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There has been an increasing awareness of the rising costs of health care in the United States. In 1950, 4.6 percent of the Gross National Product (GNP) was being spent for health care; by 1970, health care expenditures rose to 8.6 percent of the GNP or \$139 billion (Rice, 1977).

In an attempt to control the costs of hospitalization and improve the quality of care rendered to patients covered by Medicare and Medicaid, the Federal Government has imposed requirements for peer review on hospitals caring for these individuals. Professional Standards Review Organization (PSRO) was created as a part of the 1972 Social Security Amendments to determine whether:

- a) . . . services . . . are or were medically necessary;
- b) the quality of services meets professionally recognized standards of health care;
- c) . . . services . . . (could be) provided on an outpatient basis or more economically in an inpatient health care facility of a different type (Public Law 92-603).

The PSRO system is composed of several interrelated activities. Two of these mechanisms are the concurrent admission and continued stay reviews. The admission and continued stay reviews examine the patient's admission to and continued stay in the medical facility to determine if the admission and extended length of stay are medically necessary.

In November of 1975, a "fully delegated" PSRO became operational at the Medical University Hospital of South Carolina in Charleston, South Carolina. Two of the fundamental review mechanisms, the admission and continued stay reviews, are performed under the auspices of the Utilization Review Committee at the Medical University Hospital of South Carolina. The Utilization Review Committee (URC) is composed of sixteen physicians and four non-medical personnel at the Medical University Hospital. This Committee is serviced by four trained and experienced non-physician review coordinators who perform the initial and periodical review of medical records.

Within the first working day after the patient's admission to the hospital, an admission review must be performed to determine the medical necessity of the admission. If the admission is deemed medically necessary, an initial length of stay based on diagnosis-specified criteria established by Southern region norms is assigned. Before the end of this assigned length of stay, the need for an extended length of stay must be approved. The patient's medical record is periodically reviewed until the patient is discharged to certify the need for an extended length of stay based on PSRO disgnosis-specific norms and criteria.

If the coordinator questions the necessity of an admission or an extended length of stay, a physician of the Utilization Review Committee is consulted. Whenever the Utilization Review Committee or Subcommittee (composed of four physicians) finds an admission or extended length of stay to be medically necessary, the fiscal intermediary attending physician and the hospital administrator are notified in writing. If the inpatient admission or extended length of stay is denied by the physician advisors of the Utilization Review Committee, the hospital is reimbursed only for approved inpatient days that the patient has stayed in the hospital.

Some studies have reported that PSRO is cost effective in reducing the lengths of stay, admissions and/or costs of hospitalization (Brain, 1973; Flashner, 1973). Flashner et al (1973) reported a reduction of approximately \$9 million in hospital reimbursement succeeding the initiation of PSRO review procedures. Most of these studies, basically performed in the private hospital sector, were criticized for failure to account for causal factors and for weaknesses in methodology (Davidson et al, 1973).

Unlike most private hospitals where studies on the effectiveness of PSRO have been performed, the Medical University Hospital (MUH) is a teaching hospital serviced by over three hundred staff physicians. The hospital generally serves as a referral center for the tri-county area which includes Charleston, Dorchester, and Berkeley counties. The medical staff at MUH believes that optimal care is already being rendered to the population that they serve in the shortest time possible and that PSRO is not effective in reducing hospital reimbursement by third party payers. Still, the question remains to be answered: Is PSRO effective in reducing the costs of medical care services rendered to Medicare and Medicaid patients?

## METHODS OF PROCEDURE

## Cost

Costs included: the hourly salaries of the review coordinators multiplied by hours spent by each coordinator on PSRO review and review related duties; hourly salaries of members of the Utilization Review Committee calculated on the basis of a 40-hour week and multipled by the estimated number of hours spent in Utilization Review Committee meetings and other review activities; fringe benefits (15.95 percent of salaries) and overhead cost (53 percent of salaries). All salary costs for coordinators and members of the Utilization Review Committee were borne by the Medical University Hosptial.

# Effectiveness

Effectiveness was determined by direct and indirect measures. Direct measures of effectiveness were the number of admissions, extended lengths of stays, and hospital services denied by the Utilization Review Committee. The changes in pertinent hospital utilization variables over several time periods served as indirect measurements of the effectiveness of PSRO reveiw mechanisms.

Indirect evidence of the effectiveness of PSRO was sought by comparing the average lengths of stay (ALOS), average cost per patient (ACOS) and average number of admissions (ANAD) over several time periods. For each of the dependent variables, ACOS, ALOS and ANAD, a three-way analysis of variance was performed analyzing these factors: a) type of patient (Medicare-Medicaid (reviewed) vs nonMedicare-Medicaid (not reviewd)). b) month of year (January-July, i.e., the first fully operational seven-month period following the advent of PSRO). c) advent of PSRO (1975 (before PSRO), 1976 (after PSRO) and 1977 (1 year after the advent of PSRO)). The basic design therefore, followed a 2x7x3 factorial experiment.

Succeeding the analyses described above, an analysis of covariance was performed for the ACOS and ALOS adjusting for the number of Medicare and Medicaid admissions to the Medical University Hospital. It has been suggested by Flashner et al (1973) that if too many Medicaid patients are admitted to the hospital, the hospital population will contain more individuals with mild illness.

### RESULTS

Table 1 show the costs of the PSRO review procedure for January-July of 1976. The total cost was \$28,938 which annualized to \$49,608.

#### TABLE I.

## COST OF PSRO REVIEW FOR

#### JANUARY-JULY (1976)

SALARIES	HOURS	COSTS
Review Coordinators Physicians Other Committee Members	3705 98 100	15,380 1,037 
Fringe Benefits (15.95%) Overhead (53%)		17,128 2,732 <u>9,078</u>
TOTAL COST		28,938
Total Cost Annualized		49,608

No direct evidence of PSRO effectiveness could be found since there were not any denials of admission, extended lengths of stays or services rendered during the seven-month study period.

The analysis of variance of the indirect measures of PSRO effectiveness (ACOS, ALOS and ANAD) showed no time-of-the-year effect and a significant interaction between the advent of PSRO and the proportion of Medicare vs non-Medicaid patients admitted to the hospital.

The data were collapsed over months and Duncan's New Multiple Range tests were performed for the ACOS, ALOS and ANAD for the groups: Before PSRO Not Reviewed (BPNR), After PSRO Not Reviewed (APNR), Before PSRO Reviewed (BPR), After PSRO Reviewed (APR), After one year of PSRO Not Reviewed (AINR), and After one year of PSRO Reviewed (AINR). The ranked and underscored homogeneous means are shown in Table 2.

#### TABLE 2.

# RESULTS OF DUNCAN'S MULTIPLE RANGE TESTS FOR ACOS, ALOS AND ANAD

ACOS:	BPNR	APNR	APR	BPR	A1NR	AlR
	1128	1461	1642	1756	1935	2098
ALOS:	APNR	BPNR	AlR	APR	A1NR	BPR
	7.4	7.4	7.5	7.6	7.6	9.1
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ANAD:	BPR	APR	Alr	AINR	APNR	BPNR
	365	<u>498</u>	547	1055	1068	1100

The analyses of covariance for the ACOS and ALOS adjusting for the number of Medicare and Medicaid admissions showed that: a) the variation in the number of Medicare-Medicaid admissions accounted for a significant portion of the variation observed in the ALOS and ACOS, b) the adjusted mean costs of stay were significantly different before and after the initation of PSRO, and c) no significant differences existed between the average length of stay for the study periods.

Even though the analysis showed significant differences between the average cost per patient over the study period, the question of how much of these differences were due to inflation remained to be answered. To examine this issue we assumed that the increases in hospital costs for non-Medicare-Medicaid patients were due to the inflation rate, while the changes in costs for Medicare-Medicaid patients resulted from both inflation and PSRO review. When the inflation rate of the not reviewed patients is used to correct the ASOS of the PSRO reviewed group, there is a significant cost savings of \$261 per reviewed patient over the seven-month period. Extrapolating to the 1976 Medicare-Medicaid patient population of 1976 patients we find a saving of 1.5 million dollars associated with a PSRO review process which cost \$49,608. Obviously the PSRO review is cost-effective in this teaching hospital. The mechanism through which the ACOS was reduced is not clear since there was not a significant reduction in the ALOS for the reviewed population when corrected for the increased number of Medicare-Medicaid admissions.

### REFERENCES

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