Factors Affecting Choice of Health Care Plans

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The research reported here examined the factors which affected the decision to remain with either Blue Cross of Washington and Alaska or Group Health Cooperative of Puget Sound, or to change to an independent practice association (IPA) in which the primary care physicians control all care. The natural setting allowed examination of (1) the characteristics of families with experience in structurally different plans; (2) a decision not influenced by premium differentials; (3) the importance of the role of usual provider; and (4) a family-based decision using multivariate techniques. An expected utility model implied that factors affecting preferences included (1) future need for medical care; (2) access to care; (3) financial resources to meet the need for care; and (4) previous level of experience with plan and provider. Analysis of interview and medical record abstract data from 1,497 families revealed the importance of maintaining a satisfactory relationship with the usual sources of care in the decision to change plans. Adverse selection into the new IPA as measured by health status and previous utilization of medical services was not noted.

In recent years, families have been faced with new models of delivery and financing of health care. Independent practice plans, closed-panel

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group practice plans, and other types of innovative health care systems incorporate financing with provision of services, the intent being to limit enrollee risk and contain costs. This innovation increases the significance of the consumer's decision about which "insurer" to choose, since the outcome determines not only the family's potential financial investment in its health but also its access to care.

The success of these new options depends on their ability to attract enrollees from other plans, since the vast majority of employed people in the United States already have health insurance [1]. Whether families change to the new plans or remain with the old depends on attributes of the consumers, particularities of the plans, and effectiveness of the marketing programs. Past experience with other plans, sociodemographic characteristics of the enrollees, and past and expected need for health care might all contribute to a family's decision. In addition is the willingness to accept change or innovation—whether the consumer is willing to experiment with a new plan as well as a new *type* of plan.

Given the unpredictability of the need for services and the rising costs of medical care, ensuring access to health care and insuring against the possibility of financial devastation from illness is considered by many consumers to be an imperative. In settings where health insurance is a benefit of employment, the decision to select a particular type of plan involves assessment of a plan's benefit structure, its accessibility to particular care features, expediency of reimbursement, and anticipated out-of-pocket costs to the family.

For those consumers not familiar with the structural or organizational differences and therefore unaware of the implications of their choice, a well-informed decision on health care coverage will require a new and considerable effort. Whether a new plan can attract consumers is an issue of marketing strategy. A plan must be competitive with regard to benefits, costs, and access to care, but it must also attract a clientele which appreciates the value of preventing excessive use of the plan, thereby keeping down costs that the plan itself would incur.

A new health care plan considering entry into a market must assess the financial feasibility of its survival among already-insured enrollees given the interest and effort required by the prospective enrollee to change to a new plan. In order to assess the economic feasibility of survival in such an environment, the new plan must be able to identify the type of subscriber it would attract. To determine the effort required of the subscriber in changing plans, the plan must be able to identify factors believed to be important to the potential enrollee.

This study was designed to determine the factors which affected families' decisions to remain either with a comprehensive fee-for-service plan, Blue Cross of Washington and Alaska, or with a closed-panel group practice plan, Group Health Cooperative of Puget Sound; or, alternatively, to switch to a new primary care network plan, United Healthcare. United Healthcare was first offered to Washington State employees in King County in July 1978. The entire premium for United Healthcare as well as for the first two plans was paid by the state.

The new, individual-practice plan option, organized and sponsored by Safeco Insurance Company, was referred to as a primary care network plan: all care to enrollees was provided or approved by a primary care physician selected by the enrollee in advance. This physician also managed the financing of all care through a fund established by the plan for each enrollee, to cover all primary and specialist in- and outpatient care [2]. There was no deductible or coinsurance; most "claims" to United Healthcare were submitted by the physician. The new plan offered organizational and structural alternatives to the other options.

Blue Cross is a fee-for-service indemnity plan for nonhospital services and a service benefit plan with respect to hospital services, which has been available to this population in some form since the early 1970s. The plan has reimbursed most expenses incurred for inpatient and outpatient care provided by all traditional health care practitioners with a $50 deductible ($150/family) per calendar year and 10 percent copayment (for the next $1,950 in claims per year).

Group Health Cooperative of Puget Sound is a large (300,000-member) closed-panel, consumer-owned group practice prepayment plan with several facilities in the Seattle area which provide inpatient and outpatient care, as well as telephone service. Only care provided by or otherwise approved by its employee practitioners is covered by the plan. There is no deductible for most services, and a two dollar copayment is required on prescriptions.

The study population is comprised of Washington State employees, including those in higher education, who live in King County (which includes Seattle). This population is not new to the concept of health insurance (in its broadest sense) nor, since it is served by Group Health Cooperative, are its members unaccustomed to structural diversity in the manner in which health care is delivered and financed. In addition, Washington State employees have experienced traditional indemnity-type coverage as well as service benefit plans.

This setting for the introduction of a new type of plan offers a test

of acceptance and survival in a well-developed and experienced market. It also allows examination of the key differences between those enrollees who demonstrate their interest in the new plan by switching plans and those who do not. The study's uniqueness lies in the circumstances under which critical variables which are suspected to influence the decision to change plans—or not—can be examined.

Because this article looks at a family's change from a comprehensive fee-for-service plan or a prepaid group practice to an independent practice plan, the study differs from earlier research which mainly concerned only traditional versus prepaid insurance plans. Earlier work included the effect of differences in comprehensiveness of benefits, while in this study benefits are similar among the three options. Although there are limitations in the application of earlier findings to this setting, we have drawn on the concepts of risk vulnerability, accessibility, and patient satisfaction with provider.

The literature on choice of plan leads us to examine factors such as: existence of a usual provider as a measure of accessibility; family characteristics which reflect stage of development as an indicator of medical risk, risk perception, or need; and family income and family size (per capita income) as an indicator of risk of financial loss due to illness. The model we propose relies on these factors as well as others believed important in this particular setting: the presence and extent of other insurance coverage in the family; the physical *and* mental health of the enrollees; the length of experience with Group Health Cooperative and Blue Cross; family members' relationships with usual sources of care (i.e., recency of use, satisfaction with provider, ability to continue that relationship under a new plan); time-based accessibility to care; and actual use of health services during the 6-month period immediately preceding the choice. All of these indicators are evaluated in a framework which assumes that the decision maker acts as if to maximize his or her expected utility.

SAMPLE AND DATA SOURCES

The population of interest consisted of individuals who were employed by a Washington higher education or other state agency; who resided in King County, which includes the city of Seattle; who had a health plan effective date prior to May 1, 1978; and who were active employees on December 31, 1978. These criteria eliminated from the population employees who were not eligible to switch coverage in the May 1978 open enrollment period, during which Blue Cross, Group Health

Cooperative, and United Healthcare were offered as the health plan alternatives. Employees excluded from the population were those newly hired, employed less than 2 months, or retired. Thus, the four groups of interest were:

1. Enrollees who chose to remain with Blue Cross (BC)
2. Enrollees who chose to remain with Group Health Cooperative (GHC)
3. United Healthcare enrollees previously with Blue Cross (BC-UHC)
4. United Healthcare enrollees previously with Group Health Cooperative (GHC-UHC).

A family unit was defined for these analyses as a subscriber and all family members covered by a state health plan. Table 1 presents a classification of the eligible population of family units and the sample included in the study. A total sample of 1,936 families was chosen [3].

Contact with the families found 85.4 percent to be eligible for this study. Major reasons for ineligibility were termination of state employment by the time of interview, residence outside of King County, and retirement from state employment. Eleven subscribers or half of one percent of the sample could not be contacted, resulting in an overall eligible sample of 1,654 subscribers. Of those eligible for the study, 94.9 percent agreed to participate.

Since our model assumes that the sample represents those families who had a choice of health plans, only those families who reported knowledge of open enrollment are considered. The analysis used 1,497 families.

Data sources included a household interview which averaged an hour in length and, in order to address explicitly the question of potential adverse selection into UHC, abstracts of BC claims and GHC medical records.

Interviewing completed between April 1979 and January 1980, collected variables on need for care, accessibility, financial capacity to cover the costs of illness, experience with plans, and satisfaction with plans. Interviewing just prior to the July decision was preferable; however, this was not administratively feasible. As a result, the time between enrollee decision and data collection varied from 10 to 20 months. This length of time increases the possibility of simultaneous equation bias in the coefficients for the independent variables. These possible biases must be recognized in any conclusions drawn from the analysis.

Table 1: Population and Sample Distribution of Health Plan Subscribers

	GROUP									
	BC		*GHC*		*BC-UHC*		*GHC-UHC*		*TOTAL*	
	N	%	N	%	N	%	N	%	N	%
Eligible population of family unit	8,148	–	7,619	–	676	–	192	–	16,330	–
Sample, family units (as percent of population)	722	9.00	518	7.00	504	75.00	192	100.00	1,654	85.40
Ineligibles	75	10.40	82	15.80	81	16.10	33	17.20	271	14.00
No contact	7	0.97	2	0.39	1	0.20	1	0.52	11	0.57
Respondent families (as percent of eligibles)	599	93.50	413	95.20	407	96.40	151	95.60	1,570	94.90
Respondent families eligible for decision* (as percent of respondents)	554	92.00	385	93.00	407	100.00	151	100.00	1,497	95.00

*The final group used for analysis eliminated 73 families who reported no knowledge of the 1978 open enrollment period.

Extensive utilization data were retrieved from BC claims files and GHC medical records for the *6-month period prior to* the introduction of UHC (January 1978 through June 1978). Charges were difficult to compare across the three plans, because Group Health has no charges, and Blue Cross and United Healthcare may have used different pricing systems. To obtain comparable measures of the volume of services used in each plan, California Relative Value Scale units (CRVS) were used. This scale assigns a number of units to each procedure performed, in six categories: medical, anesthesia, surgical, x-ray, laboratory, and administrative. These units are consistent within categories, but not across categories. In addition, the value of a unit depends on whether the service is performed on an inpatient or an outpatient basis. Blue Cross charge data were used to estimate the average charge *per CRVS unit*. For example, one outpatient unit of medical service is worth (on average) $2.61 but one unit of anesthesia is worth $27.03; if the anesthesia is administered during an outpatient procedure, a unit of anesthesia is worth $36.93.

To achieve a single measure of the volume of services for each person, we assigned CRVS units to each procedure, weighted them, and summed them for each person. Details of the data collection methods, coding, and weighting procedures used are described elsewhere or are available from the authors [4, 5].

METHODS OF ANALYSIS

The objectives of the analysis were to examine the factors believed important in the consumers' choice and to assess the extent of adverse selection of enrollees. Thus, the analysis is composed of two major stages, one in which factors believed to influence the decision were subjected to bivariate and multivariate analysis, and another in which these associations were tested while controlling for prior utilization.

The dependent variable, switching or not switching to UHC, represents some measure of utility of the family's choice. The use of regression analysis allows prediction of ordering of preferences for switching or not switching. There are two basic assumptions in the choice of models. First, the approach assumes that all subjects have the same "tastes" or criteria for a desirable outcome. For example, families desire low costs of health care, high quality, accessible services, adequate plan coverage, etc. This assumption permits one to consider together all members of either Blue Cross or Group Health Coopera-

tive in developing estimates of the model. The second assumption is that the decision maker acts to make the best use of available resources.

Since many variables were collected at the individual level and the family level, several family-based indicators for each variable were compared to determine which were most closely correlated with the switching decision: family average, the family member with the most extreme response, or the subscriber's response. For example, physical health status measured by the health perception question was defined in three ways: the average family health status, health perception of the least healthy family member, and the subscriber's report of his/her own health status.

For each variable, bivariate testing was performed to determine which variables when taken alone were significantly related to choice. To reduce the number of variables, a stepwise linear regression analysis was performed for each of the four sets of variables to derive a smaller set of variables which could predict choice. All of these analyses were performed separately for BC and GHC. A multivariate model to predict choice was then constructed by taking the strongest correlates of choice from each subset and entering them in a linear discriminant analysis. Variables predicting previous use and some sociodemographic variables were also included in the model.

FINDINGS

FACTORS INFLUENCING CHOICE

Blue Cross enrollees were more than three times as likely to switch to UHC than were GHC enrollees (8.3 percent compared to 2.5 percent).

The *need for care* set of variables included a family's life stage, mental and physical health status, and whether anyone in the family was under medical care during the 1978 open enrollment period. In addition, the subscriber's age, sex, race, and education were included in this set (as well as in the financial set) to evaluate their contribution to the subjective assessments of need.

The Blue Cross and Group Health Cooperative groups were at approximately the same stage in the family life cycle; however, bivariate analysis reveals that Group Health Cooperative families at a lower-risk life stage were more likely to switch to United Healthcare while Blue Cross families at a higher-risk life stage were more likely to switch. The family life stage measure was not significant for the Group Health Cooperative estimation but did contribute to the Blue Cross estimation.

With respect to the physical health status variables, a substantial majority of families reported their health as good or excellent, and with fewer than two chronic conditions among members. The physical health status measures were very similar between the Blue Cross and Group Health Cooperative groups and did not appear to affect the change-of-plan decision.

Mental health status, measured by the frequency of certain positive and negative feelings, was significantly related to choice of plan only for the Group Health Cooperative switchers and nonswitchers [6, 7]. All groups reported relatively high levels of mental health, regardless of the scale used.

Still considering need for care, a subscriber's age and sex were correlated with choice of plan differently for Blue Cross and Group Health Cooperative. Group Health Cooperative families with female subscribers were more likely to change to United Healthcare. Blue Cross families with younger subscribers were more likely to change to the new plan.

The *access to care* variables included presence of usual providers and their use by the subscriber and family; satisfaction with usual sources; whether providers were on the UHC list; and appointment, travel, and waiting times. The familys' relationships with their usual sources of care and time-based measures of accessibility of care, i.e., appointment acquisition time, travel time to the provider's office, and waiting time in the office, were significantly related to choice. Relationships with usual sources of care were studied not only in terms of their presence or absence for all family members as well as for the subscriber, but also with respect to recent use of the provider by the subscriber or "all, some, or no" family members. Blue Cross switchers and nonswitchers were also asked to report whether the usual sources for the family were on the United Healthcare list of participating physicians, thus allowing a family to continue relationships despite changing health care plans. In addition, the value of a family's average satisfaction with usual sources, the value represented by the least satisfied member, and the influence of the subscriber's satisfaction with his or her usual sources were studied. Both the family's average time-measure variables and the greatest time reported by a family member were tested.

Only 4.8 percent of the Blue Cross families and 1.9 percent of the Group Health Cooperative families had no usual sources of care for any family member. All family members had usual sources in 86 percent of the Blue Cross switcher and nonswitcher families, and in 93 percent of the Group Health Cooperative families. There were not,

however, significant differences in source of care between switchers and nonswitchers in either of the plans. Recent use of a usual source by subscriber differed significantly between switchers and nonswitchers in both groups: Blue Cross subscribers who switched were *more* likely to have had recent use, while Group Health Cooperative subscribers who switched were *less* likely to have had recent use.

All measures of satisfaction with the usual sources of care (family average, least satisfied family member, and subscriber's satisfaction) appeared to play a much larger role in Group Health Cooperative decision making than in the switching decision for Blue Cross enrollees. Switchers from Group Health Cooperative were more likely to be more dissatisfied with their usual source, regardless of how satisfaction was measured, than Blue Cross switchers, who differed significantly from nonswitchers only in the level of subscriber's satisfaction: switchers were more likely to have a dissatisfied subscriber.

Accessibility of care for Blue Cross switchers and nonswitchers was characterized differently from that of the Group Health Cooperative groups. With regard to the Blue Cross groups, the greater proportion of family members with usual sources on the UHC list of participating physicians, the more likely the family was to switch to United Healthcare. Over 85 percent of the Blue Cross switchers, as compared to less than 12 percent of the nonswitchers, had one or more usual providers on the UHC list.

Significant differences also appeared in the various time-based accessibility measures when considered alone. There were significant group differences related to appointment acquisition time between Blue Cross switchers and nonswitchers—nonswitchers reported longer acquisition times than switchers. For Group Health Cooperative groups, reports of time spent waiting in the provider's office were significantly different for switchers and nonswitchers—switchers reported significantly longer waits than nonswitchers. Travel time was not a significant issue to any of the groups; the mean travel time was approximately 20 minutes.

Variables measuring *financial capability* to cover the costs of care included measures of income (gross family and per capita family); subscriber's occupation, education, race, age, and sex (as measures of potential earning power and thus financial risk); and the extent of other health care coverage (private and state) in the family, while employed by the state or not, for all family members, for each and all of the 3 years prior to the 1978 open enrollment.

Once again the variables which were related to choice of plan differed between the Blue Cross and Group Health Cooperative

groups. Reported gross and per capita income were not significantly different for Group Health Cooperative switchers and nonswitchers. However, there were significant differences in both gross income and per capita income between the Blue Cross groups, with per capita income (while controlling for the other variables) clearly related to the decision to switch. Both gross and per capita incomes were less for those switching to United Healthcare than for those remaining with Blue Cross. Blue Cross nonswitchers reported an average gross annual income of $26,000 compared to $22,500 for switchers; mean per capita income for Blue Cross nonswitchers was $12,800 compared to $11,600 for switchers.

In both Blue Cross and Group Health Cooperative, switching families were significantly more likely to have subscribers with nonprofessional, nonmanagerial occupations.

The existence of other health care coverage in a family prior to open enrollment differed in its importance between Blue Cross and Group Health switchers. Blue Cross switchers were less likely to have had other insurance coverage, while Group Health Cooperative switchers were more likely than nonswitchers to have had other coverage.

Variables used to measure *experience and satisfaction with previous plans* consisted of measures of exposure to the health care plans, both while employed by the state or elsewhere; reports of problems either with plan administration and/or with any provider while covered by the plans; reports of out-of-pocket costs for health care from January to June 1978, and of satisfaction with that amount; and frequency with which a family changed state health care plans during the time from July 1975 to June 1978 (prior to the July 1978 switch). These different measures allowed investigation of many aspects of experience with plans which deliver services as well as finance care. It was also important to measure past exposure to the Group Health Cooperative plan by Blue Cross enrollees and vice versa, since willingness to enroll in a new plan with some of the similarities of both Blue Cross and Group Health Cooperative may be influenced by even limited exposure to a variety of other plans.

This particular measure of exposure to the "other" plan (Blue Cross enrollees having experienced GHC coverage and vice versa) proved to be significantly different between switchers and nonswitchers from each plan even when length of state employment was controlled. Switchers from both plans reported greater exposure to the other plans than nonswitchers.

It is interesting to note the differing emphasis on problems with

providers reported by the Group Health Cooperative groups, and problems with plan administration reported by the Blue Cross groups. Significantly more problems with providers were reported by GHC switchers to United Healthcare. Similarly, Blue Cross switchers reported significantly more problems with plan administration than nonswitchers.

There are interesting differences both between plans and within plans. Blue Cross switchers and nonswitchers reported approximately equal out-of-pocket costs for care, averaging $121 for nonswitchers and $128 for switchers. These amounts probably reflect the fact that Blue Cross has a $50 deductible per person up to three persons per family per calendar year, in addition to a 10 percent copayment. The amounts reported were for the first half of the deductible period. In contrast, Group Health Cooperative nonswitchers reported an average of $22 spent during this same period for care, while switchers reported a mean of $51 for care. This significant ($p < .001$) difference between Group Health Cooperative switchers and nonswitchers is also reflected in the measure of costs as percentage of income, with switchers having values slightly greater than twice those of nonswitchers. Out-of-pocket costs at Group Health Cooperative stem from care received outside the system or from charges for eyeglasses, maternity care costs, or charges for mental health visits beyond the ten allowed per year.

The variable created to measure the frequency of a family's switching state health plans during the 3 years pre-1978 was found to be significant only in the Blue Cross analysis, with switchers to United Healthcare having been more likely than Blue Cross nonswitchers to have changed state plans at least once during the preceding 3 years.

COMPREHENSIVE MODELS OF CHOICE

A model including all factors related to switching was estimated using the technique described earlier. Table 2 presents the Blue Cross discriminant analysis results. All variables of the Blue Cross model were statistically significant to at least the $p < .01$ level, with the exception of the measure for plan administration problems and per capita income ($.05 < p < .06$). By far the strongest variable when other variables are held constant is that which measured the proportion of family members with usual sources of care on the United Healthcare list. The relative size of the standardized canonical discriminant function coefficient indicates its importance to the model. As indicated by the earlier results, families with younger female subscribers were more likely to switch, as were families with lower per capita incomes. This may be an

Table 2: Blue Cross Discriminant Analysis Results

Standardized Canonical Discriminant Function Coefficients

Characteristic	*Coefficients*	p ≤
Need		
Subscriber's age	-0.2013	.001
Under medical care during June 1978	-0.1397	.007
Access		
Proportion of family with usual source of care on UHC PCP list	0.9229	.001
Experience		
Months of BC coverage July 1977–June 1978	-0.1877	.003
Satisfaction with out-of-pocket costs	0.2385	.001
Report of problems with plan administration	0.1044	.056
Length of state employment July 1975–June 1978	0.1545	.012
Number of switches in state plan 1975–1978	0.1285	.009
Financial		
Subscriber's sex	0.1436	.006
Per capita income	-0.0892	.059

*Classification Results (Percent)**

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	80.6	19.4
Switchers	19.9	80.1

Correctly Classified: 80.39
Significance < .001
R^2 = .369

*The default rule used assumed that the product of prior probabilities and costs of misclassification cancel one another.

indication of the higher health risk as well as economic vulnerability described by previous research. The absence of a deductible in a plan which allows maintenance of usual providers could be especially appealing to young families and single-parent families.

The less exposure to the Blue Cross plan during the year before the switch, the more likely a family would switch to United Healthcare. This may reflect unwillingness to learn a new system once another has been mastered. But the direction of the coefficient on the variable, length of state employment, confuses the issue: the longer one worked for the state the more likely the family would switch to the new plan. This may be due to the manner in which the variable was measured—recent history of employment rather than total years of employment with the state. It might also be due to interaction. While no two-way

interaction was found, some higher-order interaction which has not been identified may exist.

Being under medical care during open enrollment was more likely in nonswitchers than switchers. When we control for all variables, those families with a member under care during the decision period were less likely to change to United Healthcare. It is not known (1) who in the family was under care; (2) whether the person's usual source was a primary care provider or a specialist; or (3) if the provider was a primary care practitioner, whether the physician was on the UHC list. One could speculate that the care was from a specialist and, therefore, that changing to a plan which required approval for that care would not be attractive to the decision maker. One might also suggest that this reflects greater identification with a plan, comfort with a provider, or merely experience in using a plan.

Those families reporting dissatisfaction with out-of-pocket costs and plan administration were more likely to change to the new plan. Concern about costs is consistent with the fact that lower-income families changed plans. The paperwork involved in filing claims for reimbursement as well as delays in reimbursement are complaints common with dissatisfied enrollees in traditional indemnity plans, including Blue Cross.

The model shown in Table 2 explains 36.8 percent of the variance in choice of plan. The final set of variables correctly classified 80.4 percent of the Blue Cross cases.

Table 3 presents the Group Health Cooperative final discriminant function estimates. The estimates for the Group Health Cooperative model once again reveal an access variable as the strongest predictor of switching when all other variables are held constant. The less satisfied any family member was with his or her usual provider, the more likely the family was to switch to United Healthcare. The other two accessibility measures, recent use of usual source by subscriber, and the interaction of recent use and lowest family satisfaction with provider did not contribute significantly to the equation.

Subscribers who switched from Group Health Cooperative were more likely to be female, as were the Blue Cross switchers. When all other variables are held constant, the direction of the effect of subscriber's age on the equation changes from the bivariate result: families with older subscribers were more likely to change to United Healthcare than to remain with Group Health Cooperative.

Subscriber's occupation was significant in the equation; subscribers with professional and managerial occupations were more likely to remain with Group Health Cooperative than to switch. The discrim-

Table 3: Group Health Cooperative Discriminant Analysis Results

Standardized Canonical Discriminant Function Coefficients

Characteristic	*Coefficients*	p ≤
Need		
Subscriber's sex	0.1371	.063
Mental health: Lowest negative feelings	0.0886	.170
Access		
Least satisfaction with usual source	1.0558	.001
Recent use of usual source by subscriber	-0.0664	.360
Interaction of above access measures	-0.3599	.150
Experience		
Report of problems with provider	0.1992	.020
Months of GHC coverage from any source 1975-1978	-0.3443	.001
Financial		
Subscriber's age	0.1823	.028
Subscriber's occupation	0.2631	.001
Sum of the means of other family 1975-1978	0.1098	.120

*Classification Results (Percent)**

	Predicted Group	
Actual Group	Nonswitchers	Switchers
Nonswitchers	83.8	16.2
Switchers	30.0	70.0

Correctly Classified: 79.91
Significance < .001
R^2 = .297

*The default rule used assumed that the product of prior probabilities and costs of misclassification cancel one another.

inant function coefficient revealed the relatively high importance of the variable to the switching decision.

The *experience with plan* variables, satisfaction with providers and length of exposure to Group Health Cooperative, were both significant when the effects of the other variables were held constant. Families with less exposure to the Group Health Cooperative plan but higher dissatisfaction with providers while covered were more likely to change to United Healthcare.

This set of measures explained 29.7 percent of the variance in switching plans. The variables correctly classified 79.9 percent of all Group Health Cooperative cases.

To determine the generalizability of switching rules developed, we applied the GHC rule to the BC data and vice versa to see how well

each rule would perform in predicting switchers in the other provider system.

We deleted the variables in the rules which were specific to the plans and recreated the rules with the remaining variables. When the BC rule was applied to the GHC families, there was a reasonable amount of separation between the switchers and the nonswitchers. Thus, the BC rule can be said to generalize to quite a different setting (the prepaid group practice), although the amount of separation between switchers and nonswitchers in the new setting is not large.

When the GHC rule was applied to the BC families, however, there was, in effect, no separation between the BC switchers and the BC nonswitchers. Thus, the GHC rule does not seem at all applicable to the BC family data.

This suggests that there are general reasons for switching, as exemplified by the BC rule, as well as plan-specific rules, as exemplified by the GHC case.

THE EFFECT OF PRIOR UTILIZATION

It is evident from the preceding analyses that the health status of an individual in a family, or of the family on average, is not a consequential factor in the choice of plans. The only one of the several components of health status which was at all correlated with switching—although possibly spurious—was a dimension of mental health for GHC families. It will be recalled that there was some tendency for families with members having positive mental health to switch to UHC.

Another way of assessing selection bias in choice of plan is to evaluate actual utilization behavior of potential switchers. Prior utilization can be viewed as a composite measure of health status on one hand and of a tendency to use health services on the other. The insurance industry has commonly used this approach in its experience rating of groups.

Abstracts of BC claims and GHC medical records were compiled for all utilization of inpatient and outpatient services for all family members from January to June 1978, 6 months prior to open enrollments. Both for the BC sample and the GHC sample, the analysis used as prior utilization variables the 12 family-average measures encompassing inpatient and outpatient use separately: total use, medical use, laboratory use, radiology use, surgery use, and hospital-related physician visit use. The remaining three utilization variables were: family

average-total hospital visit use, family average-total surgery use, and family average-total use.

Considering first the BC discriminant analysis, three variables entered the equation: family size (to calculate family averages), total outpatient use, and total hospital visits. Larger families were more likely to switch from BC to UHC. The effects of the utilization variables, however, were mixed. Lower total outpatient use was associated with switching, while the reverse was true for total hospital visits. The contribution of either or both of these variables to predicting switching, however, was negligible. For example, the total variance explained (R^2) for the equation without prior utilization, as specified in the earlier section (Table 2), was approximately .36. The change in R^2 as a result of adding the two utilization variables was .008.

Finally, for BC, the contribution of average family total prior utilization, controlling for the variables shown in Table 2, was considered. This variable (average family total prior utilization) was forced into the basic equation. Again the increase in R^2 was negligible ($\Delta R^2 = .002$). The variable was not statistically significant ($p = .085$), and the relationship between total utilization and switching to UHC was negative; that is, UHC experienced favorable selection.

Turning to GHC, only family average total surgery use entered the equation. The increase in R^2 was .007 on a total explained variance (from Table 3) of approximately .30. The relationship between surgical utilization prior to open enrollment and the decision to switch to UHC was negative. That is, UHC experienced favorable selection, however slight. As with the BC sample, we considered total prior utilization alone, controlling for the variables from Table 3. No relationship was found between switching to UHC and total prior utilization ($p = .20$).

Thus, we conclude that evaluation of actual utilization behavior of potential switchers during the 6-month period preceding choice of plan shows no adverse selection into UHC from either Blue Cross or Group Health Cooperative. This result is consistent with the absence of a relationship between the health status measures and switching reported above.

DISCUSSION

Because the two groups were analyzed separately, only a general comparison of Blue Cross and Group Health Cooperative results is possible. Nonetheless, there are certain similarities and differences.

The less time a family had been exposed to either Blue Cross or Group Health Cooperative, the more likely it was to leave that plan and try United Healthcare. Families who had had a plan for a long time may have felt comfortable with the workings of their plan, believing that the costs involved in making a change outweighed the benefits.

BC and GHC families with female subscribers were more likely to change to United Healthcare. This may reflect the general dissatisfaction some women felt with health care in general and may have been an attempt to find a "better" system. In terms of benefit coverage for women, United Healthcare was the only one of the three plans which covered the complete costs of voluntary sterilization, contraceptive devices, and spontaneous or elective abortions. While the utilization data showed no evidence of adverse selection into UHC overall, specific areas such as these may have attracted a disproportionate number of potential users of these services.

The importance to these families of satisfaction—with plan administration, providers, and costs—was striking in its significance to the decision and in the differing emphasis placed on it by switchers from Blue Cross versus those from Group Health Cooperative. Perhaps because Blue Cross enrollees could maintain a satisfactory relationship with their provider even if they switched, report of dissatisfaction with plan administration was much more common from Blue Cross enrollees than from Group Health enrollees and much more common from Blue Cross switchers than nonswitchers. In contrast, perhaps because Group Health Cooperative enrollees see plan administration *as* delivery of services, complaints about GHC providers were much more common among Group Health Cooperative switchers than nonswitchers.

The phenomenon of the usual provider, traditional in the American medical system, appears to maintain its importance to these groups of enrollees. The major predictor of switching in the Blue Cross sample was presence of the family's usual sources on the United Healthcare list. The single most important predictor of switching from Group Health Cooperative was level of satisfaction with the family's usual source of care.

Only a few studies that have used multivariate techniques to analyze the decision to change plans are available for comparison with our results. These studies have been thorough and well documented: Berki et al. [8], Ashcraft [9], and Scitovsky et al. [10]. Although study designs are similar, it should be noted that there were premium differentials in the setting studied by Scitovsky et al., and that the studies

dealt with enrollees who may or may not have had experience with another plan.

The study by Berki et al. is the only one of the three studies amenable to comparison with the Blue Cross switcher/nonswitcher analysis. In the Berki et al. analysis, usual source of care (in this case, type of provider) was not significant in the Blue Cross/open-panel plan decision. Berki et al. also found family life stage to be a critical predictor in this decision; however, family life stage was not significant; only subscriber age (a component of family life stage) lent support to their findings. Blue Cross switchers to United Healthcare were found in our research to be younger, consistent with Berki's finding that the younger family stages were more likely to choose the open-panel plan.

One result of this research in comparison with that of Berki et al. is the lack of support in our findings for the health risk hypothesis but some support for the financial risk hypotheses, as evidenced by the income differences in the BC model. Berki et al. found higher numbers of chronic conditions and higher per capita incomes in such switchers, thus supporting both hypotheses.

Some components of all three studies are applicable to comparison with the results of the Group Health Cooperative analysis. In the Group Health Cooperative analysis, findings, consistent with Scitovsky's were found with regard to switchers having had less time with their former plans and with regard to lack of support for the health-risk hypothesis. Unlike the lack of association for GHC found in this study, Berki et al., Ashcraft, and Scitovsky et al. all found support for the financial-risk hypothesis insofar as switchers were found to have higher gross family incomes (Scitovsky et al.) or higher per capita incomes (Berki et al. and Ashcraft). Again, however, no support for the health-risk hypothesis was found in this research or in the research of these other authors.

In conclusion, while families from Blue Cross and Group Health Cooperative differ sociodemographically and have had experience with divergent systems of financing and delivering health care, the observed preference for a primary care network plan was apparently affected by considerations related to accessibility of care.

APPENDIX

GROUP MEANS FOR VARIABLES USED IN ANALYSIS

VARIABLE	GROUP			
	BC	BC-UHC	GHC	GHC-UHC
Need for Care				
Family life state	4.58†	5.04	4.69*	4.54
Family age	38.29*	36.28	32.58	31.64
Physical Health Status				
Health status: Family average (1 = excellent → 4 = poor)	1.59	1.62	1.57	1.60
Health status: Least healthy person (1 = excellent → 4 = poor)	1.76	1.81	1.75	1.80
Number of chronic conditions: Family average	1.33	1.37	1.29	1.29
Number of chronic conditions: Least healthy person	1.83	1.86	1.79	1.81
Conditions under care: Family average	1.39	1.63	1.57	1.18
Conditions under care: Least healthy person	1.08	1.14	1.05	1.17
Mental Health Status				
Mental health: Least healthy adult (1 = healthy → 7 = unhealthy)	2.19	2.26	2.28	2.43
Highest on positive-feeling scale	10.48	10.46	10.38	10.39
Lowest on positive-feeling scale	9.68	9.60	9.56	9.65
(For both positive scales: 3 = unhealthy → 12 = healthy)				
Highest on negative-feeling scale	11.45	11.67	11.72	12.20
Lowest on negative-feeling scale	9.90	10.20	10.39*	11.00
(For both negative scales: 6 = healthy → 24 = unhealthy)				
Subscriber's education in years	15.99*	5.51	15.79‡	14.79
Average adult's education	15.66	15.36	15.63‡	14.69
Subscriber's age	44.84*	43.40	39.82	38.05

Continued

APPENDIX: Continued

VARIABLE	GROUP			
	BC	BC-UHC	GHC	GHC-UHC
Subscriber's sex (1 = male, 2 = female)	1.48*	1.57	1.49*	1.61
Subscriber's race (1 = white, 2-4 = nonwhite)	1.20	1.28	1.40	1.33
Under medical care during June 1978 (0 = no, 1 = yes)	0.32	0.36	0.29	0.31
Access to Care				
Presence of usual sources of care in family (0 = none have usc, 1 = some have usc, 2 = all have usc)	1.79	1.83	1.93	1.87
Subscriber has usual sources of care (0 = no, 1 = yes)	0.67*	0.77	0.79	0.82
Recent use of usual sources by family members (0 = no usc, 1 = none used, 2 = some used, 3 = all used)	2.46†	2.62	2.54	2.55
Subscriber has recent use of usual sources (1 = no use, 2 = use)	1.67‡	1.81	1.81‡	1.59
Family's sources on UHC list (1 = no sources on list, 2 = some sources on list, 3 = all sources on list)	1.25‡	2.43	—	—
Average family satisfaction with usual sources (1 = very satisfied → 4 = very dissatisfied)	1.15	1.18	1.34‡	2.22
Least satisfaction reported with any usual source (1 = very satisfied → 4 = very dissatisfied)	1.31	1.35	1.59‡	2.66
Subscriber's satisfaction with usual sources (1 = very satisfied → 4 = very dissatisfied)	1.24	1.29	1.49‡	2.54
Appointment acquisition time—family average (days)	9.43*	6.98	11.22	12.35
Appointment acquisition time—highest reported by a family member (days)	11.93*	9.34	13.65	15.51
Travel time to appointments—family average (minutes)	18.34	17.01	20.28	21.66

Continued

APPENDIX: Continued

VARIABLE	GROUP			
	BC	BC-UHC	GHC	GHC-UHC
Travel time to appointments—highest reported by a family member (minutes)	20.89	19.36	22.24	23.90
Waiting time in office—family average (minutes)	22.74	24.12	19.65‡	35.15
Waiting time in office—highest reported by a family member (minutes)	25.97	28.22	21.91‡	40.49
Financial Capability				
Gross family income (01 = lowest category → 12 = highest: $44,000 +)	7.05*	6.35	5.91	5.70
Per capita income (01 = lowest category → 12 = highest: $44,000 +)	3.76†	3.39	3.32	3.28
Subscriber's occupation (1 = pro/mgt; 2 = nonpro/mgt)	1.39*	1.46	1.39‡	1.59
Subscriber's education (years)	15.99*	15.51	15.79‡	14.79
Average education of subscriber and spouse (years)	15.67	15.36	15.63‡	14.69
Other health insurance coverage for subscriber July 1977–July 1978 (1 = yes, 0 = no)	0.32*	0.26	0.20	0.27
Number of other policies in family (controlled for eligible family members)				
July 1975–June 1976	0.48	0.41	0.33†	0.49
July 1976–June 1977	0.43	0.38	0.28*	0.39
July 1977–June 1978	0.41	0.35	0.25†	0.37
Sum of policies 3 years	1.32	1.14	0.86†	1.24
Sum of mean number of other policies in family July 1975–June 1978 while a state employee	0.90	0.75	0.51	0.69
Number of subscriber's other policies July 1975–June 1978 regardless of employment	1.12	0.95	0.76	1.07

Continued

APPENDIX: Continued

VARIABLE	GROUP			
	BC	*BC-UHC*	*GHC*	*GHC-UHC*
Experience with Plan				
Months of state employment July 1977–July 1978	11.69	11.69	11.54	11.27
Total months of state employment July 1975–July 1978	31.82*	32.95	30.66	28.83
Months of state BC coverage July 1977–July 1978	11.63	11.57	0.05	0.00
Months of state BC coverage July 1975–July 1978	30.09	30.65	1.36‡	4.56
Months of state GHC coverage July 1977–July 1978	0.02	0.00	11.48	11.15
Months of state GHC coverage July 1975–July 1978	0.49†	1.18	28.89‡	23.16
Months of BC coverage from any source, controlled for employment, July 1977–July 1978	11.69	11.67	0.65	1.02
Months of BC coverage from any source, controlled for employment, July 1975–July 1978	30.53	31.05	2.68‡	6.04
Months of GHC coverage from any source, controlled for employment, July 1977–July 1978	0.50	.29†	11.60*	11.23
Months of GHC coverage from any source July 1975–July 1978	1.50	1.70	29.15‡	23.60
Months of BC coverage from any source, not controlled for employment, July 1975–July 1978	31.26	31.79	3.29‡	7.41
Months of GHC coverage from any source, not controlled for employment, July 1975–July 1978	1.74	1.76	29.81‡	24.03
Report of problems with plan (0 = no, 1 = yes)	0.28‡	0.47	0.06	0.04
Report of problems with providers while covered by plan (0 = no, 1 = yes)	0.07	0.07	0.17‡	0.34
Out-of-pocket costs reported for January-June 1978	121.49	128.78	22.54‡	51.01

Continued

APPENDIX: Continued

VARIABLE	GROUP			
	BC	BC-UHC	GHC	GHC-UHC
Costs as percent of income (Income = 1-12)	19.29	21.46	3.80*	9.57
Satisfaction with out-of-pocket costs (1 = satisfied → 3 = dissatisfied)	1.41*	1.80	1.16	1.23
Changed plans between July 1975-July 1978 (0 = no, 1 = yes)	0.06	0.10	0.10‡	0.31
Family's average utilization of all services for 6 months prior to switching (January 1978-June 1978)	167.35	134.07	142.90	84.03

*$p < .05$ (t or X^2).
†$p < .01$ (t or X^2).
‡$p < .001$ (t or X^2).

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