

HMO: DOING BETTER AND FEELING BETTER? SOME FINDINGS FROM A REGIONAL HEALTH SURVEY

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SYNOPSIS

Escalation of health care costs in the United States provided a strong impetus for third-party payers to seek incentive-based financing systems. Among those that dealt with inefficient production of health services, *Health Maintenance Organization (HMO)* received considerable emphasis. Critics persistently raised efficiency and equity issues. This study compares *HMO* and the traditional *Fee-For-Service (FFS)* mode of insurance on two of the issues: utilization of physician services and health status. Regression analysis performed on data collected on 1,210 subjects (64.3 percent response rate) in the *Los Angeles Health Survey* demonstrated the effect of insurance mode on physician visits and health status, while controlling for possible confounding variables. Results showed that *HMO* enrollees experienced lower utilization ($b = -0.018$), and reported lower number of restricted-activity days ($b = -0.022$). In the final analysis, the conclusions that can be drawn from this study, and the limitations associated with it, are being critically examined and discussed.

INTRODUCTION

Prepaid health care plans have existed on the American health scene for well over a century. For many decades, most of these plans catered to specific target populations – mainly employment-related groups. Despite its early start, prepaid health plans did not flourish until about one decade ago. Many previous attempts to emphasize prepaid health care were frustrated by the American Medical Association's powerful lobbying efforts. In the meantime, U.S. national health expenditures have risen precipitously from 4.1 percent of the gross national product in 1935 to 9.0 percent in 1979 (1,2). In the presence of a sluggish economy at the turn of the seventies, the ever-increasing health budget shifted the focus of national health policy from that of guaranteeing accessibility of health care to that of cost containment. For the first time, prepaid health care received much attention. In fact, the Nixon Administration showed unprecedented federal interests in prepaid health plans by 1970, and the term *Health Maintenance Organization (HMO)* coined by Paul Ellwood became a symbol of health care in the US federal government's attempt to promote the *HMO* concept. The federal government's intense interest in the *HMO* concept culminated in the passing of the *HMO Act* of 1973 (Pub. L. 93-222) (3). Since passing the *HMO Act*, the U.S. federal government have encouraged both the development as well as the growth of *HMOs*, particularly in

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Data reported in this paper were collected pursuant to Grant Number 5-R18-CA-18451. "Processes in Health Behaviour and Cancer Control", awarded by the National Cancer Institute, Department of Health, Education, and Welfare.

underserved areas, through a comprehensive program of grants and loan guarantees. The *HMO Act* also sought to improve the marketability of HMO plans by requiring employers with 25 or more employees to include an HMO option in their health benefit programs, if one is currently being offered.

HMOs have been viewed as more cost efficient than the traditional fee-for-service (FFS) form of insurance, while providing health care of comparable or better quality. Previous research showed that much of the cost savings resulted from reductions in hospitalization rates. However, different views have been expressed as to what actually contributed to the cost savings (4-7). Those who favoured the HMO concept argued that prepaid health care on a capitation basis would inhibit providers from prescribing unnecessary treatment, since excessive treatment would not generate additional revenue. Equally well, HMO providers would also have an incentive for encouraging preventive health behaviour in order to reduce risks of revenue loss (8). No matter how appealing the HMO concept might seem to advocates, critics had their share of opposing viewpoints on a variety of issues concerning the performance of HMOs. Critics have claimed that HMOs have a latent financial incentive to undertreat, especially if the turnover of enrollees is high. Others claimed that the lack of a close doctor-patient relationship in prepaid health delivery systems might inhibit use of health services (9). Looking at the arguments from the demand side, it has been suggested that payment on a capitation basis will attract people in greater need of medical care, commonly referred to as "adverse self-selection" (10). Moustafa *et al.* studied the demographics of persons choosing among five health insurance plans, two of which were Kaiser and Ross Loos, found that married persons with children preferred the more comprehensive HMO plans; and, neither educational nor income level showed any significant relationship to choice of plan (11).

This article attempts to compare HMO enrollees with FFS subscribers on a number of issues that have confronted the two major categories of insurance coverage, focusing on the use of physician services and health status. The subjects of this study lived in a large and diverse metropolitan area of Los Angeles County, and the data used were obtained through conducting personal interviews as part of the *Los Angeles Health Survey*. The results of this study will be contrasted with findings from several recent studies on similar issues.

METHODS AND PROCEDURES

The *Los Angeles Health Survey*, which was a longitudinal survey initiated in 1974, provided the data for this study. The survey design incorporated a three-stage random probability sampling technique that was developed by the *Institute for Social Science Research (ISSR)* at *University of California, Los Angeles (UCLA)* (12). Initially, the sampling frame contained approximately 20,000 computer-readable addresses sampled from the Los Angeles County on an area-probability basis. Samples drawn from this frame may be described as "probabilities proportional to size" (PPS) three-stage samples. In the sampling, a sophisticated computer sampling procedure ensured that each housing unit in the Los Angeles County has an equal probability of being selected. The first stage involved sampling the more than 1600 census tracts called "primary sampling units" (PSUs), representing the Los Angeles census area. Each selected PSU was then divided into blocks, and these blocks were then subjected to another sampling procedure. In the third stage, a systematic

sampling scheme (with a random start) selected households within the selected blocks.

The multi-stage sampling procedure resulted in the selection of 2,020 household units. However, the initial sample was reduced to 1,883 units due to empty dwelling units, etc. One adult individual (age 18 or older) was then randomly selected from each of the remaining household units, using the *Kish* selection table (13). Of the 1,883 selected individuals, 1,210 (64.3 percent) eventually consented to an one-hour interview. Of those who failed to respond, 18 percent refused to participate, while 10 percent could not be reached after three consecutive attempts. Absolute nonresponse made up the remaining 8 percent.

At the initial face-to-face interviews, demographic and health data were recorded. The health data included health behaviour, recent illnesses and disabilities, use of health services, preventive health behaviour, as well as information on health insurance. Following these initial interviews, respondents were contacted by telephone every 6 weeks for approximately 1 year to continue collection of information pertinent to the study.

Analytic Framework

In order to examine whether or not there are differences between HMO and FFS subscribers concerning utilization of physician services and health status, the respondents have to be classified according to the type of insurance coverage they had. In the face-to-face interviews, respondents were asked to indicate the insurance companies and health plans in which they were insured. This question generated four main categories of insurance status, which are (1) no health insurance of any sort, (2) FFS coverage, (3) HMO enrollment, and (4) government insurance and social programs such as *Medicare* and *Medicaid*. Those respondents who had FFS insurance either subscribed to the not-for-profit *Blue Cross* and *Blue Shield* plans, or to other private insurance companies. The HMO group belonged mainly to two health maintenance organizations of Kaiser and Ross Loos. Originally the FFS and HMO groups consisted of 840 and 192 individuals respectively. However, many of those on *Medicare* and/or *Medicaid* either bought their supplementary health insurance from private insurance companies, or used them as fiscal intermediaries. Furthermore, in the sample, 10 people had both FFS and HMO coverage. For the purpose of this study, those individuals whose insurance was supported by *Medicare* and/or *Medicaid*, and those who had dual coverage, will be excluded. Also, respondents over age 65 will be excluded from this study. After having accounted for these factors, the FFS group has 643 persons (80.4 percent), and the HMO group has 157 (19.6 percent) remaining.

The dependent variables (utilization of physician services and health status), together with the questionnaire items used in constructing them, are presented in *TABLE 1*. The mean scores for the dependent variables, in each of the two modes of insurance, are also presented. Utilization of physician services is measured using the reported number of physician visits, and health status is measured by the number of restricted-activity days, both events occurring in the past 60 days prior to the interview. (A restricted-activity day is defined by the U.S. *Bureau of The Census* as "one on which a person cuts down on his usual activity for the whole of that day because of an illness or an injury" (14).

The independent variables are either single items or scales of multiple items, as indicated in *TABLE 2* and

TABLE 1
DEPENDENT VARIABLES FOR MULTIPLE REGRESSION

	Range of Scores	Mean		Mean		Level of Significance
		HMO	FFS	HMO	FFS	
Utilization of physician services	0—5	0.414	0.357	0.029	0.056	0.366
Doctor visits in last 60 days						
Health status	0—60	3.315	2.338	0.366	0.712	0.320
Number of restricted-activity days in the last 60 days						

TABLE 2
**DEMOGRAPHIC DATA USED AS INDEPENDENT
VARIABLES***

Demographic Variables	HMO	FFS	Level of Significance
Sex			0.054
Male	46.3	47.8	
Female	53.7	52.2	
Age			0.720
18-29	33.0	31.2	
30-39	23.6	27.4	
40-49	17.4	19.1	
50-59	18.4	15.3	
≥ 60	7.6	7.0	
Education			0.673
Graded school	7.5	8.9	
High school	36.7	38.2	
College education	55.7	52.9	
Total family income			0.464
< \$5,000	4.9	4.9	
\$5,000-\$9,999	19.8	17.9	
\$10,000-\$19,999	39.8	49.6	
\$20,000-\$29,999	21.9	18.0	
\$30,000-\$39,000	7.0	4.8	
≥ \$40,000	6.6	4.8	
Race			0.002
White	71.1	58.0	
Others	28.9	42.0	
Number of dependent children			0.089
None	56.1	44.6	
One	16.2	25.5	
Two or more	27.7	29.9	

*Each subgroup expressed as a percentage of the total for that variable, and for that particular mode of insurance.

TABLE 3. (Demographic data are presented in TABLE 2). Only those independent variables that are significantly correlated with dependent variables will be entered as control variables in regression analysis subsequently. Within the group of independent variables is the mode of insurance variable, which is coded in a dummy variable format (i.e., HMO = 1, FFS = 0), and will act as a predictor in studying the effects

of insurance type on each of the dependent variables. Given this form of coding, the resulting standardized regression coefficient *b* for the mode of insurance will then represent the differential effects of HMO and FFS, after controlling for other independent variables. For instance, a positive regression coefficient will indicate that the HMO group scored higher on that dependent variable as compared with the FFS group, while a negative regression coefficient represents the exact opposite. As a hypothetical example, if the standardized regression coefficient for mode of insurance turns out to be -0.01 (i.e., $b = -0.01$) when regressing on the number of doctor visits, it can be interpreted as the HMO group having less physician visits than the FFS group.

In scaling the variables (both dependent and independent), the zero-order correlations of the items that made up each scale are examined critically. Only those items that meet the criteria of having a correlation coefficient *r* of greater than 0.2 at $p \leq 0.01$ (one-tailed significance test) with every item in that scale will be included. This strategy greatly eliminates the number of uncorrelated or poorly-correlated items. To ensure that no false correlations occur as a result of misinterpretations of the coded responses to the items, the scores of the *Likert Scale* are reflected whenever it is appropriate to do so. Once the items for each scale have been decided, reliability tests based on *Cronbach's Alpha* are conducted. In order to ensure adequate internal consistency of the constructed scales, the value of the *Cronbach's Alpha* has to be no less than 0.4 (see TABLE 3). Subsequently, *principal component factor* analysis is used to determine how the items clustered together. Factor analysis with oblique rotation (nonorthogonal) produce a total of seven distinct factors (see TABLE 4).

In dealing with the independent variables for entering into the equation, the same criteria used in constructing scales could not be applied. Instead, the choice of variables depend on logical and theoretic arguments, since all except the mode of insurance variable are only acting as control variables. Essentially, the selection of independent variables involves two stages. At the first stage, only variables that have a correlation coefficient of more than 0.1 at $p \leq 0.05$ with the dependent variable will be considered for the regression procedure. After completing the stepwise regression procedure, any of the independent variables that does not produce a significant multiple correlation coefficient square R^2 change at $p \leq 0.05$ will be dropped when entering the final regression procedure. This way, only those variables that can explain a significant amount of the variance will be included into the final equation. However, the above criteria will not apply to the mode of insurance variable since it is

TABLE 3
OTHER INDEPENDENT VARIABLES

Variables*	Range of Scores	Cronbach's Alpha	Mean		Mean		Level of Significance
			HMO	FFS	HMO	FFS	
<u>Accessibility</u>	2-8	0.7963	5.583	5.873	0.039	0.069	0.793
Often difficult to see doctor when I can go							
Easy to see a doctor when I am able to go							
<u>Patient's availability</u>	2-8	0.6620	5.607	5.666	0.040	0.080	0.513
Make special arrangements to get care							
Usually free to go see a doctor							
<u>Cost concern</u>	2-8	0.7973	5.376	6.146	0.056	0.091	0.001
Concerned about cost when see a doctor							
Do not worry much about doctor's cost							
<u>Perceived susceptibility</u>	5-20	0.6562	10.363	10.365	0.077	0.176	0.994
Seem to get sick more than others							
I can avoid almost any illness							
I resist illness better than others							
Most people get sick more often than I							
Cannot do much to keep from getting sick							
<u>Motivation</u>	5-20	0.7181	13.113	13.351	0.092	0.187	0.255
I think about my health a lot							
When I get sick, it concerns me a lot							
When I am ill, I take it seriously							
Health is the most important thing to me							
I think about my health only occasionally							
<u>Efficacy</u>	3-12	0.6032	8.413	8.327	0.058	0.113	0.497
If sick, do not think doctor can do much							
I can take care of illness as well as doctor							
Doctor is good for most of my illnesses							

* Each variable is derived from the items listed beneath, using principal component factor analysis (cf TABLE 4). Each of the items has a possible score of "1" to "4" on the Likert Scale. Those items that were not asked in affirmative expressions have their scores relected. The expressions listed here may have been shortened to save space.

TABLE 4
FACTOR ANALYSIS OF QUESTIONNAIRE ITEMS*

Items	Patient's satisfaction	Access to care	Patient's availability	Perceived susceptibility	Motivation to seek care	Perceived efficacy	Cost concern
Satisfied with medical care I received	0.808	.	.	.	.	.	.
Medical care I received could be better	0.737	.	.	.	.	.	.
Doctor's care is just about perfect	0.798	.	.	.	.	.	.
Doctors are concerned about my feelings	0.767	.	.	.	.	.	.
Often difficult to see doctor when I can go	.	0.763	.	.	.	.	.
Easy to see a doctor when I am able to	.	0.729	.	.	.	.	.
Have to make special arrangements to get care	.	.	0.661	.	.	.	.
Usually free to go see a doctor	.	.	0.719	.	.	.	.
Seem to get sick more than others	.	.	.	0.684	.	.	.
I can avoid almost any illness	.	.	.	0.340	.	.	.
I resist illness better than others	.	.	.	0.840	.	.	.
Most people get sick more often than I	.	.	.	0.811	.	.	.
Cannot do much to keep getting sick	.	.	.	0.345	.	.	.
I think about my health a lot	.	.	.	.	0.645	.	.
When I get sick, it concerns me a lot	.	.	.	.	0.747	.	.
When I am ill, I take it seriously	.	.	.	.	0.672	.	.
Health is the most important thing to me	.	.	.	.	0.741	.	.
I think about my health only occasionally	.	.	.	.	0.389	.	.
If sick, I do not think doctor can do very much	.	.	.	.	.	-0.721	.
I can take care of illness as well as doctor	.	.	.	.	.	-0.696	.
Doctor is good for most of my illness	.	.	.	.	.	-0.680	.
Concerned about costs when I see a doctor	.	.	.	.	.	.	0.900
Do not worry much about doctor's cost	.	.	.	.	.	.	0.906

*Using iterative principal component factor analysis with oblique rotation.

the main effect to be studied. Therefore, it will be entered into the equation without observing set criteria applied to other independent variables. In order to achieve conservative estimates of explained variance, the reported R^2 will be adjusted for the number of independent variables in the equation, as well as for the number of cases.

RESULTS

Before comparing the *HMO* and *FFS* groups on utilization and health status, it will be worthwhile to examine their comparability on subscriber composition as well as on other related factors. Looking at *TABLE 2*, this study found no significant difference between the *HMO* and the *FFS* groups on age and sex composition, educational level, income level, and the number of dependent children— although a higher percentage of those enrolled in the *HMO* group belonged to higher income brackets. Similarly, there is no significant difference between the groups on other characteristics like health orientation beliefs (see *TABLE 3*), which are indicated by perceived susceptibility to illnesses, perceived efficacy of medical care and motivation to seek medical care, and health status which is measured by the number of days of restricted activity (see *TABLE 1*). These findings do not correspond to findings from other studies (11,15). Another interesting finding shows that the *HMO* group contained a higher proportion of Whites ($p \leq 0.002$). So far, the only finding that is consistent with findings from other studies is the greater concern for physician costs— expressed by the *FFS* group ($p \leq 0.001$).

Regressing on the number of physician visits experienced in the past 60 days, health belief orientations seem to have significant relationships to physician visits. However, need indicators such as health status, sex, and age have an even greater impact (see

TABLE 5). Health status ($b = 0.267$, $p \leq 0.001$) explained nearly 9 percent of the variance. After controlling for need and health orientation beliefs, the insurance variable does not have a significant relationship to physician visits. In fact, as already mentioned, the *HMO* and *FFS* groups do not differ statistically on the need for care as well as on health beliefs (see *TABLE 1* and *TABLE 3*). If there is a difference in utilization rates, the difference is slight, and it is the *HMO* group that reported lower utilizations ($b = 0.018$).

On the subject of health status differences between the two modes of insurance, previous studies used outcome measures, usually infant mortality and absenteeism (16,17). Others used self-appraised health status as an explanatory variable (18). Generally, most studies reported *HMOs* as performing better than private insurance companies.

The health status measures used in this study is the number of restricted-activity days in the past 60 days. From *TABLE 6*, it can be seen that greater utilization of physician services is strongly related to poorer health status. However, it will be illogical to interpret the relationship in this way. One logical interpretation would be that those who visited their physicians received professional advice to rest in bed and cut down their normal activities for a recommended period of time. The other variable having a relationship with health status is the number of dependent children. One plausible explanation would be to attribute the restricted-activity days, which measure health status, to childbirths. Although the *HMO* group displayed slightly lower tendency toward reporting restricted-activity days ($b = -0.022$), the difference is far from being significant. Therefore, it can be concluded that mode of insurance does not contribute to health status, assuming that restricted-activity day is a reasonably valid measure of health status.

TABLE 5
STEPWISE MULTIPLE REGRESSION ANALYSIS ON PHYSICIAN VISITS**

Steps	Correlation with Dependent Variable (<i>r</i>)	Standardized Coefficient of Regression (<i>b</i>)	Adjusted <i>R</i> ²
Step 1			
Health status	0.297*	0.267*	0.087
Step 2			
Perceived susceptibility	0.208*	0.161*	0.118
Step 3			
Sex	0.109*	0.100*	0.126
Step 4			
Consumer satisfaction	- 0.103*	- 0.101*	0.130
Step 5			
Perceived efficacy	0.077*	0.077*	0.134
Step 6			
Age	0.064*	0.059	0.136
Step 7			
Mode of insurance	- 0.028	- 0.018	0.136

* Statistically significant at $p \leq 0.05$

** Independent variables presented in the order of entry into the equation, which is based on the criterion of $p \leq 0.05$, except for the mode of insurance which may be forced in.

TABLE 6
STEPWISE MULTIPLE REGRESSION ANALYSIS ON HEALTH VISITS**

Steps	Correlation with Dependent Variable (<i>r</i>)	Standardized Coefficient of Regression (<i>b</i>)	Adjusted <i>R</i> ²
Step 1			
Physician visits	0.311*	0.307*	0.096
Step 2			
Number of dependent children	-0.802*	-0.059	0.098
Step 3			
Mode of Insurance	-0.034	-0.022	0.098

* Statistically significant at $p \leq 0.05$

** Independent variables presented in the order of entry into the equation, which is based on the criterion of $p \leq 0.05$, except for the mode of insurance which may be forced in.

DISCUSSION

According to the risk perception hypothesis, expected utilization patterns and their associated costs form the fundamental factors affecting choice among alternative insurance plans (9,19,20). To the extent, therefore, that HMOs offer comprehensive coverage at zero or minimal cost-sharing, they appeal to individual whose perceived health risk is higher. Perceived health risk is likely to be a function of demographics of individuals and families. A review of existing literature on the influence of demographics on choice of plans showed that married individuals with larger and younger families preferred an HMO plan to either a service benefit or an indemnity plan (11,19,21-23). Roemer *et al* found that people with greater health risks and non-White persons preferred HMO plans, and HMO enrollees generally experienced a greater number of physician contacts as compared with FFS plans (15). In the same study, persons with college education under the HMO plans had even greater number of physician contacts because being more educated, they were able to understand the relatively complex framework of HMOs. Other researchers found that psychosocial factors also affect use of services (24,25). Although these findings generally prevailed, contradictory findings had been reported (26). Similarly, this study found no significant difference (among the factors that predispose individuals to greater utilization of physician visits) in both the HMO and FFS groups. In fact, after controlling for these factors, the HMO group seems to have fewer physician visits, once again contradicting other findings (4,5,8).

The health status of HMO enrollees has always been a subject for speculation and controversy. Reliable measures of health status arising from good medical care have not been fully established. Hampered by the lack of reliable measures, methodological studies on health status can only provide clues for evaluating HMO performance at best. In the past, studies found that HMO enrollees reported greater frequency of medical conditions requiring follow-up care, when compared with nonenrollees in the same community (27). Although this study is based on individuals who have been HMO enrollees, the period of enrollment is not known. Hence, it is not clear whether illnesses were in existence before enrollment. Nonetheless,

mode of insurance was found to be unrelated to health status, although the HMO group reported as having poorer health status. For the reasons stated, the poorer health status cannot be attributed to poorer outcomes as a result of scrimping on care, which has been a frequent accusation directed at HMOs. Direct studies of well-documented duration of HMO enrollment, and of larger and more varied populations, need to be done in order to establish whether or not HMO enrollees do actually have poorer health as an outcome of enrollment.

CONCLUSION

When interpreting the results, it is worthwhile to note that this study only includes people under age 65 who were not covered by Medicare and/or Medicaid. On the same note, this study uses the representative sample of the population living in Los Angeles County. Therefore, the findings cannot, and should not, be generalized across population groups. In the attempt to investigate whether HMOs are indeed doing better than FFS, the full range of parameters has not been examined exhaustively. Other than utilization of physician services and health status, other pertinent parameters should include costs and productivity, quality assessments, consumer satisfaction, as well as utilization of hospital and preventive health services. Thus, further research involving a wider range of parameters is necessary in order to provide a more objective assessment of prepaid health care.

ACKNOWLEDGEMENT

I wish to thank Dr E. Morisky for his encouragement, and Dr E. Berkanovic for letting me have access to the Los Angeles Health Survey database. Any shortcoming found in this paper is solely mine.

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