The Evaluation of Hospital Stays for Total Hip Replacement

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The purpose of this study is to present four care experiments developed in the Netherlands and New York State that aim to reduce mean hospital stays for total hip replacement and thus increase efficiency of hospital utilization without adversely influencing quality of care. The major components of the programs and their impact on lengths of stay are described.

Key words: *hospital, length of stay, managed care, the Netherlands, United States*

Hospital lengths of stay constitute a major variable in the use of acute care services. Together with hospital admission rates, lengths of stay effectively determine the size of hospital inpatient populations and the occupancy of these institutions. Lengths of stay also have a major impact on hospital costs through their impact on census levels, bed capacities, and staffing.

During the past several years, increases in health care costs have stimulated efforts to reduce hospital utilization in a number of countries. During the 1980s, much of this activity involved the implementation of prospective hospital reimbursement systems, which stimulated reductions in length of stay by providing relatively fixed payments to institutions for each admission/discharge regardless of the duration of the stay.[1] More recently, efforts to reduce lengths of stay have taken the form of managed care programs, which attempt to reduce hospital stays through the implementation of clinical guidelines and pathways for specific procedures and diagnoses.

Available data have demonstrated that hospital stays vary widely among the United States and most western European nations.[2–6] The literature suggests that stays in the United States tend to be shorter than those in Europe. Robert J. Maxwell once concluded that "if France were to adopt the United States length

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Quality Management in Health Care, 1995, 3(3), 62–71

of stay, it would require only half as many hospital beds to treat the same number of patients."[7] At the same time, however, it has been demonstrated that hospital stays vary considerably among political subdivisions within countries.[3,4,6,8]

Available information also suggests that hospital lengths of stay are decreasing over time. A major influence on this trend has been the development of prospective hospital reimbursement systems and other utilization control mechanisms by purchasers of health care. Prospective hospital reimbursement was introduced in the United States between 1983 and 1986. It has also been implemented in some countries elsewhere. Another source of this trend has been an increasing awareness that patients are generally better off without extended hospital stays. Stimulated by these causes, acute hospitals are pursuing a variety of approaches to reducing their lengths of stay.[9]

Unfortunately, the widespread interest in length of stay reduction that has developed among health care providers has generated little information concerning the limits of hospital stay reduction for specific procedures and diagnoses. Related to this problem is a lack of information concerning how quality of care is affected by decreases in lengths of stay. Currently, there are no reliable estimates of optimum hospital stays by procedure or diagnosis. In most instances, the shortest hospital stay is implicitly assumed to be the most appropriate length of stay.

The purpose of the study is to present examples of length of stay reduction programs developed independently in the Netherlands (in western Europe) and in New York State (in the United States) that aim to reduce mean hospital stays for total hip replacement and thus increase the efficiency of hospital utilization without adversely influencing quality of care.

Methods

The study starts with a comparison of hospital stays for total hip replacement in the Netherlands and New York State at the aggregate level and among component regions and counties. The 1993 populations of the Netherlands (15,238,000) and New York State (18,353,000) are similar. The percentage of the population aged 65 and over is 13.0 in the Netherlands and 14.2 in New York State. Hospital bed availability is approximately 4.1 per 1,000 population in the Netherlands and 3.6 per 1,000 population in New York State. Hospitals in New York State function under prospective reimbursement, whereas hospitals in the Netherlands are paid according to fixed budgets. Both of the areas have aging populations and extensively developed health and social welfare systems.

Information for national-state and regional-county comparisons was obtained from computerized discharge data abstracts maintained by the Stichting Informatiecentrum Gezondheidszorg (SIG) in the Netherlands and by the Statewide Planning and Research Cooperative System (SPARCS) in New York State. Data for analysis of the operation and impact of length of stay reduction programs at the hospital level were obtained from two general hospitals in Twente, a region in the Netherlands, and from the Hospital Executive Council, the planning organization for the general hospitals of the City of Syracuse and Onondaga County, New York.

The initial section of the study focuses on identification of differences in mean hospital stays for total hip replacement for populations aged 65–74 and 75 and over at the aggregate and regional/county levels in the Netherlands and New York State. Mean lengths of stay and numbers of hospital discharges will be compared at the aggregate level for the calendar years 1982, 1986, and 1990. Among the 32 regions of the Netherlands and the 62 counties of New York State, selected length of stay indicators will also be evaluated. All of these comparisons are carried out using simple descriptive statistics. Efforts to expand the data with more (recent) data points for this section were limited by the high computer costs generated, in part, by the large number of discharges in the annual data sets and by the delay in availability of complete and corrected discharge data files for recent calendar years.

The second section of the analysis focuses on efforts to reduce hospital lengths of stay for total hip replacement in two hospitals in Twente and in two hospitals in Onondaga County. Qualitative data are used to describe programs intended to reduce hospital stays in these areas. The length of stay reduction programs for total hip replacement, which were developed independently on both sides of the Atlantic in 1991 or 1992, will be presented and compared. Quantitative data derived from the hospital data-

bases are used to identify the effects of the length of stay reduction projects on hospital lengths of stay for patients who undergo this procedure. In each case, length of stay data for the periods before and after the introduction of the programs are used to develop pretest-posttest comparisons.

Length of Stay Comparison

The initial section of the analysis involves comparison of differences in mean hospital stays for total hip replacement at the state and regional levels in the Netherlands and New York State (Table 1 and Figure 1).

Table 1

COMPARISON OF MEAN HOSPITAL STAYS: TOTAL HIP REPLACEMENT

Section A: The Netherlands and New York State

	Patients 65–74 years			Patients 75 years and over		
	1982	1986	1990	1982	1986	1990
Netherlands*						
Mean stay (days)	27.0	23.6	20.0	30.6	27.3	23.6
Discharges	3,388	4,033	4,491	2,300	3,575	3,961
New York State†						
Mean stay (days)	18.6	15.1	13.6	21.5	17.6	17.6
Discharges	563	1,125	3,350	430	1,035	5,159

Section B: Dutch Regions and New York Counties

	Patients 65–74 years			Patients 75 years and over		
	1982	1986	1990	1982	1986	1990
Dutch regions*						
Mean stay (days)	26.7	23.4	19.8	30.0	27.0	23.2
Minimum stay	18.5	17.2	14.1	22.1	21.9	17.1
Range	16.4	11.4	11.1	16.8	12.0	11.4
Standard deviation	3.8	2.6	2.4	4.0	2.8	2.7
New York counties†						
Mean stay (days)	17.3	14.4	12.5	20.6	16.1	16.9
Minimum stay	8.0	9.0	7.8	10.5	8.6	12.0
Range	18.3	23.0	17.7	31.5	15.4	13.7
Standard deviation	3.6	4.3	2.5	5.3	3.2	2.7

Section C: Twente and Onondaga County

	Patients 65–74 years			Patients 75 years and over		
	1982	1986	1990	1982	1986	1990
Twente (NL)						
Mean stay (days)	21.9	21.2	18.9	26.4	25.3	23.0
Discharges	167	163	203	93	163	149
Onondaga (NY)						
Mean stay (days)	15.9	13.5	13.1	14.2	14.4	17.2
Discharges	26	53	110	15	52	177

*Data: SIG.

†Data: SPARCS.

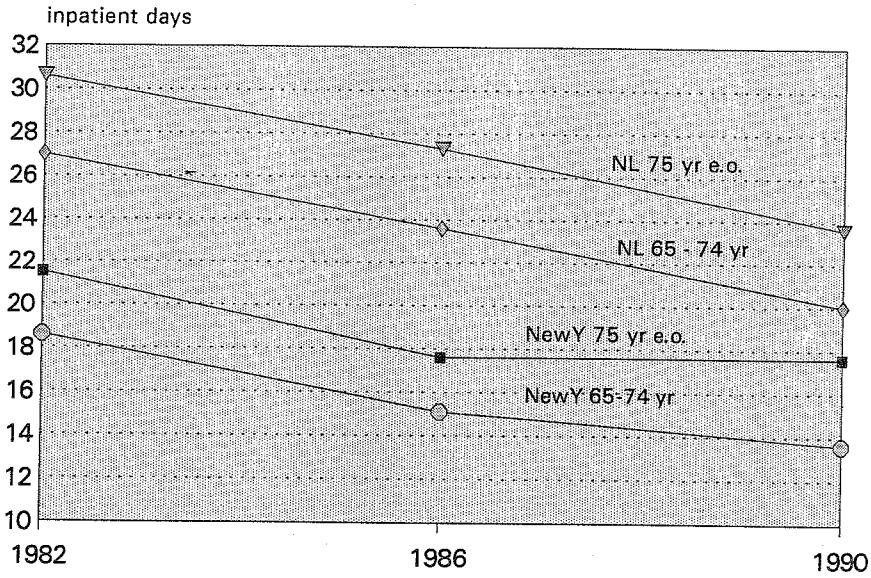

Figure 1. Mean hospital stays for total hip replacement for two age groups (65–74; 75 and older) in the Netherlands and New York State.

When compared with younger patients, those aged 75 and over have mean lengths of stay that are 17 percent and 14 percent longer in the Netherlands and New York State, respectively. Most importantly, perhaps, the information in Table 1 and Figure 1 demonstrates that mean aggregate hospital stays in both areas declined between 1982 and 1990. In the Netherlands, stays declined by 26 percent (7.0 days) for patients aged 65–74 and by 23 percent (7.0 days) for patients aged 75 and over. In New York State, proportional declines in lengths of stay are similar: 27 percent (5.0 days) for patients aged 65–74 and 18 percent (3.9 days) for patients aged 75 and over.

The data in Table 1 also demonstrate that numbers of hospital discharges involving total hip replacement increased in both areas between 1982 and 1986. In the Netherlands, the increase amounted to 33 percent (1,103 patients) for patients aged 65–74 and 72 percent (1,661 patients) for those aged 75 and over. In New York State, proportional increases are larger: more than 6 times for those aged 65–74 and almost 12 times for those aged 75 and over.

The initial portion of the analysis also involves comparison of selected length of stay statistics for total hip replacement among the 32 regions of the Netherlands and the 62 counties of New York State. The data are summarized in section B of Table 1.

Section B of Table 1 shows clearly that the variation in length of stay between regions/counties in the two states is substantial. It shows also that the counties in New York State have much shorter minimum stays, and, as a consequence of this, the length of stay ranges are larger among the counties of New York State than among the Netherlands regions, averaging 51–52 percent larger for the two age groups.

Section C of Table 1 shows a comparison of mean hospital stays for Twente in the Netherlands and Onondaga County in New York State.

The information in this section of the table demonstrates that, consistent with trends in the aggregate data for the Netherlands and New York State, mean lengths of stay for Total Hip Replacement in Twente and Onondaga County are generally longer for patients aged 75 and older than for patients aged 65–74. The data also indicate that, for both age groups in Twente and for the younger age group in Onondaga County, mean lengths of stay declined during the period.

The information in section C also demonstrates that, consistent with the aggregate data for the surrounding areas, mean lengths of stay for total hip replacement for Onondaga County are generally shorter than mean lengths of stay for the procedure in Twente. For the population aged 65–74, mean stays

in Onondaga County are 28 percent shorter, while for the population aged 75 and older, mean stays in Onondaga County are 39 percent shorter.

In comparison with the length of stay data in section A and B of Table 1, the information in section C also showed that mean lengths of stay for total hip replacement in Twente and Onondaga County are considerably shorter than lengths of stay in the surrounding areas. In a comparison of lengths of stay in the 32 Dutch regions, Twente's mean length of stay ranked 9th shortest, and in a comparison of lengths of stay in the 62 New York State counties, Onondaga County's mean length of stay ranked 21st. From this information, it can be concluded that hospitals in both Twente and Onondaga County were ahead of most institutions in neighboring areas in length of stay reduction for total hip replacement before the implementation of length of stay reduction programs.

Length of Stay Reduction Programs

This section describes the background, development, and implementation of length of stay reduction programs in four hospitals: Medisch Spectrum Twente (MST) in the city of Enschede; Streekziekenhuis Midden Twente (SMT) in the city of Hengelo; and St. Joseph's Hospital Health Center and Community-General Hospital in the City of Syracuse, Onondaga County.

In order to evaluate the development and implementation of the length of stay reduction programs, it is necessary to understand the health care environments that produced them. In the Netherlands during recent years, apart from rare instances of acute care bed shortages, there were no direct incentives for hospital staff to initiate programs to reduce hospital stays. Dutch hospitals were paid a fixed rate per day that was not differentiated according to type of patient or type of service. This system generated an open-ended hospital budget that encouraged maximum utilization of bed capacity. It also encouraged the delivery of health care on an inpatient basis. The system changed as a result of the implementation of global annual hospital budgets in 1984: To prevent further cost explosions, ceilings were established for annual hospital budgets. In addition, the budget formula used to determine the level of the hospital budgets was changed in 1989. According to the new formula, the level of the hospital budget is a function of the number of places for medical specialists in the hospital, the number of admissions or outpatient visits, and the number of patient days realized. In the new budget formula, the patient day has become more or less a balancing entry. In contrast to former years, when the costs of hospital treatment were completely covered by a patient day fee, a hospital can scarcely exert any influence at all on the level of its own budget by realizing more or less patient days. Hospitals still receive a reimbursement per patient day, but this is far less than the cost price. These changes in hospital financing encouraged health professionals in hospitals to reduce their mean stays by increasing preoperative testing on an outpatient basis and by partly replacing the postoperative hospital stay by professional home care.

Similar changes in the health care environment of New York State and the United States in general also provided incentives for the reduction of hospital stays. Prior to 1983, hospitals in the United States were reimbursed on a per diem basis. In 1983, the federal government adopted the Prospective Payment System (PPS) for Medicare reimbursement involving hospitals. In 1986, New York State implemented the New York Prospective Hospital Reimbursement Methodology (NYPHRM) for reimbursement of all hospital inpatient expenses. Both of these systems, which are still in operation, are based on payments by discharge rather than by day. The payments vary according to the diagnosis-related group (DRG) to which a patient is assigned. Limited additional payments are provided for extremely long stays and for nonacute stays, but these payments amount to only a small proportion of the former per diem rates. Hospital costs are also reimbursed on the basis of levels calculated prospectively rather than on retrospective expenses and costs. In the United States and in New York State, PPS and NYPHRM have created major incentives for reduction of hospital stays. In New York State, the replacement of payments per day by payments per discharge has combined with limits on public funds available for hospital reimbursement to increase the pressure for more efficient utilization. Both PPS and NYPHRM have also focused the responsibility for length of stay reduction on hospitals. With payments fixed on a per discharge basis and rates determined prospectively,

Medicare, Medicaid, insurance companies, and other payers no longer have a financial interest in extensive lengths of stay. As in the Netherlands, this situation has made it necessary for hospitals to become more efficient and to work with home care programs and a variety of other postdischarge services.

Partly because of the changes in hospital reimbursement mentioned above, the four hospitals under study started length of stay reduction programs that aim at maintaining or improving patient care while reducing hospital stays and related costs. The programs include hospital admission on the first day and completion of the surgical procedure on the second day. All four of these programs include only elective total hip replacements (i.e., cases where the surgical procedure is scheduled). Emergency hip replacements are not included. Each of the programs has slightly different components.

Medisch Spectrum Twente

The length of stay reduction program for total hip replacement at MST was initiated by the Department for Coordination of Intra- and Extramural Care, Bureau Zorgcoördinatie 1e-2e Lijn (BZC). BZC started work in 1991 and received financial support from the Ministry of Health Care, Oostnederland Health Insurances, MST, and the District Association of General Practitioners. The department is staffed by an ex–general practitioner, a home care nurse, and two secretaries. BZC functions as an independent intermediary representing the patient in dealing with hospitals, general practitioners, nursing homes, and home care organizations. The goal of BZC is to promote "seamless" transmural care. Intramural care is inpatient care—care occurring within the walls of an institution. Extramural care is outpatient care. Transmural care includes care provided across both settings. The objective of the length of stay reduction program is to accelerate the patient's movement through the hospital and arrange a suitable discharge disposition that meets the medical and social needs of the patient. The participants involved in the implementation of the program agreed on the following major components:

- A brochure concerning the consequences of total hip replacement for posthospital care is sent to every patient listed for the procedure. The patient or any relatives involved are encouraged to plan the posthospital care necessary. If problems arise, BZC is contacted for assistance.
- A questionnaire concerning the need for posthospital care is sent to "high-risk" patients. A patient is defined as high risk if he or she is aged 70 or more, has a multipathology, is living alone, or is living with a partner requiring services.
- If posthospital home care is needed, an intake for home care is arranged before hospital admission. If the intake for home care is positive, the home care organization is informed about the patient's admission and discharge dates so that needed posthospital care can be provided on time.
- A brochure concerning the physical condition of a discharged total hip replacement patient is given to the home care workers involved. Questions regarding what is suitable posthospital home care and when and how this care after some time can be reduced are answered in the brochure.
- On the fourth or fifth day of the hospital stay, the surgeon involved decides whether the patient needs more than 14 days of inpatient care. If more than 14 days are needed, a discharge to a nursing home is arranged. For this purpose, a special contract between the Department of Orthopedics at the MST and two nursing homes was developed. On average, patients are transferred to a nursing home for additional rehabilitation within a week for a maximum stay of three months. In the recent past, the transfer of patients to a nursing home was an important organizational obstacle. For this reason, the number of nonacute patient days in the hospital was large.

Streekziekenhuis Midden Twente

The length of stay reduction program for total hip replacement at SMT was an initiative of three health care organizations in the service area of the hospital: the hospital, the home care organization, and Oostnederland Health Insurances. The program for total hip replacement, which was implemented in 1991, has the following major elements:

- If a patient meets the program's inclusion diagnosis (arthrosis of the joint), he or she is referred to an orthopedic surgeon and his or her general practitioner provides basic information concerning the treatment and what to expect.

- If the surgeon identifies the patient as a candidate for the operation, the hospital contacts the case managers of the home care organization. The case manager visits the patient at home. The purpose of this visit is to assess the need for posthospital home care.
- If necessary, technical adjustments to the home of the patient, such as the installation of handles and removal of doorsteps, are planned and made before the patient returns home after the hospital stay.
- On the first postoperative hospital day, a training program is started that aims at mobilizing the patient within eight days. The team consists of a nurse, an ADL official, and a physiotherapist. Besides common nursing activities, like wound care, the activities coordinated by the team (supervised by the orthopedic surgeon) focus on teaching the patient how to move around and how to organize activities of daily living (ADLs) so that optimal autonomy after hospital discharge will be achieved.
- After discharge, the patient is visited by his or her general practitioner on day 1, day 3, and day 7 and eight times (maximum) by the physiotherapist. The general practitioner organizes and coordinates the professional home care and controls the patient's medical condition (pain medication, risk of thrombosis, etc.). The physiotherapist continues the therapeutic program at the patient's home.

St. Joseph's Hospital Center

The length of stay reduction program for total hip replacement at St. Joseph's Hospital Health Center was initiated by the hospital administration, hospital nursing, and the Department of Orthopedics. The staffs of each of these components of the institution identified a need for reduction of hospital stays while maintaining quality of care. The development of the length of stay reduction program was mainly the responsibility of the hospital's Rehabilitation Committee, which includes administrators, physicians, nurses, therapists, and quality assurance personnel. The process lasted approximately four months and involved numerous discussions and drafts of the program, which was implemented in December 1992.

The program implemented at St. Joseph's Hospital Health Center has the following major components:

- Patient education concerning the program is provided through classes that patients attend prior to hospital admission.
- Prior to hospital admission, efforts are made to arrange for home care services with the hospital's home care agency for patients who require them.
- The program includes specific physical and occupational therapy and discharge planning each day in the hospital.
- In order to improve quality of care and make most efficient use of resources, all patients are cared for on the same inpatient unit of the hospital.
- Additional patient education is provided after the surgery by the surgeon and the physical therapy staff.
- Discharge planning staff monitor patients during their postoperative stays so that nursing home placement can be developed for patients who require long-term inpatient care.
- After discharge, home care visits that have been arranged are provided outside the scope of the program.

Community-General Hospital

The total hip replacement length of stay reduction program at Community-General Hospital was initiated by hospital administration and a number of orthopedic surgeons who practice at the institution. The senior administration of the hospital, the Director of Quality Improvement, and certain orthopedic surgeons determined that hospital stays for the procedure could be reduced while maintaining or improving quality of care. The program was developed under the leadership of the Director of Quality Improvement through discussions with representatives of the medical, nursing, therapy, and administrative staffs of the hospital. The process lasted approximately six months in 1992, and the program was in full operation in the second month of 1993. It has the same major components as the program implemented in St. Joseph's Hospital Center.

Impact of the Programs

The initial impact of the length of stay reduction programs for total hip replacement on hospital lengths

of stay is identified through analysis of lengths of stay during the periods before and after implementation. The year of implementation differed between the hospitals: In Twente both programs were implemented in 1991; in Onondaga County implementation occurred in the second half of 1992. The data used for this section were derived from the hospital data bases. Relevant data are summarized in Table 2.

The data in Table 2 demonstrate that the implementation of each program was associated with a reduction in hospital mean stays for total hip replacement. It should be emphasized that, because lengths of stay were declining in the populations that generated these data before the programs were implemented, only a portion of the reduction was produced by the programs. At the end of this section, we will get back to this point.

In the Netherlands, mean stays for total hip replacement at MST and SMT are generally stable during the period before the development of the programs, declining by less then 5 percent. By contrast, mean stays declined substantially—by 30.4 percent at MST and by 28.9 percent at SMT—during the period following implementation of the programs. In both cases the observed differences in mean stays are statistically significant ($p < .01$).

The data indicate that notable reductions in hospital stays also accompanied the initial implementation of the length of stay reduction programs in the two hospitals in Onondaga County. During the period before development of these programs (1989–1993), mean stays for the procedure declined by 37.5 percent at Community-General Hospital and by 27.7 percent at St. Joseph's Hospital Health Center. As the implementation of the programs proceeded, mean stays declined by 9.6 percent at Community-General Hospital (which is statistically not significant) and by 30.7 percent at St. Joseph's Hospital Health Center ($p < .01$). It is notable that these reductions were achieved within a short time period.

Figure 2 summarizes the information from Table 2 in a line graph. The extra line, indicated by "mean trend," shows the downward length of stay trend of the four hospitals together. After the third point on the *x* axis, the year of implementation of the programs, the line shows a small downward change. From this we conclude that after implementation of the programs, lengths of stay in the four participating hospitals on average decreased slightly more (about one day on the *y* axis) than the trend in the foregoing years would have predicted.

Discussion

This study showed differences in hospital mean stays for total hip replacement in the Netherlands and New York State between 1982 and 1990. It demonstrated that, although mean stays for the procedure averaged approximately 30 percent longer in the Netherlands, stays declined substantially in both

Table 2

MEAN HOSPITAL STAY BY PARTICIPATING HOSPITAL

	Two years before implementation	One year before implementation	Year of implementation	One year after implementation
Twente (NL)				
MST Hospital	18.2 (136; 3.6)	18.1 (116; 4.9)	17.0 (284; 5.0)*	12.6 (240; 4.0)*
SMT Hospital	20.0 (75; 4.2)	19.4 (87; 4.7)	15.3 (106; 5.6)*	13.8 (122; 4.6)*
Onondaga (NY)				
Community-General Hospital	16.8 (137; 4.5)	13.1 (141; 5.1)	12.5 (152; 4.1)	11.3 (24; 5.5)†
St. Joseph's Hospital	14.8 (116; 8.1)	13.4 (121; 3.0)	12.7 (128; 7.2)	8.8 (66; 3.1)†

Note: Number of discharges and standard deviations are in parentheses.

*Includes data for January–December 1992.

†Includes data for January–June 1993.

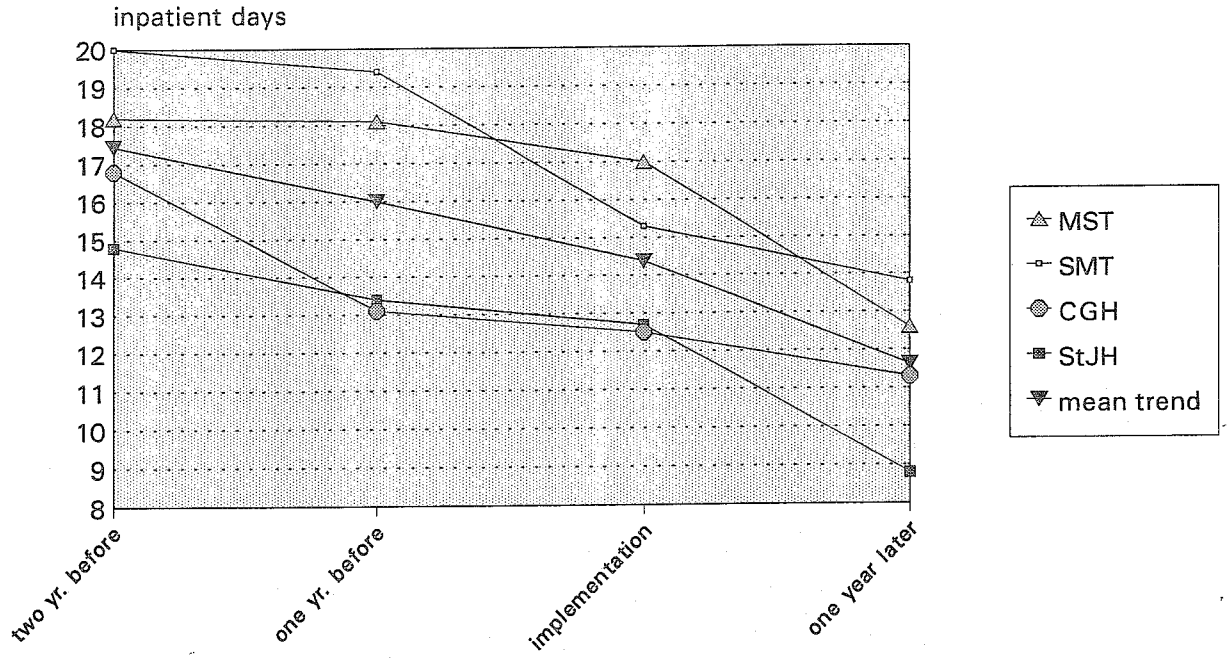

Figure 2. Mean hospital stays by participating hospital (patient group: total hip replacement). The decline in mean stays partially shows the effect of stay reduction programs.

areas during this period. It should be noted that these reductions occurred as the utilization of this procedure was increasing in both areas. Annual numbers of surgeries increased by 33–72 percent, depending on age level, in the Netherlands and by several hundred percent in New York State. The larger proportional increase in New York State may have been caused by a more rapidly aging population in New York State, a greater familiarity with the procedure, an influx of new specialists, or other factors.

The study also demonstrated that hospital mean stays for total hip replacement in Twente and in Onondaga County are generally shorter than in neighboring areas. Stays in Onondaga County are approximately 30 percent shorter than those in Twente.

These comparisons indicated that substantial progress in the reduction of hospital stays for total hip replacement has been attained in the Netherlands and New York State as well as in Twente and Onondaga County during recent years. These differences have probably resulted from increased comfort with this procedure among physicians in both countries, demonstrated by increases in utilization, as well as from pressures to increase efficiency exerted by reimbursement mechanisms, such as the PPS in the United States. By providing relatively fixed payments for each type of discharge regardless of length of stay, PPS may have been partially responsible for the shorter lengths of stay for total hip replacement in New York State.

The results of this study also suggest that specific length of stay reduction programs can produce reductions in hospital stays for total hip replacement over and above those driven by changes in reimbursement systems. In both Twente and Onondaga County, length of stay reduction programs were developed to monitor patient stays, reduce the time before hospital discharge, and address any causes of extended stays. In particular, efforts were made to anticipate the needs of patients requiring long-term care services after hospital discharge. The effectiveness of the

Specific length of stay reduction programs can produce reductions in hospital stays for total hip replacement over and above those driven by changes in reimbursement systems.

programs in Twente and in Onondaga County was demonstrated by the reductions in hospital stays partly generated by these efforts. During the time immediately following implementation of the program, mean stays for total hip replacement declined by over 10 percent at all four hospitals and by approximately 30 percent at three of these institutions. The fact that these changes were achieved within a very short period of time emphasizes the impact of the length of stay reduction programs. It should also be noted that mean hospital stays for total hip replacement at Community-General Hospital (11.3 days) and St. Joseph's Hospital Health Center (8.8 days) in the period immediately after implementation of the programs differed somewhat. These developments may have resulted from the implementation of the program three months earlier at St. Joseph's Hospital Health Center and the impact of previous experience with critical pathways at that institution.

The length of stay reduction programs employed in Twente differed from the Onondaga County programs in that they included both hospital and posthospital care. This transmural approach to care appears to be very promising. It encouraged a wider appreciation of the needs of the patient and an awareness of the role of the full continuum of care in addressing those needs.

The results of this study also suggest that a mean hospital stay of 9–11 days is an achievable level for total hip replacement. The ability of hospitals to reach this level will probably be complicated by patients requiring long-term care services who generate extended stays and, as a consequence of this, influence the mean stay of the total group. It is possible, however, that the transmural approach to care employed in the Netherlands can help address this problem by providing greater awareness of the full range of patient needs and increased continuity between acute care, home care, and nursing facility services. Hospital quality assurance and utilization review personnel in Onondaga County have suggested that acute care stays for hip replacement of 7–8 days are possible; however, these could occur only for patients who do not experience complications and whose therapy is not interrupted by reduced staffing on weekends.

The length of stay reduction programs discussed above demonstrated that goal setting and scheduling in the acute care setting can maintain quality of care and at the same time reduce the consumption of resources, as indicated by an extra decline in average lengths of stay in acute care hospitals. Researchers interested in studying the decline in length of stay caused by their length of stay reduction programs should be aware of the fact that this indicator of hospital utilization shows a downward trend over time almost everywhere. Historical and secular trends must be accounted for in all such studies. One should search for a steeper decline in acute hospital days than the decline that can be predicted by simple extrapolation of the trend in the years preceding the intervention. If done so, even a small extra decline on the aggregate level (e.g., one day) means significant improvement with respect to costs, efficient use of hospital resources, and patient satisfaction.

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