Selection of Health Insurance by an Employee Group in Northern California

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Abstract: Enrollment trends for a large employee group were analyzed to determine the extent to which consumers chose Blue Cross or Health Maintenance Organization (HMO) health insurance under various premium differentials. Data were collected from employment records of six University of California campuses for the period 1967 to 1978. Enrollment in the Kaiser Foundation Health Plan (an HMO) more than doubled during this period while enrollment in Blue Cross remained relatively stable. This increased preference for Kaiser coverage was associated with a concurrent relative rise in costs to employees of Blue Cross coverage. These data suggest that consumers are sensitive to insurance costs, and that given the opportunity HMOs can compete effectively with traditional health insurance. (*Am J Public Health* 70:274-276, 1980.)

Introduction

As the government has assumed increasing responsibility for the payment of escalating medical bills it has become interested in promoting alternative medical care systems with built-in incentives to control costs. Health Maintenance Organizations (HMOs) are one such alternative. In practice, HMOs have been shown to be capable of providing quality medical care at substantially lower overall costs;[1-5] however, in spite of these apparent advantages, HMOs account for less than 5 per cent of all medical care provided in the United States. Many explanations have been offered for the slow growth of HMOs, including opposition by organized medicine and patient loyalty to individual doctors.

Another important factor that many account for slow HMO growth, is the lack of difference in price to employees of health plans offered as fringe benefits by their employers. Very little is known about the impact of this factor. Since most private health insurance, including HMO coverage, is provided in this country through health insurance plans related to place of employment, it is important to understand how employees react to price differentials or the lack of them. In this study, enrollment trends for a large employee group were analyzed to determine the extent to which various premium differentials affect employee choice of health insurance.

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Methods

We hypothesized that as premium differentials increased favoring an HMO plan over a traditional co-payment health insurance plan, enrollment would shift toward the HMO plan. Data were compiled on all University of California (UC) employees during the period 1967 to 1978 in northern California who were enrolled in a UC health insurance plan. This population includes employees from six UC locations (Berkeley, Davis, Lawrence Livermore Laboratory, San Francisco, Santa Cruz, and Hastings) plus two University retirement groups. This employee group grew from approximately 23,000 to 33,000 people during the period studied.

UC employees are offered a choice of four health plans: Equitable Comprehensive Health Care, Equitable Basic Benefit with Major Medical Protection, Blue Cross Service Health Plan, and Kaiser Foundation Health Plan (a closed panel HMO). The two most popular plans are Blue Cross and Kaiser. Both plans offer a comprehensive scope of services, with Blue Cross having a substantial patient co-payment feature (e.g., 20 per cent of the first $5,000 for most inpatient services), and Kaiser having a nominal charge of $1 per office visit, with no co-payment for hospital services. Data analysis concentrated on Blue Cross and Kaiser since in 1978 over three-fourths of all UC employees who had employer-sponsored health insurance belonged to one of these two plans.

There are three classes of premiums: employee only, employee and one dependent, and family (employee and two or more dependents). Through 1973 the University paid a set dollar amount per employee. Beginning in 1974, the University payment began to reflect the employee's premium class. Table 1 displays Blue Cross and Kaiser premium costs during four years of the study period.

Results

Over the period studied, Kaiser doubled its enrollment of UC employees while Blue Cross enrollment remained relatively stable (see Figure 1). In 1967 Kaiser had 7,468 UC employee members, while Blue Cross had 9,245 members. In January 1978, Kaiser had 16,500 enrollees while Blue Cross had an enrollment of 9,203.

Several factors might explain the growth of Kaiser Plan enrollment over the study period; however, the most appar-

TABLE 1—Health Insurance Premiums in Dollars

Year	Blue Cross North						Kaiser North					
	One-Person		Two Persons		Family (3 or more persons)		One Person		Two Persons		Family (3 or more persons)	
	Total cost	Cost to employee	Total cost	Cost to employee	Total cost	Cost to employee	Total cost	Cost to employee	Total cost	Cost to employee	Total cost	Cost to employee
1968	$14.17	6.17	29.71	21.71	34.60	26.60	10.26	2.26	20.52	12.52	29.43	21.43
1971	20.90	10.90	43.06	33.06	50.96	40.96	15.92	5.92	31.84	21.84	45.78	35.78
1975	31.58	9.58	64.90	27.90	77.28	30.28	23.07	1.07	46.14	9.14	66.53	19.53
1978	51.50	20.50	105.02	52.02	127.58	61.58	28.36	.00	56.70	3.70	81.70	15.70

ent factor appears to be the difference in cost to the employee between Blue Cross and Kaiser. Blue Cross subscribers have been paying proportionately more every year for their health insurance than have Kaiser members.

Observation points representing each year from 1968 through 1978 are plotted in Figure 2 to show the interaction between employee costs and enrollment trends for Blue Cross and Kaiser family plans (no cost data were available for 1967). The horizontal axis of Figure 2 represents the net additional cost of Blue Cross coverage relative to that for Kaiser (converted to 1976 constant dollars to correct for inflation) while the vertical axis shows the difference in enrollment favoring Kaiser over Blue Cross. A regression curve, using a logarithmic conversion of the difference in employee net cost between Blue Cross and Kaiser, is plotted in this Figure. It can be seen that this regression equation accounts for a substantial amount of the variance of these two variables (R^2 = .89). Although not shown in Figure 2, both one-party and two-party plans exhibit very similar associations between cost and enrollment.

The data indicate that Kaiser enrollment is positively associated with the level of Kaiser's cost advantage. The fit of a logarithmic regression model to the data suggests that Kaiser needed only a small favorable premium differential to attract subscribers, but that as the premium differential became more dramatic there was a moderate slowing down of the shift to Kaiser. The most plausible explanation of this phenomenon seems to be that there were essentially three groups of employees: those only interested in their current Blue Cross coverage, those only interested in their current Kaiser coverage, and those who were sensitive to price and were willing to shift to the lower priced plan. It appears that the movement of most of this latter group may have occurred early on, with later additions to Kaiser coming mainly from new employees.

An additional enrollment trend appears to be operating that is independent of employee contributions at low levels; that is, Kaiser enrollment grew although the contribution differential remained at approximately $10 (in 1976 constant dollars) for the first years of our study. This trend can be explained by several factors, including increasing acceptance of Kaiser as an alternative medical care supplier in California, co-payment differentials between Kaiser and Blue

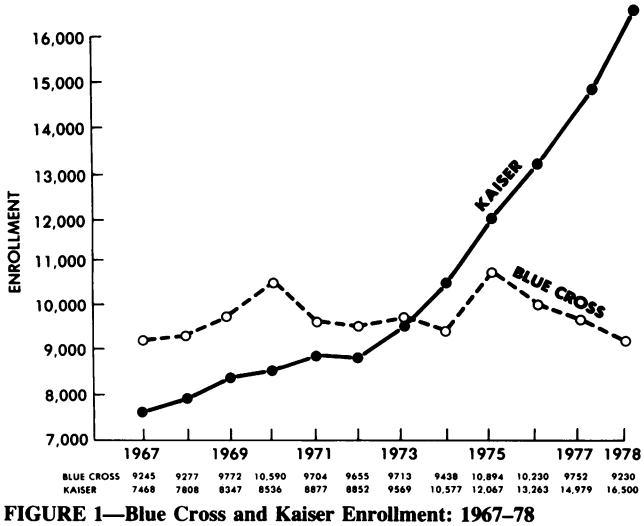

FIGURE 1—Blue Cross and Kaiser Enrollment: 1967–78

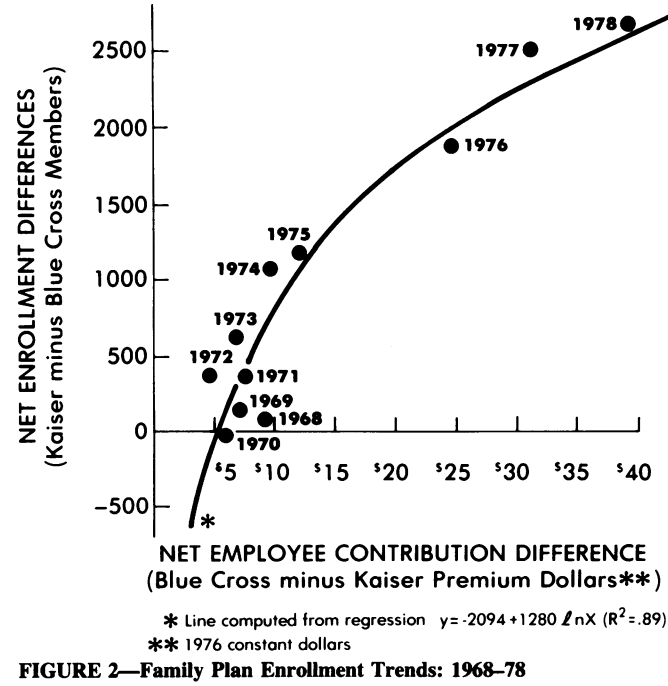

FIGURE 2—Family Plan Enrollment Trends: 1968–78

Cross, and rising medical care prices over the period. Blue Cross requires a $25 patient payment per illness for outpatient services, and a patient payment of 20 per cent of the first $5,000 for most inpatient services. In addition, the enrollee must pay any charges above the "usual, customary, and reasonable" level for most outpatient services. These all represent additional costs to subscribers. Consequently, as the price of medical care spirals upward so, too, do out-of-pocket expenses. The full cost to employees of Blue Cross coverage then is equal to the contribution level plus co-payments based on the level of covered services used. Kaiser, on the other hand, has a nominal one dollar co-payment charge for outpatient services only. Because medical care prices rose substantially over the period under study, the real cost to the employee of Blue Cross coverage has grown in excess of that indicated by the contribution alone. This growth in medical care prices may well explain the growth in Kaiser enrollment over the late 1960s and early 1970s that cannot be attributed solely to contribution differences.

Conclusion

Much of Kaiser's employee enrollment growth can be explained by the increase in cost to employees of Blue Cross premiums relative to Kaiser premiums, and general increases in medical care costs. These results support our hypothesis that there is a substantial group of employees who are sensitive to the cost of health insurance and, given the opportunity, will enroll in a lower cost HMO rather than a traditional copayment health insurance plan.

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Mutagenic Activity in Drinking Water

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Abstract: Drinking water samples concentrated by freeze drying were found to be mutagenic in a mammalian tissue culture assay using Chinese hamster embryonic lung cells (V79). The mutagenicity could be enhanced by the promoter 12-O-tetradecanoyl-phorbol-13-acetate. The water itself was also shown to contain promoting chemicals. The mutation frequency of cells pretreated with low levels of benzo(a)pyrene was increased following subsequent exposure to the concentrated water sample. Approaches to estimate the risk involved in exposure to present drinking water are proposed. (*Am J Public Health* 70:276-278, 1980.)

Introduction

The possibility that low levels of certain organic compounds in drinking water can cause cancer in the human population has not yet been resolved. A number of epidemiological studies have yielded no definitive conclusions.[1,2] We came to the realization that epidemiological studies alone are not sufficient to prove a cause-effect relationship between drinking water and human cancer. Therefore, it seems logical to integrate epidemiological studies with chemical and biological tests. However, the long, conventional *in vivo* bioassay for carcinogenicity is not feasible, either scientifically or economically.[3] The recently developed short term *in vitro* assays for carcinogens are suitable tools to examine potential risks in drinking water. The *in vitro* mutagenicity tests in bacteria[4] and in mammalian cells[5] have shown high correlations with the *in vivo* bioassay for carcinogenicity.[6,7]

Recently, a few preliminary studies on the mutagenicity of different types of water have been carried out, principally on fractions isolated from the organic soluble material.[8] In order to relate the results from toxicological assays to human epidemiological data, it seems logical to test the total water prepared for immediate human consumption. It is also important to consider the possible interactions of the organic compounds which can occur within such a complex mixture (termed generally as synergistic or antagonistic effects). In this study, a highly concentrated sample of New Orleans tap water was prepared by freeze drying (−50° C). The water sample volume was reduced 1,000 times, yielding a final solution with a total organic carbon (TOC) concentration of 1200 mg/l ("concentrated water"). The recovery of the organic material was about 90 per cent.

Methods

Mutagenicity and Promotion Assays

The tests to assess the mutagenic and promoting activities were done as described previously.[3,9] Briefly, the proce-

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