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Health Plan Switching in Anticipation of Increased Medical Care Utilization

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We compare rates and days of maternity and nonmaternity hospital admission for the years 1981 through 1984 for three groups of employees and dependents from a large private employer: those continuously enrolled in a fee-for-service (FFS) plan (N = 147,700), those continuously enrolled in a health maintenance organization (HMO) (N = 30,957), and those switching from the FFS plan to the HMO (N = 2,144). The rate of maternity admissions for plan switchers increased by 106% (P < 0.001) in the post-switch year compared with the pre-switch year, while maternity rates for continuing FFS-plan enrollees declined by 12% (P < 0.001) and rates for continuing HMO enrollees remained unchanged. Nonmaternity admission rates for switchers decreased by 19% (P = 0.079), consistent with the expectation that HMOs reduce these rates substantially, while rates for FFS-plan stayers increased 4% (P < 0.001) and those for HMO stayers remained unchanged. We conclude that employees often switch health plans when anticipating increased needs for maternity care and therefore that pre-switch rates of utilization are unreliable measures of the true magnitude of risk selection between HMOs and FFS plans. Key words: health insurance; health care costs; competition; health maintenance organization. (Med Care 1993; 31:43–51)

Biased selection is threatening the viability of market-oriented proposals to reform the health care system.[1] To the extent some competing plans attract a disproportionately healthy mix of enrollees while others attract a disproportionately sick enrollee mix, plan costs, premiums, and profits will reflect risk selection in addition to efficiency. Over the long run, health plans will receive the incentive to compete via selective enrollment of healthy and disenrollment of sick individuals rather than through price reductions and quality enhancements.[2-4]

Many observers believe that health maintenance organizations (HMOs) are benefitting from favorable risk selection, mainly because of the reluctance of persons with significant medical care needs to break relationships with their existing physicians and switch into an HMO. As reviewed on several occasions,[5-7] the literature on biased selec-

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tion among employed populations is composed primarily of studies that compare pre-switch utilization for fee-for-service (FFS) plan enrollees who subsequently switch into an HMO ("switchers") with those for FFS plan enrollees who do not switch ("stayers"). Typically no data are available on post-switch utilization by either switchers or stayers. It is implicitly assumed that pre-switch utilization in the FFS plan is an accurate predictor of utilization by switchers in the subsequent year once they have joined the HMO. This assumption is questionable. Individuals planning to switch plans may "store up" deferrable utilization for the post-switch year if the HMO provides better coverage. More importantly, the decision to switch plans may itself be prompted by the anticipation of future health care needs that are better covered by the HMO.

This study used FFS plan claims and HMO hospital discharge records to compare pre-switch and post-switch utilization for employees and dependents who switched from a FFS health plan to a group-model HMO between 1981 and 1984. The analysis is limited to inpatient utilization, because outpatient data were not available from the HMO. Employees and dependents continuously enrolled in the FFS plan and the HMO were used as control groups. We focus initially on maternity, a diagnostic category in which hospital admission is nondiscretionary for the HMO, but in which inpatient days may be influenced by the HMO's cost-containment program. We then analyze nonmaternity utilization, which includes discretionary as well as nondiscretionary admissions.

Dynamic and Steady-State Risk Selection

It is important to distinguish the hypothesis that individuals switch health plans in anticipation of changing medical care needs (and possibly defer or "store up" some utili-

zation for the post-switch period) from the more conventional hypothesis that individuals' decisions to switch plans are influenced by their health care needs. The "storing up" hypothesis refers to changes over time in the propensity of any one individual to use services. In contrast, the conventional risk selection hypothesis refers to time-invariant differences among two or more individuals in the propensity to use services. In the following discussion, we will discuss these two hypotheses in terms of "dynamic" and "steady-state" risk selection.

Most discussions of plan switching focus on whether persons with greater (steady-state) medical care needs are more or less likely than persons with fewer needs to choose an HMO over a conventional FFS plan. It is commonly argued that persons with greater needs are less likely to switch health plans because of strong existing bonds to their physicians. Because most persons "begin" in a FFS plan and must switch to join an HMO, this physician-affiliation perspective predicts that HMOs will enroll a disproportionately healthy population. To the extent that the need for services does not change over time or, at a minimum, that such changes are not correlated with the decision to switch plans, an analysis of pre-switch utilization will correctly identify patterns of steady-state risk selection. The conventional risk selection study design, which focuses on utilization by prospective switchers while still enrolled in the FFS plan, potentially separates the effects of risk selection from the effects (if any) of the HMO itself on utilization. Even if they were available, utilization data from switchers after joining the HMO could not differentiate risk selection effects from HMO utilization-control effects. In any event, post-switch utilization data usually are not available.

The dynamic risk-selection hypothesis asserts that anticipated changes in health care needs may prompt a switch of health plan. The most plausible direction of selection

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bias in this case is opposite that for time-invariant, steady-state differences among individuals in medical care needs. A FFS-plan enrollee contemplating an increased need for services has not yet developed the stronger physician affiliations this increased level of utilization may create. He or she is likely to be attracted by the lower cost-sharing and wider coverage of services offered by many HMOs, and so is more likely to switch plans than a FFS-plan enrollee not anticipating increased health care needs.

The hypothesis of adverse dynamic HMO selection is consistent with the conventional view that sick people are disproportionately likely to stay in their FFS plan (favorable steady-state HMO selection). Differences among individuals in long run average (steady-state) health care needs and (dynamic) changes for particular individuals in anticipated health care needs may both influence choice of health plan. If the dynamic risk-selection hypothesis is correct, however, the conventional switcher-based study design cannot validly measure even steady-state risk selection, because utilization by switchers while enrolled in the FFS plan will underpredict subsequent utilization once they have enrolled in the HMO. The conventional study design obviously cannot measure dynamic risk selection.

In principle, nine combinations of steady-state and dynamic risk selection are possible. Considering steady-state propensities to use services, HMOs might attract low users (favorable selection), high users (adverse selection), or a representative mix of low and high users (random selection). Considering anticipated changes over time in utilization, HMOs might attract individuals anticipating increased needs (adverse selection), individuals anticipating decreased needs (favorable selection), or individuals with a representative mix of increasing, decreasing, and unchanging needs (random selection).

This creates a 3 × 3 matrix of possibilities. In practice, however, three of the nine cells in the matrix are of greatest importance. The

obvious baseline case for comparisons is no steady-state risk selection and no dynamic risk selection (random selection). Given the strong effect of patient-physician affiliations on plan switching, the other two interesting cases are those that assume favorable steady-state risk selection for the HMO. One case assumes no dynamic risk selection; this is the case compared with the baseline (random selection) case in the conventional switcher study design.[5-7] The third possibility combines favorable steady-state risk selection for the HMO with adverse dynamic risk selection ("storing up") for the HMO.

Table 1 presents the three most interesting combinations of steady-state and dynamic risk selection, with their predictions concerning pre-switch and post-switch patterns of hospital admissions for FFS plan switchers and stayers. The first case predicts equal rates of admission in the pre-switch period ("Year 1") for both discretionary and nondiscretionary causes of admission. In the post-switch period ("Year 2"), the rate of nondiscretionary admissions is still identical for switchers (now enrolled in the HMO) compared with those staying in the FFS plan. To the extent HMOs discourage discretionary hospital admissions, however, the rate of discretionary admissions in Year 2 should be lower for switchers than for stayers. We represent this by a post-switch rate of discretionary admissions β times the pre-switch rate, where $0 < \beta < 1$. Therefore, the HMO's effect on discretionary admissions, in percentage terms, is $(1 - \beta) \times 100$.

The second case assumes sicker patients are less likely to switch into an HMO than healthier patients (favorable steady-state risk selection for the HMO), and that health care needs for any one individual do not change (or, rather, that any such changes are uncorrelated with plan switching). In this scenario, admission rates in Year 1 for switchers are a fraction α of the rates for stayers, $0 < \alpha < 1$. The fraction for nondiscretionary admissions (α_1) may differ from the fraction for discretionary admissions

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TABLE 1.   Admission Rates for Health Plan Switchers and Stayers
Under Alternative Interpretations of Risk Selection

	Nondiscretionary Admissions	Discretionary Admissions
Random steady-state selection, random dynamic selection		
Year 1	Switchers = Stayers	Switchers = Stayers
Year 2	Switchers = Stayers	Switchers = β (Stayers)
Favorable HMO steady-state selection, random dynamic selection		
Year 1	Switchers = α_1 (Stayers)	Switcher = α_2 (Stayers)
Year 2	Switchers = α_1 (Stayers)	Switcher = $(\alpha_2 \times \beta)$ (Stayers)
Favorable HMO steady-state selection, adverse HMO dynamic selection		
Year 1	Switchers = α_1 (Stayers)	Switcher = α_2 (Stayers)
Year 2	Switchers > α_1 (Stayers)	Switcher > $(\alpha_2 \times \beta)$ (Stayers)

Note: $0 < \beta < 1$; $0 < \alpha_1 \leq 1$; $0 < \alpha_2 \leq 1$.

(α_2). By hypothesis, this case has no dynamic risk selection and so the Year 2 rate of nondiscretionary admissions for switchers is α_1 times the rate for stayers. Similarly, the rate of discretionary admissions for switchers is $(\alpha_2 \times \beta)$ multiplied by the stayer rate.

The third case also assumes favorable steady-state risk selection into the HMO. Year 1 rates of admission for switchers are α_1 and α_2 times the rates for stayers, as in the second case. Because of adverse dynamic risk selection for the HMO, however, utilization among switchers increases in Year 2 compared with Year 1. The rate of nondiscretionary admissions for switchers now exceeds α_1 multiplied by the rate for stayers. It may exceed the stayer rate altogether. The rate of discretionary admissions now exceeds $(\alpha_2 \times \beta)$ multiplied by the rate for stayers and may even exceed the stayer rate altogether.

To the extent the Year 2 rate of nondiscretionary admissions for switchers exceeds the Year 2 rate for stayers, the effects of adverse dynamic risk selection have overpowered the effects of the favorable steady-state risk selection (adverse net HMO risk selection). Similarly, Year 2 rates of discretionary ad-

missions among switchers that exceed β times the stayer rate indicate that adverse HMO dynamic risk selection has overpowered favorable steady-state HMO selection. Thus, for example, a finding of equal Year 2 rates of admission for discretionary causes of admission would indicate adverse net selection for the HMO, not random selection.

In practice, it is impossible to clearly distinguish discretionary from nondiscretionary admissions using provider reimbursement claims and hospital discharge abstracts. In this study we divide admissions into maternity and nonmaternity diagnoses. Maternity diagnoses are nondiscretionary admissions from the health plan's perspective, while nonmaternity diagnoses cover a diverse mix of discretionary and nondiscretionary admissions. The nonexperimental literature[8] and the RAND Health Insurance Experiment[9] report nonmaternity admission rates for HMOs that are 20% lower than rates for FFS plans with a 20% to 25% consumer copayment. If the "nondiscretionary admissions" column in Table 1 is redefined as maternity admissions while the "discretionary admissions" column is redefined as nonma-

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ternity, we can derive a testable null hypothesis that $\beta = 0.80$. (The FFS health plan analyzed here imposed a 20% copayment).

Methods

Personnel data including health plan enrollment were provided by the Bank of America, a large financial institution based in California, for all employees enrolled in either the Bank's FFS plan or in Kaiser-Permanente of Northern California, a large group-model HMO, for 1981 through 1984. Bank employees are permitted to switch plans during the annual open enrollment season, with enrollment in the new or continuing plan effective on January 1 of the following year. We limited our analysis to employees (and their dependents) who were enrolled for an entire year at a time, excluding those hired or terminated during the course of the year. This was necessary because of our inability to accurately gauge the number of months in a given year that part-year employees were enrolled. We also excluded employees enrolled in health plans aside from the FFS plan and Northern California Kaiser, because of an inability to obtain utilization data from those plans.

We sorted the enrollment data into three overlapping pairs of years, 1981 to 1982, 1982 to 1983, and 1983 to 1984. For each pair of years, employees were classified as FFS stayers if they were enrolled in the FFS plan in both years, as HMO stayers if they were enrolled in Kaiser in both years, and as switchers if they were enrolled in the FFS plan in the first year and in Kaiser in the second year. We excluded the very small number of employees (less than five each year) who switched from Kaiser to the FFS plan. Thus, for example, an individual enrolled in the FFS plan in 1981 and 1982 and then in Kaiser in 1983 and 1984 would be classified as a FFS stayer in 1981 to 1982, a switcher in 1982 to 1983, and an HMO stayer in 1983 to 1984. An individual

enrolled in the FFS plan in 1981 and 1982 who quit the job in the middle of 1983 would be classified as a FFS stayer in 1981 to 1982 and then excluded from the analyses for 1982 to 1983 and 1983 to 1984. While the number of employees in each of the three categories (FFS stayers, HMO stayers, and FFS-to-HMO switchers) is the same in the first and second of each pair of years, the number of total enrollees is not, because employees may add or drop dependents from health plan coverage.

The personnel data from the Bank indicate whether the employee is enrolled as a single individual, as an employee plus one dependent, or as an employee plus two or more dependents. They do not indicate the number of dependents for employees with two or more dependents. Enrollment data from Kaiser permitted an exact count of the number of covered dependents for each employee enrolled in that plan. No equivalent data were available from Blue Shield of California, the administrator of the Bank's self-insured FFS plan. We calculated the mean number of dependents for Bank employees in Kaiser who had two or more dependents, and assigned that mean value to employees in the FFS plan who had two or more dependents. To ensure comparability with the HMO plan, we also assigned this mean value to Kaiser members who were enrolled as an employee plus two or more dependents.

The utilization data for FFS-plan enrollees were obtained from a comprehensive file of the claims incurred by all plan enrollees (approximately 500,000 claims per year). Claims for services provided outside of acute care hospitals were excluded, as were claims for psychiatric admissions and admissions for Acquired Immune Deficiency Syndrome. (These latter two exclusions were necessary to make the FFS data comparable to the HMO data. Kaiser does not release psychiatric and AIDS data.) Multiple claims for services provided during the same

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admission were grouped together using admission and discharge dates to avoid double counting of admissions. Inpatient days were calculated for each admission using these dates. Kaiser provided us with comprehensive discharge abstract data for each hospital admission for each Bank of America enrollee (employee or dependent). Information regarding HMO admissions and inpatient days were drawn directly from the abstracts.

We calculated rates of FFS-plan admissions and inpatient days per 1,000 enrollees in the first of each pair of years for switchers and in both the first and second of each pair of years for FFS stayers. We calculated rates of HMO admissions and inpatient days per 1,000 enrollees in the second of each pair of years for switchers and in both the first and second of each pair of years for HMO stayers. Rates were calculated for maternity and nonmaternity causes of hospitalization separately.

Utilization patterns for FFS and HMO stayers were quite stable across the three pairs of years because of the large number of enrollees in these two categories. However, relatively modest numbers of enrollees switched plans in each pair of years. To increase the stability of the rates for switchers, we pooled the pre-switch and post-switch data from the three pairs of years. Thus, Year 1 utilization consists of 1981 data obtained from the 1981 to 1982 cohort, 1982 data from the 1982 to 1983 cohort, and 1983 data from the 1983 to 1984 cohort. Year 2 utilization consists of data from the second of each pair of years. Analogous pooling of data across the three pairs of years was conducted for FFS and HMO stayers. This created a final data file with 147,700 FFS stayers, 30,957 HMO stayers, and 2,144 switchers in Year 1 and 149,387 FFS stayers, 31,812 HMO stayers, and 2,433 switchers in Year 2. The larger sample sizes in Year 2 compared with Year 1 resulted from the net addition of dependents to health plan coverage.

TABLE 2. Maternity Admissions and Inpatient Days per 1,000 Enrollees for Health Plan Stayers and Switchers

	FFS Plan Stayers	FFS-to-HMO Switchers	HMO Stayers
Admissions			
Year 1	16.2	12.6	26.8
Year 2	14.3	25.9	26.1
Inpatient days			
Year 1	74	54	122
Year 2	62	125	123

Results

Table 2 presents rates of maternity admissions and inpatient days for FFS plan stayers, HMO stayers, and FFS-to-HMO switchers. The rate of maternity admission more than doubled (106% increase) for plan switchers after they joined the HMO ($P < 0.001$). By way of contrast, the maternity admission rate for FFS stayers declined by 12% ($P < 0.001$) between Year 1 and Year 2 and that for HMO stayers did not change. While the Year 1 rate of maternity admission for switchers was 22% lower than the rate for FFS stayers ($P = 0.038$), it was 81% higher in Year 2 ($P < 0.001$). After joining the HMO in Year 2, switchers experienced the same rate of maternity admissions as HMO stayers. The data on maternity inpatient days, presented in the third and fourth rows of Table 2, confirm the evidence obtained from the admission rates.

Rates of admission and inpatient days for nonmaternity diagnoses among switchers and stayers are presented in Table 3. The rate of admission for switchers decreased by 19% in Year 2 after joining the HMO, compared with the Year 1 rate for these individuals while still enrolled in the FFS plan ($P = 0.079$). By way of comparison, the nonmaternity admission rate for FFS stayers increased slightly between Year 1 and Year 2 while that for HMO stayers declined slightly. These changes were not statistically significant. The rate of nonmaternity admis-

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TABLE 3. Nonmaternity Admissions and Inpatient Days per 1,000 Enrollees for Health Plan Stayers and Switchers

	FFS Plan Stayers	FFS-to-HMO Switchers	HMO Stayers
Admissions			
Year 1	68.2	27.0	32.5
Year 2	71.2	21.8	31.7
Inpatient days			
Year 1	429	135	162
Year 2	440	120	170

sions in Year 1 for switchers was 60% lower than for FFS stayers ($P < 0.001$). In Year 2, after becoming subject to the hospital utilization control program of the HMO, switchers experienced a nonmaternity admission rate 69% lower than those who remained in the FFS plan ($P < 0.001$). HMO stayers experienced rates of nonmaternity admission 52% lower than FFS stayers in Year 1 ($P < 0.001$) and 55% lower in Year 2 ($P < 0.001$). Rates on nonmaternity inpatient days declined by 11% ($P = 0.222$) for switchers after joining the HMO but increased slightly between Year 1 and Year 2 for FFS stayers and HMO stayers. These increases in inpatient days are not statistically significant.

Steady-State and Dynamic Risk Selection

The data in Tables 2 and 3 can be interpreted in terms of the conceptual matrix presented in Table 1, because maternity is a nondiscretionary form of hospital utilization from the health plan's perspective. The doubling in maternity admissions for switchers between Year 1 and Year 2 strongly supports the hypothesis of dynamic risk selection unfavorable to the HMO. The pre-switch rate of maternity admissions for switchers is 22% lower than for FFS stayers ($\alpha_1 = 0.78$). In Year 2, however, the maternity admission rate for switchers not only exceeds 0.78 times the stayer rate but exceeds the stayer rate itself by 81%. In terms of the conceptual

framework developed earlier, this implies that the effects of adverse dynamic risk selection overpowered the effects of favorable steady-state risk selection, creating adverse net risk selection regarding maternity care for the HMO.

The picture is quite different for nonmaternity diagnoses, a heterogeneous group that includes both discretionary and nondiscretionary admissions. After joining the HMO, switchers experienced a decline in nonmaternity admission by one fifth (19%), precisely what one would expect based on the RAND Health Insurance Experiment.[9] If the nonmaternity admission rate for switchers had declined by less than 19% or had increased, this would have suggested adverse dynamic risk selection for the HMO. The data, however, support the null hypothesis of no dynamic risk selection. The pre-switch rate of nonmaternity admissions for switchers is 60% lower than for FFS stayers ($\alpha_2 = 0.40$). The post-switch rate for switchers is 69% lower, consistent with the evidence that the HMO reduces nonmaternity admissions by approximately one fifth. (A post-switch rate for switchers 31% as high as for stayers (i.e. $1.00 - 0.69$), combined with a steady-state risk selection factor of $\alpha_2 = 0.40$, implies an HMO effect of 22.5%: $(1 - 0.225)(0.40) = (0.31)$). Therefore, $\beta = 0.775$.

An overall assessment of risk selection in this employment setting can be made as follows: The evidence on maternity diagnoses suggest favorable initial selection into the HMO but adverse dynamic selection, which add up to adverse net risk selection in Year 2. The nonmaternity evidence suggests favorable initial risk selection into the HMO, random dynamic risk selection, and hence, favorable net risk selection in Year 2. The two types of admission rates can be combined, using Year 2 data, if one accounts for the effect of the HMO's inpatient utilization controls. Consistent with the RAND Health Insurance Experiment and the switcher data

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in Table 3, we assume that the Year 2 non-maternity admission rate for switchers would have remained at 27.0 per 1,000 had they not joined the HMO (i.e., the 19% decline in nonmaternity admissions was caused by the HMO, not by favorable dynamic risk selection). We assume that the Year 2 maternity admission rate for switchers, had they remained in the FFS plan, would have been 25.9 per 1,000, the same rate as actually experienced in the HMO (i.e. no HMO effect on the rate of maternity admissions). Adding these two rates and dividing by the combined Year 2 maternity and nonmaternity admission rates for FFS stayers, we conclude that the HMO benefitted from an overall admission rate 38% below the FFS plan rate due to favorable net risk selection. The conventional switcher study design would compare Year 1 admission rates for switchers and stayers and incorrectly conclude that the HMO benefitted from an admission rate 53% below the FFS rate due to (steady-state) favorable selection. The conventional switcher study design thus overestimates the true degree of risk selection by 40%.

These estimates should be interpreted with caution, because they reflect only inpatient to the exclusion of outpatient services. Both the nonexperimental literature[8] and the RAND experiment[9] report that HMO enrollees use as many if not more outpatient services than FFS enrollees, because HMO physicians have few direct means to control ambulatory visits and because copayment provisions discourage outpatient utilization in the FFS plan. In a different analysis of the Bank of America data, which used comprehensive outpatient as well as inpatient FFS claims, we estimated that Kaiser benefitted from favorable selection to a much more modest degree than presented here.[10] Based on a six-equation predictive model for expenditures, we estimated that Kaiser benefitted from 1.9% favorable selection in 1981, 6.6% in 1982, 9.4% in 1983, and 11.5% in

1984. Furthermore, these estimates were for the entire population of HMO enrollees (switchers and HMO stayers) compared with FFS-plan enrollees, not merely for switchers compared with FFS-plan stayers.

Discussion

The perception among many employers, policymakers, and industry observers that HMOs are benefitting from favorable selection at the expense of FFS health plans is based largely on studies that compare utilization rates for individuals switching plans with those for individuals remaining in FFS plans. Our study suggests that this is unreliable evidence concerning the true distribution of risk among HMOs and FFS plans. We focussed on maternity admissions because they are a frequently occurring and easily measurable form of nondiscretionary medical care for the Bank of America employee population (72% of which was between 18 and 45 years of age). Other data could be used to analyze plan switching in anticipation of nonmaternity forms of care (i.e., Medicare data for surgical procedures common among the elderly).

Risk selection is a potentially serious problem for health insurance markets. The existing literature based on analyses of pre-switch utilization by prospective plan switchers, however, provides a potentially misleading perspective on the magnitude and possibly even the direction of the bias. Future switcher-based studies should incorporate data on post-switch utilization as a complement to the pre-switch data. Wherever possible, studies of risk selection should include all HMO and FFS-plan enrollees rather than focus on the relatively small and often unrepresentative cohort of plan switchers.

References

1. Enthoven AC, Kronick A. A consumer choice health plan for the 1990s. N Engl J Med 1989;320:29, 94.

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2. Luft HS. Compensating for biased selection in health insurance. Milbank Q 1986;64:566.

3. Robinson JC. Hospital quality competition and the economics of imperfect information. Milbank Q 1988;66:465.

4. Jones SB. Multiple choice health insurance: the lessons and challenge for private insurers. Inquiry 1990;27:161.

5. Luft HS, Miller RH. Patient selection in a competitive health care system. Health Affairs 1988;7:97.

6. Hellinger FJ. Selection bias in health maintenance organizations: analysis of recent evidence. Health Care Financing Review 1987;9:55.

7. Wilensky GR, Rossiter LF. Patient selection in HMOs. Health Affairs 1986;5:66.

8. Luft HS. How do health maintenance organizations achieve their savings? N Engl J Med 1978; 298:1336.

9. Manning WG, Leibowitz A, Goldberg GA, et al. A controlled trial of the effect of a prepaid group practice on use of services. N Engl J Med 1984;310:1505.

10. Robinson JC, Luft HS, Gardner LB, et al. A method for risk-adjusting employer contributions to competing health insurance plans. Inquiry 1991; 28:107.

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