to Dr. Crane. Herbert Semmel, Professor and Co-Director of the Center for Law and Health, Cardozo School of Law, New York City, and Louanne Kennedy, Associate Professor, Department of Health Care Administration, Baruch College and Mount Sinai School of Medicine, City University of New York, made critical suggestions on an earlier draft.

Tearsheet requests to Thomas S. Crane, JD, MHSA, Rm. 5541, HHS Bldg., 330 Independence Ave. SW, Washington, DC, 20201.

### Synopsis .....

*Under Norway's prospective payment system, which was in existence from 1972 to 1980, hospital costs increased 15.8 percent annually, compared with 15.3 percent in the United States. In 1980 the Norwegian national government started paying for all institutional services according to a population-based, morbidity-adjusted formula.*

*Norway's prospective payment system provides important insights into problems of controlling hospital costs despite significant differences, including ownership of medical facilities and payment and spending as a percent of GNP. Yet striking similarities exist. Annual real growth in health expenditures from 1972 to 1980 in Norway was 2.2 percent, compared with 2.4 percent in the United States. In both countries, public demands for cost control were accompanied by demands for more services. And problems of geographic dispersion of new technology and distribution of resources were similar.*

*Norway's experience in the 1970s demonstrates that prospective payment is no panacea. The annual budget process created disincentives to hospitals to control costs. But Norway's changes in 1980 to a population-based methodology suggest a useful approach to achieve a more equitable distribution of resources. This method of payment provides incentives to control variations in both admissions and cost per case.*

*In contrast, the Medicare approach based on Diagnostic Related Groups (DRGs) is limited, and it does not affect variations in admissions and capital costs. Population-based methodologies can be used in adjusting DRG rates to control both problems. In addition, the DRG system only applies to Medicare payments; the Norwegian experience demonstrates that this system may result in significant shifting of costs onto other payors.*

---

**O**N JANUARY 1, 1980, MAJOR HOSPITAL reimbursement reform legislation took effect in Norway (1). The national government ended its direct payments for institutional health care services in a country where virtually all of the institutions are county-owned. The old prospective budget approval process was replaced with a lump sum payment to the counties that is computed by employing a morbidity-adjusted, population-based formula. The county governments are now totally free to distribute these resources among their respective health care institutions.

In the United States major reforms, prospective payments to hospitals, are taking place under State rate-setting programs (2,3) and in the 1983 changes in Medicare legislation (4). Prospective payment

promises to control costs better than reimbursement systems based on reasonable costs (2), and preliminary evidence in the United States points toward shortening lengths of stay and moderating cost inflation. Yet Norway's experience indicates that prospective payment in itself may not achieve the expected long-term savings. Indeed, because of the uncertainties in the 1983 legislation, the Congressional Budget Office declined to provide Congress with estimated savings effected by the new Medicare prospective payment system (5).

Norway's prospective payment system offers many insights into the problems of cost control and interesting comparisons between the two health systems. During the period under study in this paper, 1972 to 1980, both countries experienced strik-

ingly similar inflation of hospital costs even though Norway has a prospective payment system, more restrictive central controls on expansion, salaried hospital-based physicians, much lower levels of national health care expenditures, virtually exclusive public ownership of institutional facilities, and predominantly public payment for health care. Norway's experience indicates that solutions to cost control lie either beyond these factors or in the variations within them, for example, in different types of prospective payment programs.

Common to both countries are conflicting public demands over health care policy. Health care remains a popular commodity with strong public support for better health care services. Yet political pressure to control health care spending is widespread. In addition, Norway's problems with dispersion of technical advances to rural areas and with the equalization of spending between urban and rural areas bear close parallels to the situation in the United States. In both countries, professional managers and physicians dominate consumers in the decisionmaking processes.

This preliminary study examines Norwegian cost control mechanisms and the reimbursement system from 1972 to 1980, the perceived failures of the nationally centralized budget approval process, the legislative reforms based on the Hospital Act of 1979, the policy implications for Norway's goals of cost control and equalizing spending across urban-rural lines, and policy implications for reimbursement reforms in the United States. The paper is primarily based on a series of interviews held in June 1981 with senior national health officials at the Hospital Bureau of the Royal Norwegian Ministry of Social Affairs, as well as with health officials and hospital administrators in Oslo.

Data are provided based on an examination of inflation in health care and hospital costs, in particular from 1972 to 1980. This analysis is primarily confined to the rate of increases in health care costs during the 8-year period. This measure, the rate of increases in costs, is the best comparative indicator because it neutralizes the effects of different components used in each country to determine the costs of particular services, and it focuses on how each country has performed over a given period. For example, although many Norwegian physicians are in private practice and retain substantial independence, virtually all of those who practice in hospitals are salaried specialists. This expense is included in hospital rates and, as a result, many comparisons of hospital costs in Norway and the United States are meaningless. The 1972-80 period of

Table 1. Selected health and demographic indices, Norway and United States, 1976

<i>Index</i>	<i>Norway</i>	<i>United States</i>
Births per 1,000 population . . . . .	13.3	14.8
Male life expectancy at birth (years) <sup>1</sup> . . . . .	72.3	69.3
Female life expectancy at birth (years) <sup>1</sup> . . . . .	78.9	77.1
Deaths under 1 year per 1,000 live births . . . . .	10.5	15.2
Live births under 2,500 g (percent) <sup>2</sup> . . . . .	4.2	7.7
Deaths per 1,000 population . . . . .	10.0	8.9
Percent of population over 65 years . . . . .	24.0	10.7
Percent of population over 80 years . . . . .	2.6	2.2

<sup>1</sup> 1977.

<sup>2</sup> 1972.

**SOURCES NORWAY**

- World Health Organization: Sixth report on the world health situation, 1973-77. Geneva, 1980.
- Royal Norwegian Ministry of Social Affairs, Helsedirektoratet: Health for all by the year 2000. Oslo, 1980.

**SOURCES UNITED STATES**

- National Center for Health Statistics: Vital statistics of the United States, 1972. Vol. 1. Natality. DHHS Publication No. (PHS) 76-1100. U.S. Government Printing Office, Washington, DC, 1976.
- National Center for Health Statistics: Vital Statistics of the United States, 1976. Vol. 1. Natality. DHHS Publication No. (PHS) 81-1100. U.S. Government Printing Office, Washington, DC, 1980.
- National Center for Health Statistics: Vital Statistics of the United States, 1976. Vol. 2. Mortality. DHHS Publication No. (PHS) 80-1101. U.S. Government Printing Office, Washington, DC, 1980.
- U.S. Bureau of the Census: Estimates of the population of the United States, by age, race, and sex: 1976 to 1979. Current Population Reports. Series P-25, No. 870. January 1980.
- Public Health Service: Health, United States, 1981. DHHS Publication No. (PHS) 82-1232. U.S. Government Printing Office, Washington, DC, December 1981.

study was chosen because it provides the best data on the effects of inflation in hospital costs in Norway under the Hospital Act of 1969. The years 1970 and 1971 were eliminated to minimize any one-time effects caused by the phase-in of the prospective payment system.

**Overview: Use Rates and Expenditures**

Norway's health system has been sufficiently described elsewhere (6-8). The acute care hospital system consists of 89 hospitals with 24,000 beds. Under the authority of the Hospital Act of 1969, hospitals are owned and managed by the 19 counties of Norway (9). The counties, not including Oslo, have an average population of 200,000 people, ranging from 80,000 to 390,000, with a geographic size ranging from 2,000 to 19,000 square miles.

Table 1 shows comparative demographic and health indices for the United States and Norway in the mid 1970s. With the one exception of crude death rate (possibly explained by the high percentage of the elderly in the Norwegian population), Norway leads the United States in these selected health indices. These results were achieved with a national health expenditure rate in 1980 27 percent lower than that of the United States. In 1972 health

Table 2. Acute care hospital utilization rates, Norway and United States, 1972 and 1980

Measure	Norway			United States		
	1972	1980	Annual percent change	1972	1980	Annual percent change
Number of beds in 1,000s .....	23.6	21.9	-0.9	884.0	992.0	1.5
Beds per 1,000 population .....	6.0	5.3	-1.5	4.3	4.4	0.3
Admissions per 1,000 population <sup>1</sup> .....	131.4	142.8	1.2	150.8	162.3	0.9
Length of stay (days) .....	13.9	11.0	-2.9	7.9	7.6	-0.5
Occupancy rate (percent) .....	84.1	79.0	-0.8	75.2	75.4	0.0

<sup>1</sup> 1973 data.

**SOURCES NORWAY**

• Council of Europe, European Public Health Committee: The costs of health care in member states of the Council of Europe and in Finland. Strasbourg, 1980.

• Central Bureau of Health Statistics: Health institutions, 1980. Oslo, 1982.

**SOURCES UNITED STATES**

• American Hospital Association: Hospital statistics, 1981 edition. Chicago, 1981. [short term, non-Federal, general hospitals].

• U.S. Bureau of the Census: Estimates of the population of the United States to July 1, 1980. Current population Reports, Series P-25, No. 891, September 1980.

• U.S. Bureau of the Census: Estimates of the population of the United States to July 1, 1972. Current Population Reports, Series P-25, No. 487, August 1972.

care took 5.9 percent of Norway's gross national product (GNP), and this share increased to 6.9 percent in 1980. (Data were derived from official unpublished figures, correspondence from Ole Hovind, MD, Director of the Hospital Bureau, Royal Norwegian Ministry of Social Affairs, May 11, 1982.) In the United States, health expenditures took 7.9 percent of the GNP in 1972, and they rose to 9.5 percent in 1980 (10).

These differences in spending provide an important basis for assessing the relative efficiency of the two health care systems. It is of interest that Norway's reforms in prospective payment, discussed in this paper, were implemented in 1970, when national health care spending was about 6 percent of the GNP, while the limited Medicare prospective payment system in the United States was passed in 1983 (4), when health expenditures took up about 10 percent of the GNP.

Table 2 shows comparative acute care indices for the two countries in 1972 and 1980. Norway has more beds per 1,000 population, a lower admissions rate, longer hospital stays, and a higher occupancy rate than the United States. Norway's ability to control the bed supply may be attributed to a number of factors, including a higher bed rate and tighter controls on capital spending. The observed 1980 admissions rate in the United States, 14 percent higher than in Norway, would be even greater when adjustments are made for admissions to VA hospitals in the United States and for Norway's large elderly population. Conversely, the observed difference in length of stay may well be attributed to the differences in the elderly populations. In 1976 the proportion of Norway's population over 65 years was 24 percent and over 80 years was 2.6 percent (11). In 1979 U.S. census estimates showed

that only 11 percent of the population was over 65 years, with 2.3 percent over 80 years.

Although data on hospital use by the elderly in Norway were not available, their use may also help explain the differences in length of stay between the two countries. The large elderly population in Norway suggests a different case-mix of hospitalized patients, with more severely and chronically ill patients requiring longer stays. Without these considerations, the longer stays in Norway seem unexpected. The highly organized system of institutional services suggests that length of stay should be shorter. It would be expected that Norway's extensive alternative settings to hospital care, including nursing homes and institutions for alcohol and drug abuse, would provide more efficient discharge planning and hence shorter stays than in the United States. Nonetheless, length of stay dropped markedly in Norway compared with the United States, a 23.1 percent decline from 1972 to 1980 compared with only a 3.8 percent decrease.

Much of the observed change in Norway's hospital use can be traced to the doubling of the number of nursing home beds during this period. While this policy, along with a target of reducing beds to 4.5 per 1,000, helped take beds out of the system and reduce length of stay, it was offset by increasing admission rates. Interestingly, the rapid increase in nursing home beds seems to have proceeded faster than the corresponding decrease in hospital beds. With both length of stay and occupancy lower than in 1972, the Norwegian hospital system had more slack in 1980 than in 1972. If the system had maintained its previous occupancy rate of 84.1 percent with the 1980 admission rate and length of stay, theoretically 1,000 hospital beds could have been taken out of service. This number would represent a

5 percent decrease in beds down to a level of 5.1 beds per 1,000.

The chart shows the distribution of Norway's health expenditures in 1980: acute care hospitals account for 41.2 percent, noninstitutional services 21.9 percent, and nursing homes 18.7 percent. Comparisons with the United States are difficult and misleading. Because institutions pay the salaries of hospital-based physicians in Norway, these institutional expenses seem inflated. Second, Norway has a highly stratified institutional system that includes acute care hospitals, nursing homes, psychiatric institutions, institutions for the mentally retarded, holding beds and maternity homes, psychiatric nursing homes, and institutions for alcohol and drug abuse. The last three categories have been combined with miscellaneous expenses for analytical purposes in this paper. Third, Norway accounts for capital expenditures separately from operating costs.

The data in the chart and elsewhere in this paper, unless otherwise specified (for example, estimates of national and per capita expenditures), represent operating costs and exclude capital expenses. In Norway in 1980, capital expenditures accounted for 7.4 percent of total health care expenditures, and operating costs equalled 92.6 percent (Hovind correspondence). Capital expenditures include depreciation and interest and are reported on an accrual basis with assets depreciated over a 40-year life.

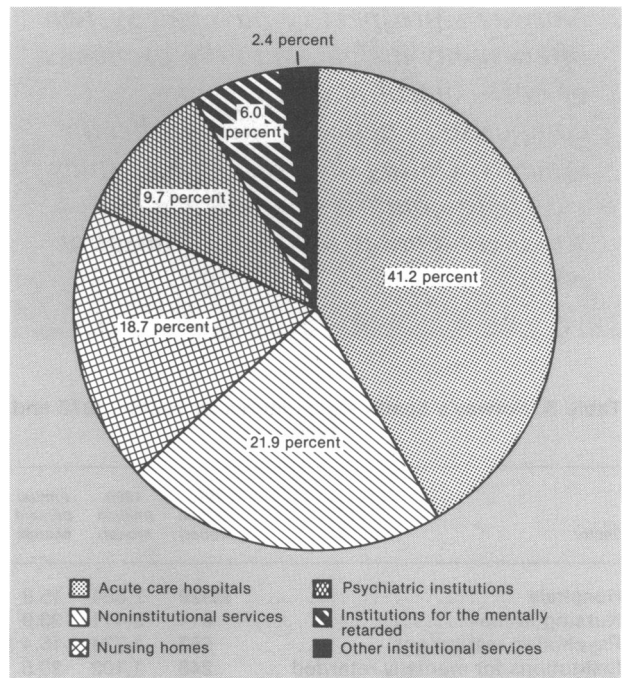
### Norway's Cost Control Mechanisms

The Norwegian government has three principal overlapping mechanisms to regulate hospital care: the budget process, planning, and capital financing.

The Hospital Act of 1969 was implemented January 1, 1970. It established a hospital-by-hospital prospective budgeting system administered nationally by the Bed Price Commission within the Hospital Bureau of the Royal Norwegian Ministry of Social Affairs (9). Under this system, hospital budgets were first submitted to the counties and then forwarded to the national level for final approval. The Hospital Act of 1969 also provided for hospital reimbursement on the basis of a 75 percent national contribution from the National Health Insurance Fund and 25 percent from county government. In 1977, the national share was decreased to 50 percent of an approved rate, with counties free to pay more.

In addition to the budget process, the national government has authority to control the county hospital system through the planning system and

Percentage distribution of Norway's health expenditures, 1980



SOURCE: Royal Norwegian Ministry of Social Affairs, Helsedirektoratet, Hospital Bureau, Oslo, 1982.

access to capital financing. The national government approves all institutional plans for health services, which must also be approved by the respective county. These 4-year plans are revised annually, and each includes a program and facility plan with accompanying operating and capital cost projections. This link between planning and financing is notably different from the planning system in the United States. Renovation and construction plans in Norway must conform to a national goal of 4.5 beds per 1,000 population (4.0 for community hospitals and 0.5 for tertiary hospitals) as well as with other well-defined facility and utilization standards. For example, X-ray facilities are approved on the basis of 0.6 X-rays per person per year.

In comparison with the United States' planning system, the Norwegian system is marked by the absence of provider-regulator confrontation and a fusion of program and financial planning. It should be noted, however, that by 1981 Norway's planning system had not yet confronted major issues of hospital closures and service reductions. Administrators indicated in 1981 that these battles were only beginning to be faced at that time. Health planning officials were skeptical of the political feasibility of producing a national health plan that targeted reductions in specific hospital beds and services to achieve the national goal, as established in 1977, of 4.5 beds per 1,000 population.

*Norway's prospective payment system offers many insights into the problems of cost control and interesting comparisons between the two health systems. During the period under study . . . both countries experienced strikingly similar inflation of hospital costs. . . .*

Table 3. Norway's health expenditures by sector, 1972 and 1980

Sector	1972 (million kroner)	1980 (million kroner)	Annual percent change
Hospitals	2,329	7,504	15.8
Nursing homes	614	3,411	23.9
Psychiatric institutions	563	1,774	15.4
Institutions for mentally retarded	248	1,102	20.5
Institutions for alcohol and drug addicts	30	82	13.4
Other institutions	94	373	18.8
Noninstitutional services	1,510	3,986	12.9
Total operating expenditures	5,388	18,232	16.5
Capital expenditures	402	1,464	17.5
Total health expenditures	5,790	19,696	16.5

SOURCE: Royal Norwegian Ministry of Social Affairs, Helsedirektoratet, Hospital Bureau, Oslo, 1982.

National health officials conceded that the achievement of this national goal could only be accomplished incrementally as hospitals are renovated. They believed that, despite full statutory authority to mandate such changes unilaterally, they would face political suicide if they tried to implement these changes too quickly, for example, as part of the budget process.

This political reality makes the capital budgeting process a critical lever on which health officials in both countries must rely to implement health policy. Norway's capital cost controls are more vigorous and centralized than in the United States. According to Norwegian health officials, about 80–85 percent of all capital investment in health care comes from the national central bank. Health care must compete for funds along with roads, schools, and other items in a national capital budget.

Access to national financing is available only through the Ministry of Social Affairs, once a hospital's plan is approved. Because health is just one

sector requiring capital funds, the health care capital budget cannot accommodate all approved projects, and many wait years for funding. Priorities developed by national officials with input from the county plans are based on criteria including travel distance, population, need, and supply, as well as prior committed funds.

As early as 1974, a capital financing crisis was foreseen (12):

Investment expenditure will be so great that it will exceed the scope of the National Bank's budget for the construction of health and social establishments. . . . This applies even if investments in the primary [care] health services, which are also assumed to be within the scope of this budget, are included.

Not until 1979, however, was the capital budget for health care frozen. Despite this relatively drastic action, capital expenditures still grew 13.6 percent between 1979 and 1980 as a result of projects coming on line whose funding had been previously committed (Hovind correspondence). Nevertheless, this compares favorably with an annual growth rate of 26.1 percent between 1972 and 1979 (Hovind correspondence).

This result presents a good illustration of the difficulty in redirecting resources, even in a planned nationalized system. Although controls on capital were vigorously applied, a resulting decrease in capital spending for health care was not seen quickly. By 1981, however, national health officials expressed concern about the potential effects of a continued freeze in this area.

Such freezes usually achieve short-term objectives, but they create unintended distortions in the system. The capital budget system tends to usurp the planning priorities, which are not constrained by these limits on capital spending.

For example, local health officials in Oslo pointed out that noninstitutional health services such as primary care were growing slower than any other health care sector (table 3). They expressed reservations about their ability to lower hospital costs through their plan of increasing outpatient services. They believed that outpatient facilities in Oslo will not be constructed as a result of a decision to build a new tertiary hospital to serve the northern region of Norway. This is an unusually clear example of the "crowding out" of primary care as a result of allocating limited funds for hospital construction.

In summary, Norway's hospital system is controlled through reimbursement, planning, and capital budgeting. The broad statutory authority in this national health system is often not used to its full

extent as a result of political realities that necessitate accommodation and compromise. The national government acts as much as a moderating force as it acts as a regulator of a county hospital system. Political concerns over rising hospital costs are balanced against strong public support for the health care system. These conflicting public demands for both more services and cost control, which were perceived by all the officials interviewed, bear a striking resemblance to the similar tensions in the United States. Despite the completely different organization of health services in the two countries, virtually complete public ownership and public source of payment, and the noted absence of provider-regulator tensions in Norway, a common thread of public perceptions and expectations for the health care system and professional dominance over consumers in decisionmaking tend to override these differences.

### Growth in the Health Sector

Table 3 shows the growth in Norway's health expenditures between 1972 and 1980. Total expenditures grew at an annual rate of 16.5 percent, with nursing homes growing fastest at 23.9 percent and noninstitutional services the slowest at 12.9 percent. Although the annual increase in hospital costs of 15.8 percent was exceeded by many other sectors of health care expenditures, it was by far the largest in absolute terms, growing a total of more than 5 billion kroner, or about US\$1 billion, over the 8-year period. (On December 31, 1980, the monetary exchange rate was US\$1 to 5.175 kroner.)

The large growth in nursing home care is a direct result of a government policy to increase nursing home capacity. Since 1972, nursing home beds have increased from 11,000 to 24,000. On a per bed basis, nursing home growth was only 12.4 percent annually. In contrast, because hospital patient days have decreased 3 percent since 1972, per unit hospital costs are somewhat higher than the 15.8 percent increase in hospital expenditures.

While Norwegian health officials believed the expansion of nursing home capacity achieved its policy objectives, they were quick to point out that other policies have been less successful. There was marked disappointment over the failure to transfer resources into the noninstitutional sector despite a 1974 policy making this a priority (12). Two distinct patterns of growth are hidden within the overall growth rate of 12.9 percent for noninstitutional services: 1972-76 and 1976-80. In the first period, noninstitutional services grew at an annual rate of

*'Common to both countries are conflicting public demands over health care policy. Health care remains a popular commodity with strong public support for better health care services. Yet political pressure to control health care spending is widespread.'*

Table 4. Annual percentage growth in health expenditures between 1972 and 1980, Norway and the United States

Measure	Norway	United States
Per capita health expenditures .....	16.0	11.8
Total health expenditures .....	16.5	12.9
Real growth in total health expenditures <sup>1</sup> ..	2.2	2.4
Acute care hospitals .....	15.8	15.3
Real growth in acute care hospitals <sup>1</sup> .....	3.5	4.6

<sup>1</sup> Deflated by GNP.

SOURCE NORWAY

• Royal Norwegian Ministry of Social Affairs, Helsedirektoratet, Hospital Bureau, Oslo, 1982.

SOURCE UNITED STATES

• Public Health Service: Health, United States, 1981. DHHS Publication No. (PHS) 82-1232. U.S. Government Printing Office, Washington, DC, 1981.

15.5 percent (Hovind correspondence). From 1976 to 1980, when the new policy of directing resources toward noninstitutional services should have been implemented, the growth rate sank to 10.5 percent (Hovind correspondence). Norwegian health officials could not pinpoint precise reasons for such a downturn in the face of overt government attempts to promote primary care and other noninstitutional services, but many felt that hospital inflation has crowded out investment in other sectors within the health care system. As discussed previously, this problem was first identified in Norway in 1974 (12).

Table 4 compares growth rates in health expenditures, hospital care, and per capita expenditures in Norway and in the United States. Norway's per capita expenditures (including capital costs) grew at an average annual rate of 16.0 percent, compared with 11.8 percent in the United States. A similar trend is seen in the growth in total expenditures (including capital costs), with the difference merely explained by faster population growth in Norway. However, in real terms, the United States' growth becomes higher at 2.4 percent compared to 2.2 percent in Norway. As noted earlier, although these rates of growth were similar, Norway's health ex-

penditures as a percent of GNP remained significantly below that of the United States throughout this period (Hovind correspondence, 10).

These data show no distinct differences in the pattern of growth in expenditures. Depending on the indicator chosen, different inferences may be drawn. For example, while real hospital inflation is significantly greater in the United States, in absolute terms Norway's is slightly ahead. From a political point of view, this indicator, which is the focus of the budget and legislative process, takes on greater importance than the more precise GNP deflated indicator. Nonetheless, it seems clear that, on the whole, the two countries have experienced similar patterns in growth in health expenditures during this period.

### Changes in Prospective Payment in Norway

By 1974 it was clear that the reimbursement and planning control mechanisms in Norway had been unable to check hospital growth or redistribute resources. A 1974 report to Parliament summarized the problem (12a):

Health insurance [payments to counties] have increased considerably faster since 1970 than was the case in the later sixties, the rate of increase since 1970 has been approximately 20 percent per year. . . .

The current refund rate under the national health insurance contribution scheme (75 percent) is so high that, in some cases, it may have a strong stimulating effect on expenditure, or on the assignment of priority to more expensive methods of treatment. . . .

The main problems in the development until the present time would seem to be in the following:

- lack of balance in health service expansion, which has led to a seeming lack of hospital bed capacity.
- a great increase in resource consumption. . . .

Although data as to specific features of the reimbursement system that failed to contain costs are not available, it is clear that health officials attributed important weight to the failure of the annual budget process to provide institutions with incentives to save money. For example, savings in 1 year were, for the most part, eliminated from next year's base costs. A more detailed study is necessary of the steps in the annual prospective budgeting system, following the process from the institutional, to the county, to the national level. It would be useful to quantify, for example, the level of spending below the approved rate and how those "savings" were taken into consideration in the next year's budget. This would give a better understanding of

the incentives hospitals were given to contain costs.

A state commission was created as a result of the 1974 Parliamentary Report. In 1977 it recommended a new reimbursement system that amended the 1969 legislation and was finally passed as the Hospital Act of 1979 (1). Members of the commission interviewed indicated that a consensus existed about the problems that needed change. These included rising costs, expanding capacity, and the inequitable distribution of resources to urban centers, Oslo in particular. By that time, the prospective reimbursement system was placing caps on hospital budgets, but the caps had little impact on hospital behavior. This resulted, in many cases, in shifting costs onto county budgets; the extent of this shifting has not been analyzed.

Between the completion of the commission's report in 1977 and the implementation of the new law in 1980, two other changes took place. In 1977, as a step toward increasing county responsibility for the hospital system, counties were required to pay 50 percent of hospital budgets, with the National Health Insurance Fund paying 50 percent. Second, as discussed previously, capital funding for health care was frozen at 1979 levels. Although not a part of the reimbursement reform, health officials viewed these changes as key to its implementation.

The Hospital Act of 1979 contained two fundamental reforms: it transferred total budget responsibility to the counties, and it specified that the national government would pay the counties a lump sum for all institutional services according to a population-based formula. Payments for physicians and noninstitutional services were not affected. The elimination of any role for the national government in budget decisions concerning individual hospitals was the culmination of a process that started in 1970 when operational control was turned over to the counties. This process continued in 1977, when the county reimbursement share increased to 50 percent.

The allocation to counties is based on an overall budget set by parliamentary appropriations. Although the Hospital Act of 1979 called for targeted increases of 4 percent real growth, 1980-81 increases were cut to 2 percent (13), the level of growth seen for all health care during the 1972-80 period (table 4). Counties are then allocated their funds on a population-based, morbidity-adjusted formula. Ninety-five percent of the funds are allocated on a straight population basis, and the remaining 5 percent are weighted by age, sex, mortality, morbidity, and travel distance. The mortality weight used is the standard mean age-adjusted mor-

tality rate. Travel distance is the proportion of the population living more than 10 km from a hospital. The proxy measure of morbidity that is used is pension claims.

National health officials indicated that they are experimenting with a new morbidity index to replace pension claims. This new index uses four morbidity proxies: the number of single parents, new cancer cases, hip fractures, and stroke cases. It is expected that this index will reflect more accurately the elderly's extensive use of health services. It should be emphasized that, despite these adjustments, 95 percent of the funds are allocated on a per capita basis, reflecting the strong sentiment to equalize resources among counties.

The equalization process will have its greatest impact on Oslo (13). Because the national payment does not include patients treated from other counties, the county where the patient resides must pay that hospital a "guest fee." Consequently, there is a strong incentive not to have patients treated outside the county. Norwegian officials expressed concern over the extent of the impact of this rule on teaching hospitals. For example, they did not preclude the possibility of county primary care clinics' directing referrals to their own county hospitals. As a result, significant reductions in bed capacity and consolidation of services in Oslo were seen as likely. Norwegian officials, however, believed that much of this impact was the direct result of an intended policy to increase resources and tertiary centers away from Oslo.

Because the change will be so large, Norwegian officials estimate it will take 5 to 10 years to bring Oslo's allocation down to a level commensurate with its population. The equalization will be accomplished by reducing Oslo's rate of increase because a political compromise was made in passing the Hospital Act of 1979; it specifically bars reductions to any county. In 1979 Oslo had 7.6 hospital beds per 1,000, 43.4 percent above the national average, and institutional expenditures 23 percent above its population base (13).

This population-based, morbidity-adjusted formula gives the counties strong incentives and flexibility to redistribute resources away from intensive inpatient services. They may use this formula as the basis for their reimbursement to hospitals, or they can shift funding away from inefficient hospitals to more efficient ones or to other institutional settings. Because the Hospital Act of 1979 did not specify how the counties should reimburse hospitals, it may be that little will change at the hospital level. This is unlikely, given the high levels of payment from the

*'It is clear that the location of the budget fight is now removed to the county level. It may be that the counties will be able to exert more leverage through their ability to shift resources away from hospitals. However, it may be that county officials will become more susceptible to pressures to increase hospital spending.'*

National Health Insurance Fund. Most Norwegian health officials interviewed indicated that it is likely that counties will use the national payment formula as a basis for their payments to hospitals, with more aggressive reforms to be held off until the effects of the new system are more clearly understood.

If this is the case, the counties will give hospitals a clear incentive to control costs. Because reimbursement levels will be separated from costs, hospitals will be able to "keep" any savings. Health officials indicated that, while it is too early to tell what effect the new law was having, anecdotal evidence, particularly from Oslo, showed a marked trend in shorter length of stay and more outpatient services.

It is clear that the location of the budget fight is now removed to the county level. It may be that the counties will be able to exert more leverage through their ability to shift resources away from hospitals. However, it may be that county officials will become more susceptible to pressures to increase hospital spending.

Further research is needed to study the new process at the county level. Such research should examine the counties' performance in controlling costs in the 1970s, for example, by quantifying what proportion of hospital budgets in that period were cut at the county level as opposed to the national level. And now that the new system has been in place for 4 years, preliminary assessments can be made of the ability of the new system to contain costs and of the counties' use of opportunities to experiment with different payment incentives to hospitals.

### **Policy Implications for the United States**

The United States has much to learn from Norway's extensive experience with prospective pay-



ment. Despite the major differences between the two health systems, strong common threads exist. Health care remains a popular commodity despite demands for cost control. Bureaucratic imperatives among hospital administrators have kept hospitals filled with patients and growing. And inflation in hospital costs has been similar.

Norway's hospital reimbursement system provides two principal lessons: prospective budgeting will not achieve long-term results when savings are taken away from the hospitals that eliminate waste and do not fill empty beds, and a reimbursement system can seek the dual objectives of controlling costs and distributing resources equitably.

As stated previously, it cannot be determined from this preliminary study what incentives will operate on hospital managers in Norway under the new system. However, the population-based allocations are a major advance because this system attempts to confront both objectives—cost control and equity. By its nature, it will achieve more equitable spending among counties and thus accomplish a major goal of the Hospital Act of 1979.

In addition, a population-based methodology has significant potential in controlling costs through its ability to identify areas of unusually high expenditures. Recent studies suggest a wide distribution of per capita hospital expenditures in the United States. In 1978, per capita hospital expenditures in Massachusetts of \$375 led the nation (except the District of Columbia); this was 112.5 percent higher than the \$177 per capita expenditures in the lowest State, Utah (14). Other studies show that per capita hospital expenditures in 1978 for residents of Boston, MA, were \$448 compared with \$215 in New Haven, CT (15), and that in 1980 such rates varied from \$317 to \$107 in 23 hospital markets in Iowa (16). In summarizing these studies a researcher concluded (17):

These variations are not explained by differences in population characteristics and there seems to be no clear association between the factors that one ordinarily thinks should contribute to high costs, such as a greater percentage of the elderly in the population or the presence of a teaching hospital.

This analysis of the variations in per capita hospital expenditures can also be correlated to the wide variations in procedures and hospitalization rates found in the United States, Norway, and other countries (15a,16a,18–21). For example, in 1979 the age-adjusted discharge rate in the southern region of the United States was 37.1 percent above that of the western region (10a). It is these underlying varia-

tions in use of services that may explain an important part of the variation in expenditures. One researcher has concluded, "[P]er capita admission rates are the most important determinant of variations in per capita costs" (15b,16b). Population-based reimbursement is particularly useful in this regard because it attempts to eliminate variations in both admissions and per case costs. This feature of population-based reimbursement is significantly more far-reaching than hospital reimbursement systems, such as the Medicare system in the United States, that pay on a per case basis and thus provide incentives to increase admissions.

There are two caveats to this analysis. To the extent population-based reimbursement is used to identify under-expenditures, it becomes a technique to increase spending, or at least equalize it. Seen this way, population-based reimbursement methodologies, when fully implemented, may not encourage cost control: they are merely a resource equalization tool. On the other hand, given a cost control mandate, population-based reimbursement can ratchet down "excess" expenditures while leaving under-expenditures untouched.

A second caveat exists with all approaches to cost control. Cuts in reimbursement cannot be equated with reduced costs. Extensive fixed costs, generally assumed to average 60 percent, greatly weaken the impact of reducing reimbursement. Cuts in reimbursement, whether from the National Health Insurance Fund in Norway or from Medicare and Medicaid in the United States, often lead only to shifting costs onto other payors: to county governments in Norway and to private payors in the United States. Only when permanent savings are achieved at the institutional level through the elimination of fixed costs do cuts in reimbursement translate into meaningful reductions in a provider's costs. Such large institutional savings generally arise when entire departments are closed or savings achieved as a result of major renovations. Partly because of the difficulty in obtaining these decisions, cost control remains elusive in both countries.

Conversely, reduced costs at the provider level do not necessarily translate into similar savings for the payor. The more reimbursement is based on charges, the less bearing an institution's costs will have on a payor's reimbursement. As discussed previously, the experience of the Norwegian budget approval system in the 1970s indicates that government's attempts to participate in an institution's cost savings, by reducing 1 year's savings in the next year's budget, may thwart cost control efforts.

The principal experiment in the United States with prospective payment involves the change in Medicare's principles of reimbursement to a system based on Diagnostic Related Groups (DRGs), enacted on April 20, 1983, as part of the Social Security Amendments of 1983 (4). In comparing the Norwegian population-based methodology to this approach, it can be seen that the DRG system is limited, and its long-term savings are difficult to estimate (5). The system establishes nationally adjusted DRG prospective payment rates for each hospital case to reimburse eligible hospitals for most operating costs (4a,4b,4c). Excluded from the DRG rate, however, are such costs as capital, medical education, and "outlier" cases (22). Although this system is clearly designed to encourage hospitals to live within a fixed budget (5a), no formal budget approval system exists nationally as it does in many States (2,3) and in Norway.

The legislative history indicates that the principal goal of the DRG program was to improve the efficiency of hospitals with little recognition of the impact on the equitable distribution of resources (4b,5a). Consequently, the DRG system focuses only on costs per case and does not affect admission rates, which may be an equally important factor in the overall variation in per capita hospital expenditures (15b,16b). Seen in this light, the DRG system will affect at most 50 percent of the variation in per capita expenditures. And this impact may be even less if consideration is given to the incentives to increase admissions.

Consequently, it can be seen that population-based reimbursement has a significantly greater ability to reduce variations in per capita hospital expenditures. Given the incentives to increase admissions, the high admissions rate in 1980 in the United States compared with Norway (table 2), and the experience of health maintenance organizations (HMOs) in controlling admissions (23), the potential for controlling costs through reduced admission rates deserves greater attention in the United States. One approach could be to develop an admission-rate weighting factor to be applied to DRG rates.

Another principal limitation of the DRG system is that it applies only to Medicare patients. The shifting to costs seen in Norway with its comprehensive prospective budget system suggests that Medicare restrictions will have a significant impact on other payors.

Although both payment systems attempt to strengthen the incentives of hospitals to contain costs, there is nothing inherent in either system to

assure that these savings will be passed along to the payors: the Federal Hospital Insurance Trust Fund in the United States and the National Health Insurance Fund in Norway. Norway's experience in the 1970s indicates that the government's attempts to share too quickly in hospitals' cost control may have significantly weakened the hospitals' incentives to control costs and thereby contributed to the rapid escalation in hospital costs in Norway. It remains to be seen whether the incentives under the population-based system will work differently.

Similarly, it is unclear how the Secretary of Health and Human Services (HHS) will deal with this problem. The law gives the Secretary two principal mechanisms to increase hospital payments through the nationally adjusted DRG prospective payment rates. Starting with a hospital's fiscal year 1986, the Secretary has the authority to determine annual inflation adjustments (4d) and to recalibrate the DRG rates at least every 4 years "to reflect changes in treatment patterns, technology, and other factors which may change the relative use of hospital services" (4e). It is through these mechanisms that Medicare will be able to translate the institutional savings resulting from the DRG incentives into savings for the Federal Hospital Insurance Trust Fund. The Norwegian experience suggests that a cautious approach is called for.

Norway's population-based methodology may be usefully applied to a component of cost that is not yet part of the DRG system: capital costs (4a,4c). Such an approach would facilitate health planning goals and capital expenditure review (24) by increasing the equality in capital expenditure payments and distribution of resources. As with population-based adjustment to DRG rates to compensate for variations in admissions, such a method could be used to pay for capital costs.

Differences between spending for hospital care in Norway and in the United States may also stem from the political arm of government that sets spending levels. A major feature of the DRG system is that most "uncontrollable" elements of Medicare spending on hospital care have been ended and, starting in fiscal year 1986, HHS will determine aggregate spending levels through regulation by providing for inflation adjustments and revising DRG rates (4d,4e). In Norway, however, this power has remained with Parliament through the appropriations process. The political climate in each country may be the controlling factor in the success of cost control programs.

One of the more interesting Medicare reforms consistent with a population-based methodology is

the Medicare payment system to HMOs and Competitive Medical Plans (CMPs) enacted in 1982, which significantly changed the approach to paying these plans for Medicare-covered services given to beneficiaries (25). It provides for prospective payments to be made on a capitation basis to qualifying organizations. An annual per capita rate of payment to the HMOs and CMPs is set by statute at 95 percent of the "adjusted average per capita costs" (25a). This rate is an actuarial estimate, based on regional sampling, of the costs to Medicare of providing services to a beneficiary through non-HMO or non-CMP providers and suppliers (25b).

This approach is very similar to the Norwegian system in that rates are prospectively set according to a population-based methodology with, however, different population groups—Medicare beneficiaries in the United States and the entire population in Norway. This payment system should provide the benefits of population-based payment and reduce hospitalization rates for these beneficiaries to a level more closely approaching HMO rates for the elderly. It is also similar to the system in Norway in that both methods pay an organization: the counties in Norway and qualifying HMO and CMP plans in the United States. This approach is also more global than the Norwegian system because it provides payments to beneficiaries for physicians' and institutions' services, whereas the Norwegian system merely pays for institutional care.

This Medicare HMO-CMP approach is, however, a limited reform compared to Norway's. The payment system applies to virtually all institutionalized Norwegians, but the Medicare payment plan applies only to Medicare beneficiaries enrolling in qualifying plans. According to HHS estimates, only 400,000 to 800,000 Medicare enrollees are expected to join the plans as a result of these changes in the next 3 to 4 years (26). In addition, this Medicare reform is further limited in three ways: it permits enrollment of beneficiaries for Part B only, with payments for hospital care paid for under Part A through the DRG prospective payment method (25c); some of the plans will continue to be paid on a reasonable cost basis (25d); and payments to HMOs are based on regional sampling of costs, leaving unaffected the wide regional variations previously discussed (25a).

Finally, the Norwegian experience also points to useful new approaches in the United States focusing on reimbursement of physicians. The 1983 Medicare changes authorizing DRG prospective payment for hospitals also require the study of the feasibility of paying physicians on a prospective basis (4f).

This approach has promising potential and should be vigorously pursued. It is indeed the direction in which Norway is now proceeding, a change patterned after its 1980 hospital reforms. Norway's experience, however, shows that merely placing physicians on salary, without making other changes, will not hold down costs in the long term.

What neither country has yet to implement on a large scale are methodologies to create incentives for physicians to control their cost-generating practices (27-29); instead, both countries have chosen to control hospitals, thereby affecting physicians indirectly. A readily feasible approach to this problem would be to make one DRG payment to physicians that would reflect payment for their services along with the associated costs of the hospital's special care services. Such a payment is highly compatible with the new DRG system, and it is a relatively good, although imperfect, proxy for the hospital costs that physicians directly generate. This approach, however, does not accommodate the equity features found in the population-based Norwegian methodology and may well provide physicians with too strong an incentive to provide fewer services.

Nonetheless, systems focusing on these cost-generating practices have strong potential for yielding the long-term savings in hospital costs that have not yet been seen as a consequence of prospective payment. The choice remains whether to pay hospitals and let them shop around for efficient physicians or to pay physicians and have them shop around for efficient hospitals. The experience of both countries indicates that it may be time to choose the latter.

## References .....

1. The Hospital Act of June 1, 1979. Norsk Lovtidend, Nr. 26, Pt. 1. Oslo, Norway.
2. Biles, B., Schramm, C. J., and Atkinson, J. G.: Hospital cost inflation under state rate-setting programs. *N Engl J Med* 303: 664-668, Sept. 18, 1980.
3. Esposito, A., Hupfer, M., Mason, C., and Rogler, D.: Abstracts of state legislated hospital cost-containment programs. *Health Care Financing Rev* 4: 129-158, December 1982.
4. 98th Congress: Social Security Amendments of 1983 (Public Law 98-21). Title VI, Secs. 601-607. 42 U.S.C. 1395ww. U.S. Government Printing Office, Washington, DC, 1983; (a) 42 U.S.C. 1395ww(a)(4); (b) 42 U.S.C. 1395ww(d)(5); (c) 42 U.S.C. 1395ww(g)(1); (d) 42 U.S.C. 1395ww(e)(4); (e) 42 U.S.C. 1395ww(d)(4)(C); (f) Sec. 603(a)(2)(B).
5. U.S. House of Representatives, House Committee on Ways and Means: Social Security Amendments of 1983. H. Rep. 98-25, Pt. 1, 98th Cong., 1st sess., U.S. Government Printing Office, Washington, DC, 1983, p. 178; (a) p. 132.

6. Evang, K.: *Medical care and family security: Norway, England, U.S.A.* Prentice Hall, Englewood Cliffs, NJ, 1963.
7. Roemer, M.: *Comparative national policies on health care.* Marcel Dekker, New York City, 1977, pp. 212-217.
8. Roemer, M., and Roemer, R.: *Manpower in the health care system of Norway.* DHEW Publication No. 77-39. U.S. Government Printing Office, Washington, DC, 1977.
9. *The Hospital Act of June 19, 1969.* Norges Lov (1685-1977), Nr. 57. Oslo, Norway.
10. Department of Health and Human Services, Public Health Service: *Health, United States, 1981.* DHHS Publication No. (PHS) 82-1232. U.S. Government Printing Office, Washington, DC, 1981, p. 195; (a) p. 168.
11. Royal Norwegian Ministry of Social Affairs, Helsedirektoratet: *Health for all by the year 2,000.* Oslo, 1980, p. 21.
12. Royal Norwegian Ministry of Social Affairs: *Hospital development etc. in a regionalized health system.* Parliamentary Report No. 9. Oslo, 1974, p. 5; (a) pp. 2-3.
13. Royal Norwegian Ministry of Social Affairs: *Parliamentary proposal No. 1 (1980-81), for the fiscal year of 1981.* Department of Social Affairs, budget for the national health insurance. Oslo, 1981, p. 100.
14. Levit, K. R.: *Personal health care expenditures by state, selected years 1966-78.* *Health Care Financing Rev* 4: 1-45, p. 10, December 1982.
15. Wennberg, J. E.: *Dealing with medical practice variations: a proposal for action.* *Health Affairs* 3: 6-32, p. 17, summer 1984; (a) p. 10; (b) p. 7.
16. Wennberg, J. E.: *A study of hospital utilization in Iowa in 1980.* *Servi-Share of Iowa.* Des Moines, 1982, p. 14; (a) p. 27; (b) pp. 19-21.
17. Testimony of John E. Wennberg, MD, before the Committee on Appropriations, Subcommittee on Labor, Health and Human Services, and Education, U.S. Senate, Nov. 19, 1984, p. 2.
18. Lewis, C. E.: *Variations in the incidence of surgery.* *N Engl J Med* 281: 880-884, Oct. 16, 1969.
19. Bunker, J. P.: *Surgical manpower: a comparison of operations and surgeons in the United States and in England and Wales.* *N Engl J Med* 282: 135-144, Jan. 15, 1970.
20. Wennberg, J., and Gittelsohn, A.: *Small area variations in health care delivery.* *Science* 182: 1102-1108, December 1973.
21. Vayda, E.: *A comparison of surgical rates in Canada and in England and Wales.* *N Engl J Med* 289: 1224-1229, Dec. 6, 1973.
22. 42 C.F.R. 412.2 (d) and (e) Medicare program; prospective payment system for hospital inpatient services; redesignation of rules. *Federal Register* 50:12742. No. 61, Mar. 29, 1985.
23. Luft, H. S.: *How do health-maintenance organizations achieve their 'savings'?; rhetoric and evidence.* *N Engl J Med* 298: 1336-1343, June 15, 1978.
24. 42 U.S.C. 300m-6 and 1320a-1.
25. 97th Congress: *Tax Equity and Fiscal Responsibility Act of 1982 (Public Law 97-248).* Sec. 114. 42 U.S.C. 1395mm. U.S. Government Printing Office, Washington, DC, 1982; (a) 42 U.S.C. 1395mm(a)(1)(C); (b) 42 U.S.C. 1395mm(a)(4); (c) 42 U.S.C. 1395mm(a)(1)(A); (d) 42 U.S.C. 1395mm(h).
26. Medicare program; payment to health maintenance organizations and competitive medical plans. Final rule. *Federal Register* 50: 1341-1342, No. 7, Jan. 10, 1985.
27. Evans, F. O.: *Physician-based group insurance.* *N Engl J Med* 302: 1280-1283, June 5, 1980.
28. Moore, S.: *Cost containment through risk-sharing by primary-care physicians.* *N Engl J Med* 300: 1359-1362, June 14, 1979.
29. Egdahl, R. H., Taft, C. H., and Linde, J. K. F.: *The potential of organizations of fee-for-service physicians for achieving significant decreases in hospitalization.* *Ann Surg* 186: 388-397, September 1977.

## Declines in Nonwhite and White Neonatal Mortality in Mississippi, 1975-80

DONNA M. STROBINO, PhD  
 YOUNG J. KIM, PhD  
 BARBARA E. CRAWLEY, MS  
 GARY A. CHASE, PhD  
 JOAN H. SALIM, MA, MHS

Dr. Strobino is Associate Professor, Department of Maternal and Child Health; Dr. Kim is Associate Professor, Department of Population Dynamics; and Dr. Chase is Associate Professor, Department of Mental Hygiene, School of Hygiene and Public Health, Johns Hopkins University, 615 North Wolfe St., Baltimore, MD 21205. Ms. Salim is a Health Planner with the Maryland Department of Health and Mental Hygiene, and Ms. Crawley is Research Associate, Department of Epidemiology and Preventive Medicine, University of Maryland.

Tearsheet requests to Donna M. Strobino, PhD. A shorter version of this paper was presented at the 111th meeting of the American Public Health Association in Dallas, November 14,

1983. The research was supported by grant No. MCI-240421-05-1 from Maternal and Child Health Research, Bureau of Health Care Delivery and Assistance, Department of Health and Human Services.

### Synopsis .....

*Linked birth and death records provided the population for an investigation of declines in nonwhite and white neonatal mortality rates (NMR) in Mississippi between 1975 and 1980. The effect of changes in the characteristics of women giving birth and in perinatal care on declining NMRs was analyzed. A decomposition of the difference in the 1975-76 and 1979-80 NMRs was performed to determine whether declines in NMRs were due to shifts in population characteristics or in characteristic-specific rates.*

*Between 1975 and 1980, the NMR declined significantly by 1 death per 1,000 live births per year among nonwhites and by 0.8 per 1,000 among*