NBER WORKING PAPER SERIES

UTILIZATION OF SURGICAL MANPOWER IN A PREPAID GROUP PRACTICE

Edward F.X. Hughes
Eugene M. Lewit
Richard N. Watkins
Richard Handschin

Working Paper No. 19

CENTER FOR ECONOMIC ANALYSIS OF HUMAN BEHAVIOR AND SOCIAL INSTITUTIONS
National Bureau of Economic Research, Inc.
261 Madison Avenue, New York, N.Y. 10016

December, 1973

Preliminary; Not for Quotation

The research reported herein was performed persuant to a grant from the U.S. P.H.S. Bureau for Health Services Research and Evaluation to the NBER for research in the area of health and economics. The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Public Health Service.

This paper was presented before the Medical Care Section of the American Public Health Association at the 101st Annual Meeting, San Francisco, Nov.7, 1973.

Authors affiliated with the Dept. of Community Medicine, Mt. Sinai School of Medicine, CUNY; NBER; and Group Health Cooperative of Puget Sound, Seattle

Abstract

The median operative workload of seven general surgeons comprising the general surgical staff of a prepaid group practice of 158,000 enrollees was 9.9 hernia equivalents [HE] per week. The value was over three times that of a previously studied population of 19 general surgeons in fee-for-service community practice, and approximated a consensus standard of a full surgical workload. The median complexity of operations was 1.00 HE, similar to the community practice, and evidence suggested the most complex operations were handled by the surgeons with the most training. 23.6% of operations were performed on an ambulatory basis. The results suggest that the prepaid group practice under study possesses administrative mechanisms to efficiently utilize both general surgeons and the resources devoted to general surgery.

Introduction

Prepaid group practice has been shown to be associated with economies in the delivery of surgical services. These economies have resulted from reduced rates for all inpatient operations, with operative rates markedly reduced for certain procedures.[1-4] (A recent study of utilization patterns of union members in a prepaid group practice versus a fee-for-service setting found this difference in operative rates to be less clear cut than in previous studies.[5]) To date, no attempts have been made to assess the utilization of surgeons who comprise the staffs of prepaid group practices. There has been one attempt to measure the utilization of internists in three prepaid group practices and to compare that with a population of internists in a fee-for-service setting.[6] This study did not show any increased productivity associated with prepaid group practice. Studies by economists in non-prepaid group practices have suggested that, at best, only modest productivity gains may be associated with group practice. They have also suggested possible areas of increased inefficiency in group settings due to decreased incentives to control costs.[7-9] In view of the previously demonstrated economy of decreased operative rates in prepaid group practice and in view of the incentives in prepaid group practice toward the efficient utilization of scarce resources, this study was designed to investigate whether there are any economies in the utilization of surgeons in such a setting.

A recently developed methodology allows for the measurement of the workloads of surgeons.[10] The methodology expresses the operative work of surgeons in terms of hernia equivalents (HE). One hernia equivalent is defined as the amount of work involved in the operative and in the pre- and post-operative care of a patient undergoing an adult unilateral inguinal herniorrhaphy. A consensus of surgeons from a variety of practice settings has suggested that a weekly workload approximating 10 HE would comprise an active surgical practice yet still leave time for continuing education.[10] A recent study of the workloads of 19 general surgeons in fee-for-service, community practice showed that the median weekly workload was 3.1 HE, less than one third of the suggested standard.[10] The size of these workloads suggested an underutilization of the precious skills of these surgeons and an excess capacity of general surgeons in this particular community.

To investigate whether a prepaid setting may have an effect in adjusting the supply of surgeons to the demand for surgery in a defined population, the weekly workloads of seven general surgeons who comprise the entire general surgical staff of a prepaid group practice of 158,000 enrollees were measured for a recent six month period. The workloads measured comprised those operations performed in the operating room of the prepaid group practice's hospital on both hospitalized and ambulatory patients. Surgery performed in the surgeon's office was not recorded. The workloads of these seven surgeons were then compared with those of the previously studied population of nineteen general surgeons practicing in a suburban community in the New York metropolitan area.

Methods

Methodology Employed:

Hughes et al. have demonstrated that the relative values for surgical procedures in the California Relative Value Studies are valid weights that accurately reflect both the operative and the pre- and post-operative work involved in a procedure.[10,11] In developing their weighting scale, the relative value of an adult unilateral inguinal herniorrhaphy was designated as one hernia equivalent of surgical work and the relative values of all other procedures were ranked as multiples of it. The resulting quotient was termed the hernia equivalent (HE) of the procedure. Thus a radical mastectomy with a relative value of 70.0, twice that of an inguinal herniorrhaphy, 35.0, may be said to be equivalent to 2 HE of surgical work. In order to account for some of the increased work involved in an operation with more than one procedure, a relative value equal to twenty per cent of the first secondary procedure in such an operation was added to the relative value of the primary procedure to arrive at a total HE for the operation.

In the present study, hernia equivalent values were assigned to all of the operations performed in an operating room during a given six month period by the seven surgeons comprising the general surgical staff of the prepaid group practice. Weekly workloads for inpatient, ambulatory, and total operations were calculated. The workloads were adjusted for seasonal variation and extrapolated for a 48-week working year. The

complexity of operations performed (HE/operation) was also determined for each surgeon, for each classification of operation, and for the entire population of operations. The specific operations performed by the surgeons were enumerated.

The findings were then compared to those of a study of 19 general surgeons in community practice. The workloads of the surgeons in community practice contained only inpatient operations. The comparison of the workloads of the two populations of surgeons is facilitated by the fact that the surgeons in the community performed very few ambulatory procedures and, for the most part, admitted as inpatients those patients who were treated on an ambulatory basis in the prepaid group practice.

Population of Surgeons:

The seven general surgeons were graduates of American medical schools and were all certified by the American Board of Surgery. Two were also certified by the American Board of Thoracic Surgery. The surgeons ranged in age from 40 to 56, with mean age of 47.6 years. The mean duration of association with the prepaid group practice was 11.7 years, with a range of from 5 to 20 years. These seven surgeons performed all the general surgery presenting from the enrollees of the plan with the exception of open-heart, plastic, and transplantation surgery, which was referred to surgeons outside the prepaid group. It was the policy of the prepaid group that general surgeons not perform surgery from the specialties of gynecology, otolaryngology, or orthopedic surgery. That surgery was handled by appropriate specialists within the prepaid group. In the community previously studied, the general surgeons performed surgery from these specialties. During the period of the study, the seven surgeons did no surgery outside

the prepaid setting and very little surgery on non-enrollees was performed within that setting. It was the opinion of the surgeons that enrollees of the prepaid group underwent very little surgery outside the group, other than for the specific procedures which were referred out. The particular prepaid health care plan owned its own hospital.

In the prepaid practice under study, the surgeons were compensated according to a formula based on the number of years they have been associated with the group, the duration of their residency training, and the number of years of their experience before joining the group. Compensation was not related to the workloads produced. The general surgeon to population ratio in the prepaid group practice at the time of this study was 4.4/100,000, a low ratio compared to other prepaid group practices, which ranged from 5.6 to 12.4/100,000, and 45% of the ratio of the U.S. in general (9.8/100,000).*[12] The general surgeon to population ratio in the fee-for-service community was 10.1 surgeons to 100,000 population, roughly comparable to that of the United States as a whole at the time of that study.

*This figure excludes general surgical interns and residents. With them included as surgical specialists, the ratio of general surgeons to population in the United States in 1970 was 13.1/100,000.

Results

During the six months of observation, the seven general surgeons performed 1,523 operations with 377 secondary procedures, totaling 1,543.6 HE of surgical work. Of these 1,523 operations, 1,163 (76.4%) were performed on an inpatient basis and 360 (23.6%) on an ambulatory basis. These operations account for 94.6% and 5.4% of the total surgical work.

The mean total weekly workload in the population of surgeons was 9.1 HE per week, close to the consensus standard for a full workload of 10 HE, elaborated in the community study (Table I). The median weekly workload was 9.9 HE. Although four of the seven surgeons were producing at or modestly above the consensus standard, there was variation among the individual surgeons such that the weekly workload of the lowest producer (6.8 HE) was 65% that of the highest (10.5 HE).

The size of each surgeon's workload was a function of both the frequency and the complexity of his operations in both the inpatient and ambulatory settings. The frequency and the complexity of inpatient procedures were greatly in excess of those in the ambulatory setting and were the major determinants of the size of a surgeon's total workload. In fact, in no case did a surgeon's inpatient HE comprise less than 89% of his total workload. The volume of each surgeon's inpatient workloads was determined equally by the frequency and the complexity of his operations. The frequency of inpatient operations per surgeon ranged from 4.8 to 8.3 per week, with a mean of 6.9. The surgeon with the highest frequency of inpatient procedures was only the third highest producer. Inpatient operations were distributed among the surgeons in such a way that the highest mean HE per inpatient operation (1.68 HE) belonged to the highest overall producer, and was 75% more complex than the mean of the surgeon performing the least complex work (0.96 HE), the second lowest producer. The

Table 1

Volume and Complexity of Inpatient, Ambulatory, and Total Operative Workloads of Seven General Surgeons in a Prepaid Group Practice

Surgeon	No. of Inpatient Operations Per Week	No. of Ambulatory Operations Per Week	Inpatient H.E.s Per Week	Ambulatory H.E.s Per Week	Total H.E.s Per Week	Mean H.E. Per Inpatient Operation	Mean H.E. Per Ambulatory Operation	Mean H.E. Per All Operations
A	6.0	1.7	10.1	.35	10.5	1.68	.20	1.36
B	7.4	1.1	10.0	.27	10.3	1.36	.25	1.23
C	8.3	2.1	9.7	.39	10.1	1.17	.19	.97
D	6.5	3.5	8.9	1.01	9.9	1.36	.29	.99
E	7.8	2.3	8.7	.40	9.1	1.11	.17	.89
F	7.2	2.0	6.9	.45	7.3	.96	.23	.80
G	4.8	2.6	6.1	.75	6.8	1.27	.28	.91
Mean	6.9	2.2	8.6	.52	9.1	1.27	.23	1.02
Median	7.2	2.3	8.9	.40	9.9	1.27	.23	.97

median complexity for inpatient operations by surgeon was 1.27 H.E. The frequen of weekly ambulatory operations per surgeon ranged from 1.1 to 3.5, with a mean of 2.2. The mean complexity of ambulatory operations by surgeon ranged from 0.17 to 0.29, with a median value of 0.23. The mean complexity of all operations by surgeon was 1.02 HE and the median complexity 0.97 HE.

Though all the surgeons performed operations ranging in complexity from relatively minor ambulatory procedures as resection of skin lesions (0.16 HE) to major inpatient work as abdominal-perineal resections (2.86 HE), the distribution of mean HE per inpatient operation by surgeon tends to suggest that there was some specialization among the surgeons in the handling of their work. This impression is supported by the fact that, of the 17 operations more complex than 4.0 HE (vascular surgery), all but 3 were performed by surgeons A and D. These were the two surgeons certified in thoracic surgery. Further support for specialization among the surgeons is found in a negative correlation ($r=-0.4$) between the volume of each surgeon's inpatient and ambulatory workload. This would tend to indicate that there was some specialization among the surgeons in the handling of ambulatory as well as inpatient cases.

Comparing the prepaid group surgeons with the 19 general surgeons in community practice studied earlier (Table 2), we note that the median workload of the prepaid group surgeons is over three times that of the community surgeons. The distribution of workloads among the community surgeons was such that 16 out of the 19 surgeons in that setting had workloads less than the lowest workload observed in the prepaid group (6.8 HE).

Table 2

Comparison of the Surgical Workloads of 7 General Surgeons in Prepaid Group Practice and 19 General Surgeons in Community Practice

Practice Setting	Weekly HE Per General Surgeon				Mean HE Per Operation
	Range	Median	Mean	Standard Deviation	
Prepaid Group Practice (N = 7)	10.5-6.8	9.9	9.1	1.6	1.01
Community Surgeons (N = 19)	13.0-0.9	3,1	4.3	3.1	.95
Community Surgeons $\leq$ 56 years old (N = 10)	13.0-1,0	5.3	5.6	3.5	.94

It is interesting to note, however, that the workload of the highest producer in the fee for service setting was 13.0 HE per week, 124% that of the highest producer in the prepaid group. In the prepaid group practice, the workloads were distributed more evenly among the surgeons than in the community--the coefficient of variation of mean weekly workload was 0.18 in the prepaid group vs. 0.73 among the community surgeons.

In the community, a surgeon's age and the number of his hospital affiliations were found to be significantly correlated with his workload. In this prepaid group practice setting, however, neither a surgeon's age nor his number of years with the group were significantly correlated with his surgical workload; and a surgeon's hospital affiliations was not a relevant variable. A possible reason for the absence of a relationship between age and workloads in this prepaid group may be the relatively small range in age of the surgeons in this setting. The prepaid group surgeons ranged in age from 40 to 56 years, while the community surgeons ranged from 35 to 69 years. The mean age of the surgeons in the two settings, 48 years in the prepaid group and 52 years in the community, did not differ markedly. The distribution of ages in each setting differed, however, such that nine of the community surgeons were older than the oldest surgeon in the group (56 years). These nine surgeons would seem to be at that point in their careers where workloads might fall off most sharply. Indeed, it would appear that this older age distribution in the community might account for some of the difference in the median workload between the two settings. As indicated in Table 2, the median weekly workload of the 10 community surgeons equal to or less than 56 years old was 5.3 HE per week. This value is about 30% closer to the median in the prepaid group of 9.9 per week than the overall community median of 3.1 per week, but still 46% less than that value.

The distribution of all operations and of ambulatory operations in the prepaid group practice by complexity is given in Figure 1. Forty-six percent of all operations are less complex than an inguinal herniorrhaphy (1.00 HE) and 79% are less complex than a cholecystectomy (1.71 HE). Only 6% of the surgery is more complex than a partial gastrectomy (2.29 HE) and 2% more complex than an abdominal-perineal resection (2.86 HE). Particularly striking in Figure 1 are the high peaks at 0.1-0.3 HE (resection of skin lesion) and at 1.0 HE (inguinal herniorrhaphy). More than two-thirds of the operations in the range of 0.1-0.3 HE were performed on an ambulatory basis. Ambulatory operations, comprising 23.6% of all operations, accounted for 50.2% of operations less complex than 1 HE. Ninety-four per cent of ambulatory procedures were less complex than 0.5 HE and all but two (vein strippings) less complex than 1 HE.

The mean and median complexity of operations in the prepaid group practice, 1.01 HE and 1.00 HE per operation, were not substantially different from those values found in the fee-for-service community practice, 0.95 HE and 0.94 HE per operation respectively (Table 2). Figure 2 compares the frequency distribution of all operations performed in the prepaid group practice with that of inpatient operations performed by the community surgeons. (Though the community study contains only inpatient surgery, the comparison of the two populations of operations are, in the aggregate, appropriate for the reasons previously stated.) With a few exceptions, the distributions are quite similar. The first exception is the fact that 33% of all surgery in the prepaid group occurs in the 0.1-0.5 range as opposed to 24% in the community. The large volume of surgery in this range in the prepaid group practice is, in large measure, accounted for by the

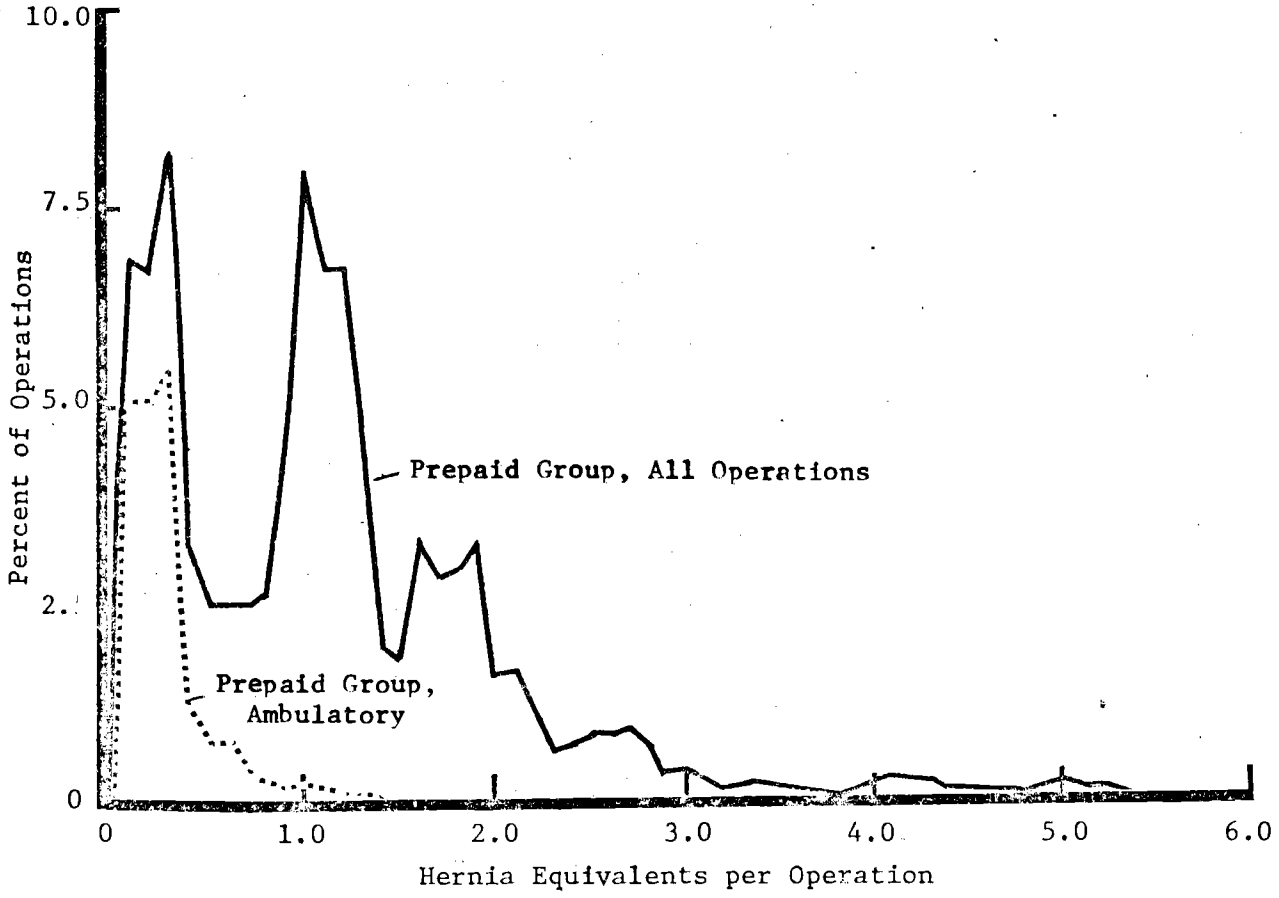

Figure 1: Distribution of all Operations and of Ambulatory Operations by Complexity for 7 General Surgeons in Prepaid Group Practice

Note: Data smoothed by four-term moving average.

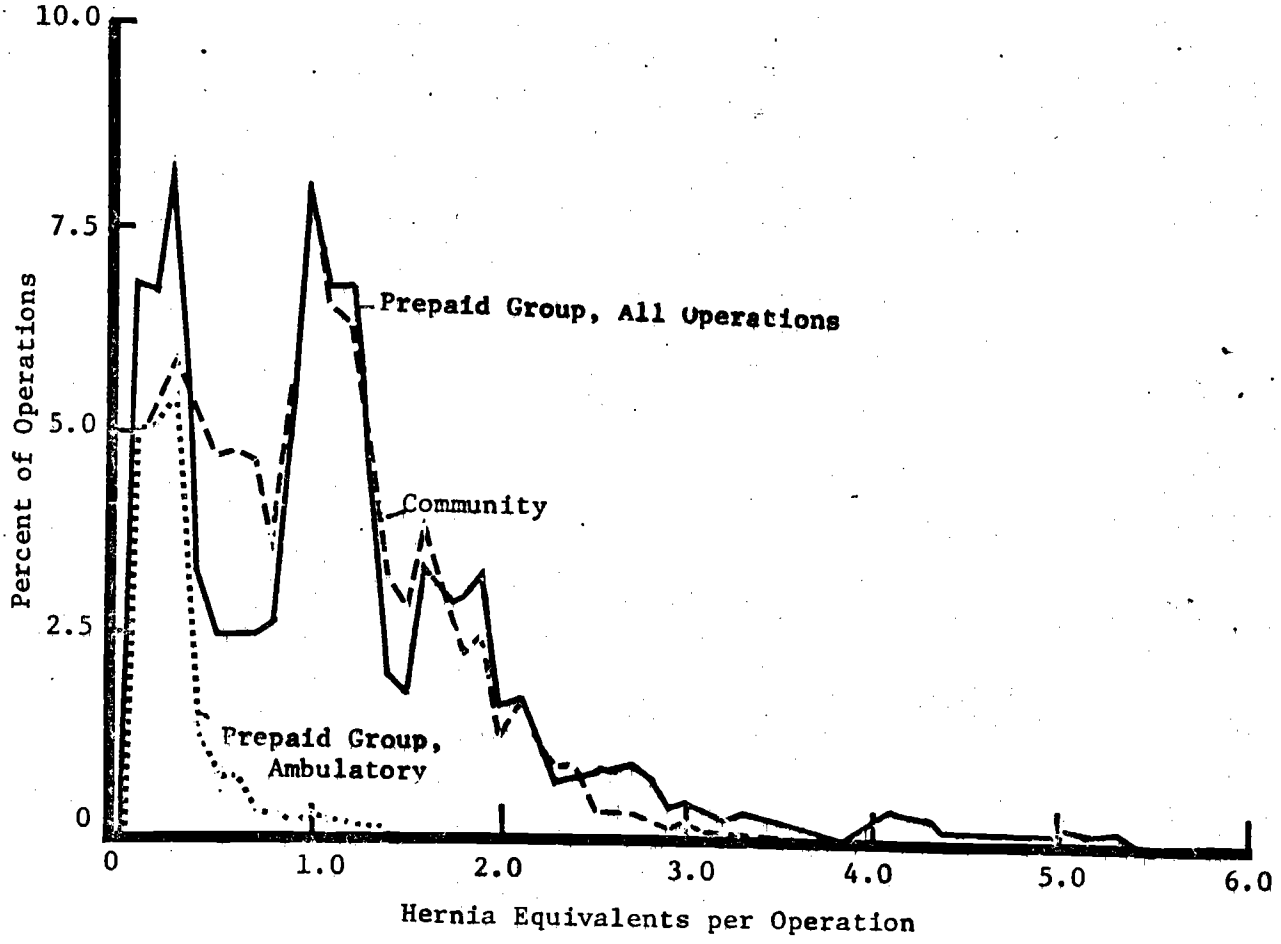

Figure 2: Distribution of all Operations and Ambulatory Operations by Complexity for 7 General Surgeons in Prepaid Group Practice and of Inpatient Operations for 19 General Surgeons in Community Practice

Note: Data smoothed by four-term moving average.

procedure, resection of lesion of skin (0.16 HE), which comprises 17% of all the operations in the prepaid group practice and 53% of surgery within this range. It is tempting to speculate that some of the difference between the two settings in the volume of the workloads in this range stems from the fact that the community surgeons were probably performing an additional number of these relatively straightforward procedures in their private offices. Accordingly, these procedures would not appear in their inpatient workloads. There is not, in the prepaid group setting, a facility exactly comparable to a surgeon's private office.

The second exception appears in the range of 0.4-0.8 HE where there is a greater relative frequency of cases in the community as compared to the prepaid group. This is largely a result of the fact that 8.0% of the surgery performed by the general surgeons in the community was in the categories of tonsillectomy with and without adenoidectomy, and dilation and curetage. The HE values for these two categories of procedures are 0.5 HE and 0.43 HE, and they account for 42% of operations in that range. In the prepaid group, all of this surgery is performed by surgeons in specialties other than general surgery and accordingly does not appear in the workloads of the general surgeons. Finally, two per cent of cases in the group setting are in excess of 2.9 HE, as compared to 0.5% of cases in the community. The resulting skewed tail of the prepaid group curve includes the substantially larger number of complex vascular cases, clustering about 4 HE, in that setting.

Despite the differences enumerated above and the fact that the two curves were found to be significantly different at the 1% level by the Kolmogorov-Smirnov test, it is important to note two important

similarities between the surgery performed in each setting. In both settings, operations in the range of complexity from 1-2.3 HE account for almost half of all surgery and are similarly distributed within that range. Also, the five most frequently performed operations in both settings: inguinal herniorrhaphy, resection of skin lesion, cholecystectomy, appendectomy and breast biopsy/partial mastectomy, are identical, accounting for 50% of all operations in the prepaid group and 36% of all operations in the community.

Discussion

The prepaid group practice under study appears to be achieving economies in the delivery of surgical services through: (1) the relatively high volume of the workloads of its general surgeons, (2) the rationing of surgical resources to handle specific procedures, and (3) the utilization of an ambulatory modality for the performance of almost 1 in every 4 operations.

A median weekly workload approaching 10 HE suggests that the skills of this population of seven general surgeons are being more efficiently utilized than those of a previously studied population of 19 general surgeons in community practice. At the time this study was performed, five years had passed since a new surgeon had been added to the group. During that time, the number of enrollees had grown by over sixty per cent. This fact suggests the possibility of a previous underutilization of or of a present rationing of surgeons' services through a number of means. In this light, it would be worthwhile knowing where the prepaid group practice stood, at the time of the study, in relationship to the equilibrium between the supply of surgeons and the demand for surgery. Shortly after the completion of this study, the prepaid group added an additional general surgeon. The addition of this surgeon would imply that the surgeons in this study perceived their current workloads as approaching a maximum for a desirable workload. Assuming that the addition of a new surgeon entailed no change in the incidence of surgical procedures in the group enrollees, a 12.5% diminution in the mean workload per surgeon would be expected. Interesting information as to the dynamics of the surgical staffing of prepaid group practices could be gathered by analysis of workloads of surgeons over time in relationship to increases in the number of enrollees and in the number

of surgeons. It would be important to couple such information with analysis of the non-operative tasks performed by surgeons in prepaid groups to see if variations in the surgeon to population ratio are associated with variations in the amount of non-surgical work performed and, in the case of general surgeons, associated with changes in the frequency of the performance of non-general surgical procedures. A study of the non-operative tasks of the general surgeons in this prepaid group is currently underway.

It is interesting to note that the seven general surgeons in this particular prepaid group practice maintained their high workloads despite the fact that their compensation was not related to the volume of their individual workloads. This finding is in line with the hypothesis that the success of prepaid group practice in delivering medical care at lower cost may be a function of the type of physicians attracted to such a setting as well as a function of the prepayment mechanism itself.[9,13]

It's important to note that the findings in this study are not, per se, generalizable to other prepaid group practices. The general surgeon to population ratio in the particular prepaid group practice was kept low as compared to other prepaid groups.[12] It would appear, however, that the prepaid group practice modality of organizing the delivery of surgical care, as exemplified in this particular setting, provides the necessary administrative controls that enable the supply of surgeons for a defined population to be adjusted to the actual demand for surgery from that population. Similar controls might also be found in non-prepaid group practices and in foundations for medical care. It would be worthwhile studying the surgical workloads of surgeons both in other prepaid group practices with differing surgeon to population ratios and in other forms of organized practice to elucidate the

impact of various forms of organization on surgeon utilization. The importance of the ratio of surgeons to population is further exemplified by the fact that if the surgeon to population ratio in the fee-for-service community previously studied were the same as that in the prepaid group, and if the total volume of surgery performed in the community remained unchanged, the mean operative workload of the community surgeons would be 9.9 HE per week, approximating that in the prepaid group practice.

A further benefit in this particular prepaid group practice is the fact that the two surgeons with the most specialized post graduate training (thoracic surgery residency training) were able to utilize their skills in the performance of complex vascular work--for the most part, aneurysms of the abdominal and thoracic vessels. This finding was reflected in the fact that these two surgeons had the two highest mean complexities for inpatient operations. This economy might also entail the possibility that, in view of the relative frequency with which these two surgeons were performing this type of work, the patients undergoing these operations were receiving an increased quality of care. This is in contrast to the community of 19 general surgeons where it was noted that the few complex cases performed during the year of study were scattered almost at random among the surgeons with no regard to their qualifications. A further quality of care benefit may acrue to the enrollees of the prepaid group from the practice of having specialty surgery performed only by specialists trained in that field.

Perhaps the most substantial economy in the delivery of surgical services in the prepaid group practice is the handling of 24% of all cases on an ambulatory basis. The prepayment mechanism in prepaid group practice encourages practices as this. In the fee for service community, however, hospitals can receive no compensation for unfilled beds or for unused operating rooms and the patient can receive little, if

any, compensation for elective surgical work performed in a doctor's office. The pressures from both directions work toward the hospitalization of patients for minor surgical procedures. Fifty per cent of cases chosen for ambulatory work were less complex than 0.5 HE, a range of complexity that would, for the most part, appear to create no undue risk to the patient. Were almost one in four operations in other prepaid group settings to be performed on a similar ambulatory basis, such a practice would appear to account for much of the difference noted in the rates of hospitalized surgical procedures between health plan members enrolled in prepaid plans vs those receiving care in fee-for-service settings.[1-5] The efficacy of the practice of ambulatory surgery is becoming increasingly recognized. In recent years, a number of ambulatory surgical services have arisen in medical settings with favorable results and hints of major cost savings.[14-17] The economic nature of the ambulatory practice in this prepaid group is further heightened by the fact that the operations were performed in a regular hospital operating room. Thus, this practice entailed the use of a facility that would otherwise be idle and did not require the construction of a special facility.

The similarity of the frequency distributions of the operations in the group practice and in the community and the similarity of the ranking of specific procedures in each setting is worth noting, especially in view of previous studies showing decreased rates, and at times markedly decreased rates, for surgical procedures in prepaid vs. fee for service settings. To a large extent, these decreased rates have been demonstrated for otolaryngologic and gynecologic operations which do not fall within

the workloads of the general surgeons in the prepaid group practice. The similar frequency distributions in the range 1.0 to 2.3 HE suggest that general surgery of middle level complexity is performed in the same proportion in the two populations. Studies are now underway to ascertain the incidence of specific general surgical operations in the two settings.

References

1. Densen PM, Balamuth E, and Shapiro S: Prepaid medical care and hospital utilization. American Hospital Assn, Hospital Monograph Series 3, 1958

2. Densen PM, Jones EW, Balamuth E, Shapiro S: Prepaid medical care and hospital utilization in a dual choice situation. Amer J Public Health 50:1710, 1960

3. Perrott GS: Utilization of hospital services. Amer J Public Health 56:57, 1966

4. _____: The federal employees health benefits program: enrollment and utilization of health services, 1961-1968. Department of Health, Education and Welfare, Health Services and Mental Health Administration, Washington, D.C., 1971

5. Hastings JEF, Mott FD, Barclay A, Hewitt D: Prepaid group practice in Sault Ste. Marie, Ontario: Part I: Analysis of utilization records. Medical Care 11:91, 1973

6. Kopplin P, Vayda E: The characteristics of internists in three prepaid group practices. Health Services Reports 88:541, 1973

7. Bailey RM: A comparison of internists in solo and fee-for-service group practice in the San Francisco Bay area. Bull NY Acad Med 44:1293, 1968

8. Reinhardt UE: A production function for physicians' services. Rev Eco & Stat 54:55, 1972

9. Newhouse JP: The economics of group practice. J Hum Res 8:37, 1973

10. Hughes EFX, Fuchs VR, Jacoby JE, et al: Surgical work loads in a community practice. Surgery 71:315, 1972

11. Committee on Fees of the Commission on Medical Services: 1960 Relative Value Studies. Third edition. San Francisco, California Medical Association, 1960

12. Mason HR: Manpower needs by specialty. JAMA 219:1621, 1972

13. Reinhardt UE: Proposed changes in the organization of health-care delivery: an overview and critique. Health and Society 51:169, 1973

14. Craig GA: Use of day beds in gynecology. Brit Med J 2:786, 1970

15. Davis JE, Detmer, DE: The ambulatory surgical unit. Ann Surg 175:856, 1972

16. David JE: Ambulatory surgical care: basic concepts and review of 1,000 patients. Surgery 73:483, 1973

17. Egdahl RN: Ambulatory health-care delivery and the surgeon. Surgery 73:637, 1973