

# Hospitals and Health Maintenance Organizations: An Analysis of the Minneapolis-St. Paul Experience

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*Minneapolis-St. Paul is recognized as a prime example of health care competition. Policymakers and others have been asked to look to the Twin Cities as a model upon which to base new competitive initiatives in the health care sector. Yet little is known about the impact of Health Maintenance Organizations (HMOs) on other health care providers. This study examines the effects of the area's seven health maintenance organizations on the local hospital community. Three questions are addressed. First, is the situation in the Twin Cities unique? A comparison of case study findings and the available literature together with hospital data from similarly HMO-penetrated markets suggests that the Twin Cities' hospital market is indeed different. Second, what is the nature of hospital-HMO interaction? The flexibility of contracting apparently allows hospitals to affiliate successfully with an HMO under a variety of service and reimbursement agreements. Third, what effect has HMO activity had on community-wide utilization? While HMO enrollees clearly use fewer hospital days and the trend in the community is toward fewer days, attributing the change to HMOs is difficult. A large portion of the differences between HMO and community-wide utilization levels is attributable to differences in population.*

## Introduction

In recent years, the concept of a competitive market in health services has been gathering support in various quarters, largely based on the presumption that competition offers a nonregulatory means of improving efficiency in health care delivery, thereby containing its costs. The competitive factor introduced by Health Maintenance Organizations (HMOs) is a critical element in many legislative reform proposals, and has been introduced as a new issue in the long-standing national health insurance debate. Current interest in HMO-related competition is based

on more than the prospect of legislated change in the market environment. Between 1970 and 1980 the number of operational HMOs rose from 37 to 229; their geographic distribution broadened from 14 to 37 states; and the percentage of standard metropolitan statistical areas (SMSAs) with at least one HMO has doubled (*Group Health News*, 1980). This growth has potentially dramatic implications for hospital competition and utilization. This paper explores three issues within the context of a Minneapolis-St. Paul case study: (A) Is the high HMO market share in the Twin Cities a result of special, unique factors? (B) How have individual hospitals been involved in HMO activity? (C) What has been the effect of HMOs on community-wide hospital utilization?

The following section of this paper will briefly summarize the existing analytic literature on the effects of health maintenance organizations. Particular emphasis is given to analyses of their competitive effects. The third section highlights the socio-

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demographic and economic characteristics of the Twin Cities. The fourth section analyzes local explanations for the development of HMOs. These hypotheses are tested, where possible, using existing literature. Additional tests are provided by comparisons of the operating characteristics of hospitals in Minneapolis-St. Paul and those in similarly penetrated markets. In the fifth section reimbursement mechanisms and service arrangements of HMO-hospital contracts are analyzed, together with the effects of these affiliations on hospitals. The sixth section focuses on the effect of HMOs on community-wide hospital utilization. Particular attention is devoted to the effects of population differences. The last section contains a summary and conclusions.

## The HMO Literature

The literature evaluating the effects of health maintenance organizations in terms of their health services utilization, costs, and quality have been admirably reviewed elsewhere (Luft, 1978; Luft, 1980(a); Cunningham and Williamson, 1980; and Wolinsky, 1980). Here those findings are briefly summarized.

Luft's review indicates:

- Total costs (premium and out-of-pocket) for HMO enrollees are 10 to 40 percent lower than those for comparable people with conventional health insurance.
- The rates of change in HMO costs per unit of service are not significantly different from the national trend.
- Enrollees in HMOs have about as many ambulatory visits as comparison groups.
- Most of the HMO cost differences are attributable to hospitalization rates about 30 percent lower than those of conventionally insured populations.
- The lower HMO hospitalization rates are due almost entirely to lower admission rates; the average length of stay shows little difference.
- There is no evidence that discretionary or "unnecessary" categories of admissions are disproportionately reduced in HMOs.

Cunningham and Williamson have reviewed twenty years of quality of care studies and conclude that no methodologically sound study has been able to show lower quality of care in an HMO than in a fee-for-service setting.

It is important to note that these summaries do not say. Particularly, they do not indicate whether the lower hospital utilization among HMO enrollees is due to an "HMO effect" which reduces inpatient utilization, or to a "self-selection" effect by those who do not use hospitals, or to some other factor. They do not say that total health care costs in the community are lower, or that HMO premiums are lower than traditional insurance premiums (unlike total costs, which are lower). In short, existing

research has been able to rigorously demonstrate very little.

The analytic literature on the competitive effects of HMOs is sparse. This is due in part to the lack of a well-specified theory of what actions one would expect in a "competitive market". Economic theory only says that as a result of competition prices will be driven down to marginal costs. Careful analysts of the nature of competition have observed that much of the literature confuses competition with market-structure (Stigler, 1968 (a); McNulty, 1968). The distinction is critical. Competition in the classical sense is a process of moving toward an equilibrium where price will be equal to marginal cost. It involves activities such as price-cutting and offering different service configurations, (e.g., longer hours, higher quality, multiple locations, no frills). Competition in the market-structure sense focuses on the conditions prevailing when equilibrium is reached—price equals marginal cost, there is no price-cutting, no advertising. Firms are identical, selling identical products, and are too small to affect price. Rivalry, or the process of competing has more significant consequences for the operation of the firm, and thus is the center of our attention. Rivalry is also more difficult to quantify, because it takes a variety of price and non-price forms depending upon the constraints in the market (Stigler, 1968(b); Douglas and Miller, 1974; Cheung, 1980).

With respect to insurance markets, Enthoven (1978) and Luft (1980(a)) have together developed four models of the effects of the introduction of HMOs into traditional insurance markets, predicting that:

- *per capita* health care costs may increase or decrease;
- community-wide hospital utilization may increase or decrease;
- insurance benefit packages may or may not expand;
- the market may be segmented.

The authors note that each of the models may be correct depending upon the other conditions present in the local market. While noting evidence from various communities, they do not rigorously test their hypotheses. To our knowledge there has been no analysis of the effects of HMOs on the local hospital markets. In fact, the literature concerning hospital competition is largely anecdotal (Salkever, 1978), although Hales (1974) does present and test a model of local hospital service competition.

The Goldberg-Greenberg (1977, 1980) study is particularly interesting since it is the only analysis to empirically test hypotheses concerning insurance industry behavior in environments that have experienced HMO activity. The authors argued that an increase in HMO market share would decrease Blue Cross hospitalization rates. As an HMO attracted patients by means of lower premiums, broader benefits, or some other method, Blue Cross was hypothesized to try to keep its costs (and, therefore, premiums)

comparable by implementing (unspecified) hospital utilization controls. The authors analyzed 1974 State data on federal employees choosing the Blue Cross high option plan. The results were consistent with the hypothesis using both non-maternity hospital days per thousand and the average length of stay in maternity cases. The analysis, however, has a potentially serious short-coming. As Enthoven (1978) notes:

"... the results are dominated by the three West Coast States and Hawaii. Using Goldberg-Greenberg's measure of penetration, only these States and the District of Columbia have HMO enrollees equal to more than five percent of insured persons . . . . When the four western States are omitted, the relationship between HMO share and Blue Cross utilization is no longer statistically significant."

This failure to incorporate the historically lower utilization of inpatient facilities on the West Coast potentially biases their results. At best, the authors cannot reject the joint hypothesis that historically lower West coast utilization.<sup>1</sup> Consequently their results, though important, must be viewed with caution.

All other analyses of the competitive effects of HMOs consist of case studies. They provide useful insights into the workings of the various markets but do not allow the testing of specific hypotheses. Further, the findings are open to alternative interpretation.

### Northern California

Northern California has been identified as exhibiting the most "clear and unambiguous" competitive response by insurers (Goldberg and Greenberg, 1977; 1979). This has included the establishment of several independent practice associations by area physicians and medical societies. Blue Cross has developed more comprehensive benefit packages, more thorough hospital utilization review, and its own HMO. Luft (1980(a)) raises a serious question about the cost impact of these activities, noting that *per capita* total health expenditures in California rank third nationally, suggesting that the net effect of this rivalry may be a substitution of ambulatory for inpatient hospital care with no net savings in health expenditures. There is virtually no discussion of the effects of these activities on area hospitals, individually or as a group.

<sup>1</sup>Goldberg and Greenberg (1980, fn. 20) do address this issue. The authors re-estimate the equation including a West Coast dummy comprising 13 States. The result is a smaller estimated effect and reduced statistical significance. This approach does not exactly address Enthoven's earlier critique. Further, however, the author's discussion of multicollinearity is an admission that they were unable to separate HMO and West Coast effects.

### Rochester, New York

Goldberg and Greenberg (1977) also identified Rochester as supporting the competitive model. The city has several HMOs which are said to be providing intense competition with the local Blue Cross/Blue Shield Plan. The inpatient medical-surgical utilization rate for members under 65 years of age was relatively constant from 1974 to 1977 but dropped precipitously by mid-1977. This decline, much larger than that experienced by any other eastern Blue Cross Plan, is attributed by Rochester Blue Cross to the competitive effect. Luft (1980(a)), however, offers a variety of alternative explanations: Rochester has an innovative employer community interested health care cost control; a unique regional budgeting strategy was being implemented during the period; and changes in New York State's nursing home reimbursement policies may have kept Medicare and Medicaid recipients in hospitals longer, thus reducing the number of beds available for Blue Cross use.

### Hawaii

Christianson (1978) and Goldberg-Greenberg (1977, 1979) describe competition between Blue Shield and Kaiser as proceeding along premium and benefit dimensions. Attempts to control costs have concentrated on payments to physicians. Hospital use is very low by national standards. There are few hospital beds *per capita* and, at least on Oahu, occupancy rates are high. Area hospitals do not seem to be actively offering service or price incentives to attract Blue Shield or Kaiser patients. Enthoven (1978) and Luft (1980(a)) feel that in Hawaii the Blue Shield Plan functions much like an HMO. Hence there is no true traditional insurer to respond to competition by Kaiser. Further, the Blue Shield behavior may be related to the special history of plantation-provided medical care rather than competition (Luft, 1980(a)).

In addition to Minneapolis-St. Paul, discussed below, there have been a number of other case studies (Goldberg and Greenberg, 1979; Christianson, 1979; Aquilina and McClure, 1980). In general, these studies find little evidence of dramatic price or benefit competition as a result of HMO development and report little documentation of the effects of such competition on individual hospitals.

## Minneapolis-St. Paul

Minneapolis-St. Paul has been cited as a prime example of the competitive effect generated by HMOs. The Twin Cities have witnessed highly visible changes in their health care market during the past few years. Based upon a 1976 visit, Goldberg and Greenberg (1977) only briefly described the area as having a bright future for HMO development. By the late seventies Christianson (1978) and Christianson and McClure (1979) observed active price and accessibility of care competition among HMOs. Physicians had responded with their own prepayment arrangements and had submitted to cost controls that "may be unprecedented in a physician-sponsored (excluding group practice) HMO." Blue Cross had also established an HMO, but had not yet been successful in controlling premium increases. Hospitals were described as providing discounts to HMOs by a variety of mechanisms. This activity was said to be due to the low overall occupancy rate in the community, resulting from the large number of beds *per capita*. This study focuses on hospital-specific effects.

The seven-county Twin Cities metropolitan area has a population of almost two million. As Table 1 indicates, the population is younger than both the national average and the state as a whole. Ethnically the area is relatively homogenous. Only four percent of the population is black, compared to a 12.1 percent black population in the "average" U.S. Standard Metropolitan Statistical Area. Further, data from the 1970 census suggest that nearly 35 percent of the population in the Twin Cities has Scandinavian origins, compared with six percent nationally.

Educationally, Minnesota has a larger proportion of high school graduates than does the nation as a whole. Minnesotans in general, and Twin Cities residents in particular, are more affluent. *Per capita* personal income in the metropolitan area was \$8,021 in 1977, while the state reported \$7,129 and the national average was only \$7,019. The incidence of poverty is 26 percent below the national average.

The Minneapolis-St. Paul area has considerably more community hospital beds per thousand population than the U.S. as a whole. The 1979 national average was 4.47 beds per thousand; the Twin Cities had 5.42. As Table 2 indicates, the Minneapolis-St. Paul area also has more active physicians per thousand. The proportion of physicians in group practice in the state exceeds the national average by almost 68 percent. This fact may be of crucial importance in explaining the development of HMOs in the Twin Cities.

### TABLE 1

#### Demographic Characteristics of Minneapolis/St. Paul (MSP)

	MSP	Minnesota	National
Population (Millions), 1977 <sup>1,2</sup>	1.92	3.98	216.33
Population Distribution by Age, 1977 <sup>1,2</sup>			
0-4 Years	6.5%	6.9%	7.0%
5-14	16.8	16.7	14.9 <sup>5</sup>
15-44	49.4	45.5	47.0 <sup>5</sup>
45-64	17.9	19.4	20.2
65 +	9.4	11.4	10.8
Population Distribution by Race and Ethnicity, 1970			
Black (SMSA only) <sup>1</sup>	4.0% <sup>6</sup>	NA	12.1%
Scandinavian <sup>3</sup>	34.9	37.1	6.0
Proportion Graduating High School, 1976 <sup>1</sup>	NA	72.4	66.6
Proportion Below Poverty Level, 1975 <sup>1</sup>	NA	8.3	11.4
Per Capita Personal Income, 1977 <sup>1,4</sup>	\$8,021	\$7,129	\$7,019

<sup>1</sup>U.S. Department of Commerce, *Statistical Abstract of the United States, 1978*, pp. 14, 17, 25, 29, 146, 449 or 470.

<sup>2</sup>Minnesota Department of Health, *Minnesota Health Statistics, 1977*, pp. 51-63.

<sup>3</sup>U.S. Bureau of the Census, *Characteristics of the Population, 1970*.

<sup>4</sup>*Survey of Current Business*, April 1979, p. 28.

<sup>5</sup>National age groups are 5-13 and 14-44.

<sup>6</sup>Based on populations of cities of Minneapolis and St. Paul.

### TABLE 2

#### Medical Facilities and Services

	US	MN	MSP
Community Hospital Beds per 1,000 Population (1979) <sup>1</sup>	4.47	5.85	5.42
Active Patient Care Physicians per 1,000 Population (1978) <sup>2</sup>	1.47	1.57	1.92
Percent of Physicians in Groups <sup>3</sup>	23.5	39.4	NA

<sup>1</sup>AHA, *Hospital Statistics, 1980 Edition*, Table 6.

<sup>2</sup>AMA, *Physician Distribution and Medical Licensure in the U.S., 1978*.

<sup>3</sup>AMA, *Group Medical Practice in the U.S., 1975*.

There are seven HMOs currently operating in Minneapolis-St. Paul with an estimated enrollment of over 16 percent of the 1979 population.<sup>2</sup> The first HMO, the Group Health Plan, was established as a cooperative in 1957. In its early years, some community members alleged that it provided inferior care. In 1972, the St. Louis Park Medical Center adopted a prepayment plan (The MedCenter Health Plan). This group is considered the most prestigious in the community. The role of such a group is often seen as pivotal in legitimizing HMOs (Aquilina and McClure, 1980).<sup>3</sup> The Ramsey Health Plan was organized in 1972 for county employees but has enrolled others since 1976. In 1974, SHARE, the only federally qualified plan, Nicollet-Eitel, and HMO-Minnesota were formed. The Physicians' Health Plan (PHP) sponsored by the Hennepin County Medical Society was formed in 1975. HMO-Minnesota and PHP are Independent Practice Associations (IPAs) admittedly organized as responses to the "competitive threat" of patient transfer to the group-type HMOs.

### Reasons for Development

Twin Cities' respondents have asserted five reasons for the existence and growth of HMOs in the community.<sup>4</sup>

#### Presence of Many Group Practices

Some prepaid group practice executives argued that the conversion from independent practice to group practice is more difficult than from a fee-for-service to a prepaid format. Prepayment only simplified accounting; the group practice form resulted in changed patterns of medical care. In any event, as Table 2 indicates, Minnesota does have a larger proportion of physicians in group practice than does the nation. The only rationale offered for this disparity was proximity to the May Clinic model.

#### Employer Situation

Employer arguments have three distinct elements. First, there is generally a high employment rate. Second, there are many large employers in the area, and third, many employers have their corporate headquarters located in the Twin Cities.<sup>5</sup> The high employment

<sup>2</sup>Informal estimates list 1980 enrollment at 18 to 20 percent.

<sup>3</sup>The reason for its expansion is unclear. Some observers suggest that the group was losing patients to Group Health. The medical director of MedCenter argues that the group was interested in experimenting with prepayment as a means of reducing administrative problems of billing and to help forecast expected patient volume.

<sup>4</sup>For a description of the case study procedure and the persons interviewed see Morrisey, Gibson, and Ashby (1980).

<sup>5</sup>The *Wall Street Journal* (1981) reported that Minneapolis ranks ninth nationally in the number of major company headquarters in a city.

rate insures that the wages and fringe benefits of any firm in the area will be competitive. The large firm size reduces marketing costs and reduces the per-employee administrative costs of offering multiple plans. The headquarters argument is more subtle, holding that corporate executives, by virtue of living in the community, are more cognizant of the interests and issues of that community than of those in other plant locations. Hence, it is argued, an issue with high local visibility, such as HMOs in the Twin Cities, will get more serious consideration by those in a position to make decisions than would a similar issue raised in the corporate hinterlands.

It should be noted that there is a single strong dissenting view which holds that employers did not play a major role in the development of HMOs or in their expansion. Rather, employers postured supportively, but many failed to offer any of the available plans. According to this view, it was only when the SHARE plan became federally qualified, thus able to mandate employers, that any large increases in HMO enrollment occurred. SHARE officials are somewhat in agreement with this point of view but argue that the only real impact of their federal qualification was to force employers to offer HMOs somewhat sooner than they otherwise would have.

#### Paul Elwood, InterStudy

The principal role played by InterStudy is seen as the provision of low-cost information. Many respondents noted that Ellwood *et al.* kept the programs in the public eye and provided information to interested employers. One apparent additional influence of InterStudy has been the training of key personnel. The MedCenter HMO in St. Louis Park was established under a management contract with InterStudy. The SHARE program was assisted in its development by InterStudy. The director of the Physicians' Health Plan was once an employee of InterStudy.

#### Many Physicians, Hospital Beds

The large supplies of physicians and beds shown in Table 2 are seen as making physicians more concerned about potential loss of patient and individual hospitals more receptive to means of increasing inpatient volume.

#### Population Characteristics

First, as noted in Table 1, the population is relatively white and affluent. These characteristics have been associated with lower health care utilization (DHHS, 1980). Second, the respondents felt that the Scandinavian influence leads to a spirit of cooperation, evident not only in health care, but also in cooperation activities of many kinds, including a forward-looking, progressive government.

Recent work by Goldberg and Greenberg (1981) lends support to two of the five explanations. The authors attempted to judge the impact of state level regulation on the growth and market share of HMOs at the state level. They found that the proportion of physicians in group practice and the proportion of the labor force in unions had positive and statistically significant impacts on HMO growth. These factors are consistent with the marketing to large employer and group practice themes. However, Goldberg and Greenberg also found that State legislative and regulatory restrictions had little adverse impact. This finding suggests that the progressive government explanation of the Twin Cities HMO development should be discounted. Finally, Goldberg and Greenberg hypothesized that areas of high hospital costs would experience greater HMO development. While not an explanation offered by Twin Cities observers, it is true that 1979 hospital expenses per day in Minneapolis-St. Paul were over 10 percent above the national average (AHA, 1980). This interpretation, however, is mitigated by Minnesota State legislation requiring inpatient insurance coverage for chemical dependency in all hospital insurance programs.

Another means of judging the uniqueness of the Twin Cities experience, is to examine the available hospital operating characteristics to see if the overall performance of hospitals in the community is similar to that of hospitals in other major HMO markets. Table 3 presents such a comparison. The mean values of all Twin Cities' community hospitals are compared both with those of hospitals located in standard metropolitan statistical areas with 10 percent or more of their population enrolled in HMOs, and with those SMSAs having four or more operating HMOs. Both comparisons are shown because of assertions that the full impact of HMO presence can only be observed when there are multiple and competing HMOs (Christianson, 1979). The results suggest that there is indeed something different about the Twin Cities hospital market. It may be that the HMO environment is fundamentally different in the Twin cities. The difference may stem from differences in timing of HMO development, populations, regulations, input prices, or the nationally recognized Professional Standard Review Organization (PSRO) (Deacon *et al.*, 1979).<sup>6</sup>

<sup>6</sup>It is interesting to note that the similarity of operating margins suggests that the hospitals, as a group, have been able to adjust to whatever differences do exist across communities.

TABLE 3

Hospital Performance in Minneapolis-St. Paul and Other Major HMO Markets<sup>1</sup>, 1978  
(Standard Deviation in Parentheses)

	Hospitals in Twin Cities	Hospitals in other major HMO-Penetrated SMSAs with:	
		10% + Market Share	Four or more HMOs
Number of Hospitals	33	264	665
Occupancy Rate	67.07 (10.07)	63.86 (16.07)	72.17 <sup>2</sup> (14.71)
Total Expenses per Admission	\$1795.73 (\$ 794.39)	\$2319.64 <sup>2</sup> (\$1332.33)	\$2815.39 <sup>2</sup> (\$1157.32)
Surgical Procedures per Admission	.48 (.13)	.54 <sup>2</sup> (.29)	.55 <sup>2</sup> (.23)
Operating Margin <sup>3</sup>	2.25 (3.40)	3.01 (6.67)	2.30 (6.76)

<sup>1</sup>These Markets are identified in Ellwood (1979).

<sup>2</sup>Differences between this group and the Minneapolis-St. Paul hospitals is significant at the 90% confidence level or higher using a t-test with unequal variances.

<sup>3</sup>Operating margin is defined as:

$$\frac{\text{Total Net Revenue} - \text{Total Expenses}}{\text{Total Net Revenue}} \times 100,$$

where total net revenue is gross revenue less deductions for bad debts, contractual adjustments, and charity; i.e., actual revenue, not total billed charges.

Sources: American Hospital Association, Annual Survey, 1978.

Office of Health Maintenance Organizations, *National HMO Census of Prepaid Plans, 1979*.

U.S. Department of Commerce, *Statistical Abstract, 1978*.

## The Nature of the HMO-Hospital Relationship

Hospitals in the Twin Cities cannot be simply cataloged as those with and without an HMO affiliation. Complicating factors include special service contracts and the variety of HMO formats (Kralewski and Countryman, forthcoming).

The nature of the relationship depends upon the form of HMO considered. There are two forms in Minneapolis-St. Paul. The first consists of a multi-specialty group of physicians who are often salaried by the HMO. The distinctive feature for present purposes is that all members of the closed-panel group effectively have admitting privileges at contracted hospitals. On the other hand, IPAs, or open-panel HMOs, consist of independent practitioners who have joined an association solely to provide a prepaid health care package. Such physicians do not share common admitting privileges. Each form is discussed in turn.

The group HMOs have negotiated at least four types of hospital contracts, defined in terms of price-risk elements listed below.

- A global rate in which the hospital agrees to provide all hospital services to an HMO for an agreed-upon annual payment;
- An all-inclusive rate in which the hospital agrees to provide all hospital services for an agreed-upon payment per HMO-admitted patient;
- A discount on the billed charges; and
- A risk-sharing agreement in which any loss incurred by the hospital and the HMO is shared on an agreed-upon rate.

The group-type HMOs tend to negotiate a contract with a single hospital and expand to others as the enrolled population encompasses broader geographic areas. It is not uncommon for the HMO to make one agreement with one hospital for medical/surgical services, and another agreement with another hospital for obstetrics, and still another for chemical dependency cases. In addition, these HMOs, much like Kaiser (Luft and Crane, 1980), send their open-heart surgery and other severe cases to local tertiary care centers.

In IPA format, the HMO serves as a broker to member physicians. In the Twin Cities these HMOs attempt to steer admissions to those hospitals where the physician has admitting privileges and where the IPA has negotiated a contract. Thus, in contrast with the closed-panel HMO, an IPA has affiliations with many or most of the hospitals in the community. It has only been since 1979, however, that the IPAs have been able to make a credible case of their "steering ability" and receive discounts from local hospitals. One of the steering devices is the

prescreening procedure used for admissions in one Twin Cities' IPA. When a physician decides to admit a patient he first calls the IPA and talks to a nurse on staff. That nurse reviews where the physician has admitting privileges and indicates where the patient can be admitted at the lowest price. In addition, the nurse must approve the admission. If a physician admits a patient without this prior approval, the IPA will suspend the payment to the doctor. This procedure is followed for all non-emergency admissions.

The anecdotal evidence from the Twin Cities suggests that the area hospitals do value HMO business and are willing to expend resources to acquire it. First, as described above, hospitals provide various price discounts. Second, while only one HMO has actually switched hospital affiliations, an HMO executive reported receiving three "competitive bids" during a recent round of negotiations with a contract hospital. Third, one hospital organization admits to having "wooded" HMO business from other hospitals. However, these observations should not be taken to suggest that only price rivalry exists. Service, access, location, and the quality of the hospital administration are all dimensions of the HMO-hospital affiliation. From the hospital side, the HMO contract was seen as beneficial because it offers higher volume and immediate reimbursement, particularly since the community has a large number of hospital beds.

No clear picture of the type of hospital likely to succeed in attracting and maintaining affiliations with group-model HMO emerges from the Twin Cities' experience. A wide and growing range of hospitals is involved. For example, the Fairview Hospitals are a large multi-hospital system with 1,051 beds; Ramsey Hospital is a county-run teaching hospital with 471 beds; Samaritan is a small primary care hospital with only 56 beds. All have HMO affiliations. This heterogeneity undoubtedly results from contractual flexibility which allows individual hospitals to provide only certain prescribed services.

When a hospital affiliates with an HMO, it is reasonable to expect that its utilization will increase since the HMO enrollees are admitted to the affiliate rather than sent elsewhere. This will, in turn, result in higher *total* costs for the facility as the additional patients use staff time and consume other inputs. Also, the literature suggests that HMOs admit fewer marginal cases; thus the average HMO admission is likely to be "sicker" than the average non-HMO admission and will likely use a disproportionate amount of hospital services. These conditions suggest that even at the same actual prices, hospitals which admit HMO enrollees may generate fewer internal funds for modernization or expansion. Available evidence indicates that HMOs are given discounts. Hence, the net marginal gain for the additional HMO admission may be smaller than from other patients. Fewer bad debts and improved patient flow may offset the smaller gain, however.

Table 4 presents some preliminary tests of this scenario. The performance of eight hospitals with group HMO affiliations are compared with the 22 other community hospitals in the area.<sup>7</sup>

Occupancy rates are compared to test the supposition that hospitals with HMO affiliations have higher occupancy as a result of attracting the HMO admissions. The results are consistent with this supposition but lack statistical significance at the usual levels. Furthermore, differences in individual hospital catchment areas may actually explain the observed differences.

Even though enrollees in HMOs do use less hospital care it is not necessarily the case that HMOs affiliate with low cost hospitals. Certainly HMOs have an incentive to do so. But if HMOs really do hospitalize fewer marginal cases, more services per case actually admitted may be demanded. If so, the average cost per admission may be higher in those hospitals affiliated with HMOs. As Table 4 indicates, such is the case. However, the difference is virtually without statistical significance. Further evidence on the use of hospital services is provided by the data on surgery. If the prevalence of surgery is indicative of higher resource use per admission, the HMOs would appear to be admitting more costly patients. The number of surgical procedures per admission is 18 percent higher in HMO-affiliated hospitals; this result has only a five percent probability of being caused by chance. At minimum the available evidence suggests that HMOs have not affiliated with the lowest cost hospitals.

<sup>7</sup>The three children's hospitals are excluded from the analysis. The two IPA's admit to all hospitals and the data are not sufficiently disaggregated to judge their effect.

**TABLE 4**  
**Selected Performance Measures**  
**Of Minneapolis-St. Paul Hospitals By**  
**Group-HMO Affiliation, 1978**  
**(Standard Deviation in Parentheses)**

	Means Values	
	Affiliated	Non-Affiliated
Number of Hospitals	8	22
Occupancy Rate	69.49 (6.42)	67.17 (10.72)
Total Expenses Per Admission	\$1792.31 (540.14)	\$1699.09 (818.71)
Surgical Procedures Per Admission	.52' (.07)	.44' (.12)
Operating Margin	1.42 (4.01)	2.44 (3.13)

<sup>8</sup>Significant at the 90% confidence level or above using a t-test for groups with unequal variances. Source: American Hospital Association, Annual Survey data, 1978.

Operating margins are compared in Table 4 to suggest the effects of the affiliation on a hospital's financial position. Providing appropriate care to more seriously ill patients and offering a discount implies that operating margins should be lower. Increased occupancy rates suggest higher margins. The data show that HMO-affiliated hospitals have a 50 percent lower operating margin than non-affiliates. The large hospital-to-hospital variation indicates no likely difference if hospitals were grouped randomly.

In short, the available evidence suggests that hospital performance is consistent with the conjectural model presented. However, the differences in hospital performance are small and statistically insignificant enough to be easily caused by chance or other uncontrolled factors.

## Community-wide Hospital Effects

The conventional wisdom has held that the expansion of HMO enrollment decreases community-wide hospital utilization. This conclusion is based upon well-documented evidence that HMO enrollees use fewer inpatient hospital services. However, as Luft (1980(a)) correctly argues this result need not be the case if the statistics simply reflect a self-selection of nonhospital utilizers into HMOs. This section reviews the trends in Minneapolis-St. Paul utilization and analyzes the impact of HMO enrollments.

Table 5 reports utilization trends for the nation, for Minnesota, for the Twin Cities, and for the Twin Cities HMOs. In general, the data reflect lower utilization by HMO enrollees. Their inpatient days per thousand were 69 percent below the community-wide average in 1979. Contrary to the findings in the literature, this difference appears to result from differences in length of stay as well as differences in admissions. The trends in inpatient days of use at the HMO, metropolitan and State levels also reflect reduced use of hospitals throughout the area. Surprisingly, though, HMO admissions per thousand enrollees rose in 1979 while the city and State values declined.

Joining an HMO is a conscious decision based in part upon the choices available, their relative prices, and the preferences of the individual (Berki and Ashcraft, 1980). Clearly an individual chooses one plan over another because he expects himself and his family to be better protected with it than with the alternatives. Under these conditions one cannot view the differences between HMO and community-wide utilization as the result of a randomized experiment testing for the presence of an "HMO effect." The result may merely reflect the endogenous choice of plans, i.e., the resultant differences in utilization may only reflect "self-selection" by nonhospital users.<sup>9</sup>

<sup>9</sup>Some argue that self-selection may result in subscribers who are more likely to demand services (Blumberg, 1980).

TABLE 5

**Minneapolis-St. Paul  
Utilization Trends, Community Hospitals and HMOs**

	1979	1978	1977	1976	1975	1974	1973	1972
Inpatient Days/1000 Population								
National	1204.9	1201.8	1205.9	1214.4	1208.9	1207.2	1190.3	1163.8
Minnesota	1512.1	1533.2	1528.2	1553.5	1526.9	1526.9	1581.7	1499.7
MSP <sup>1</sup>	1418.9	1443.0	1486.7	1481.1	1465.7	1491.0	1422.5	1386.1
MSP-HMO	447.0	456.2	504.1	500.3	520.3	490.1	496.3	NA
Admissions/1000 Population								
National	159.5	158.2	158.5	158.3	156.9	155.5	150.9	147.5
Minnesota	166.7	171.3	174.4	178.4	176.6	174.7	171.7	168.3
MSP <sup>1</sup>	172.1	176.6	180.7	184.1	181.3	178.8	172.6	163.8
MSP-HMO	89.0	84.6	89.1	92.1	89.7	85.9	83.0	NA
Average Length of Stay								
National	7.6	7.6	7.6	7.7	7.7	7.8	7.8	7.9
Minnesota	7.1	8.9	8.8	8.7	8.8	8.8	8.8	8.7
MSP <sup>1</sup>	8.2	8.2	8.2	8.0	8.1	8.1	8.2	8.6
MSP-HMO	4.8	5.2	5.8	5.4	5.8	5.7	6.0	NA

<sup>1</sup>MSP = Seven County Minneapolis - St. Paul Area.

Sources: U.S. Department of Commerce, *Statistical Abstract of the U.S.*, 1978.

Minnesota Department of Health, *Minnesota Health Statistics*, annual.

American Hospital Association, *Hospital Statistics*, annual.

Christianson, Jon B. *Do HMOs Stimulate Beneficial Competition?*

(Excelsior, MN: InterStudy, April 1978).

The available data do not allow an estimate of the magnitude of either of these effects, but some hints are available from a consideration of population differences. First, the HMO population is decidedly younger than the community at large. As Table 6 indicates, in 1977 the HMOs were virtually without elderly enrollees. These age differences clearly explain much of the differences in utilization. If the HMOs had a proportionate share of the elderly, and if the Twin Cities' elderly utilized hospitals as frequently as they do nationally, then the Minneapolis-St. Paul HMOs would have 338.0 inpatient days per thousand of additional utilization in 1977 (AHA, 1977). This, however, still leaves the overall HMO utilization rate at less than 57 percent of the community-wide average. Second, since Twin Cities HMOs principally limit their marketing to large employers (Christianson, 1978) and since employed persons are likely to be lower utilizers of medical services, this too may be a source of self-selection. If ten percent of the population were outside employer groups and used hospital days at one and a half times the community-wide rate, their proportionate inclusion into the HMO enrollee population would add another 154.6 days per thousand. This still leaves almost 500 days per thousand enrollees unaccounted for.

Finally, Eggers (1980) and Berkl *et al.* (1977) note that there are many variables relevant to a discussion of self-selection, not the least of which is consumer tastes. This suggests that any direct attempt to accurately gauge the magnitude of the self-selection effect may be impossible given the difficulty of measuring state differences. These back-of-an-envelope estimates, however, do suggest that population differences could easily account for half of the observed differences in hospital utilization in the Twin Cities.

TABLE 6

**Age Distribution of the Population, 1977**

	0-4	5-14	15-44	45-64	65+	Total Population
MSP	6.5	16.8	49.4	17.9	9.4	1,924,000
MSP-HMO	8.0	17.1	59.3	15.0	.4	247,265

Sources: Minnesota Department of Health, *Minnesota Health Statistics*, 1977

*HMOs and Statistical Report on Minnesota HMO Operation*, 1978.

## Summary and Conclusion

This paper has highlighted the findings of the literature dealing with health maintenance organizations and applied that literature to a case study of Minneapolis-St. Paul. Case studies by their very nature do not provide definitive answers and are not generalizable, yet they can provide valuable insight. This paper has attempted to address three questions: (A) Is Minneapolis-St. Paul unique in its HMO experience? (B) How have individual hospitals been involved in the HMO activity? and (C) What has been the effect on community-wide hospital utilization?

The conclusion in each case is less than wholly satisfying. Minneapolis-St. Paul officials find five reasons for HMO development. Two allegations, the disproportionate number of physicians in group practice and the presence of large employers, are supported by the empirical research. The presence of a progressive government is rejected as a major factor. The availability of a large number of physicians and hospital beds, while eminently plausible, has not been tested. Finally, the role of Paul Ellwood and InterStudy clearly is unique to the Twin Cities. The hospital data we report suggest that Twin Cities' hospital performance is somehow different from that of hospitals in other major HMO markets. This suggests that replicating the Twin Cities' HMO factors in other cities may not yield similar results.

There has been and continues to be substantial price competition among hospitals for HMO business, probably due to the large number of hospital beds *per capita*. One cannot generalize about the type of hospital likely to affiliate and there is little evidence of difference in hospital performance measures between affiliated and nonaffiliated hospitals. This may mean that rivalry among HMOs has not been sufficient or present for a sufficient time to have a marked impact. It also suggests that with the flexibility provided by contractual agreements any hospital may be able to market at least some of its services to an HMO.

Finally, there is clear evidence that HMO enrollees use less hospital inpatient services than the population overall. However, differences in populations enrolled seem to explain at least one half of that disparity. Even so, an adjusted difference of 500 days per thousand population is remarkable. The overall conclusion of this, like to many other HMO studies, is that further research is clearly desirable.

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