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WORKSHOP IN HEALTH ADMINISTRATION STUDIES

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"HMO Compared to Fee-for-Service among Medicaid Beneficiaries:
USE, COST AND QUALITY"

WORKSHOP PAPER

for

Thursday, November 10, 1988

Rosenwald 405

3:30 to 5:00 p.m.

MEDICAID IN A HEALTH MAINTENANCE ORGANIZATION AND FEE-FOR-SERVICE:
USE AND COSTS*

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INTRODUCTION

The 1980s have witnessed the beginnings of fundamental and widespread change in the health services industry of the United States. Recently enacted public policies and emerging market forces are exerting unprecedented financial pressures on the industry to improve its efficiency. Private insurers and providers of health care are responding by expanding supplies of "alternative delivery systems" and by establishing novel organizational and financial arrangements. As fiscal constraints tighten, health care providers are being forced to compete among themselves as never before.

The federal and state governments are both instigators and potential beneficiaries of the gathering revolution in health care. Two decades of relentless growth in federal spending for health care prompted Congress in the early 1980s to enact sweeping changes in the programs that purchase health care for the nation's elderly (Medicare) and poor (Medicaid). Revisions of Medicare's method of paying hospitals imposed on those institutions, and on the physicians who use them, strong incentives to economize. Relaxation of federal regulations governing Medicaid awarded states greater discretion in the management of their programs and encouraged them to introduce various cost-saving reforms. By mid-decade, half the states had exercised their newly won prerogatives by fostering the establishment of *managed health care systems*.

While the great variety among initiatives labeled managed care defies precise definition,¹ its proponents share common ideas about its essential features and hold similar expectations for its likely accomplishments.² Managed care requires participating health care providers to oversee the

¹For a taxonomy of types of managed care systems, see R.E. Hurley, and D.A. Freund, "A Typology of Medicaid Managed Care," *Medical Care*, 26 (August, 1988), 764-774.

²A.R. Somers, "And Who Shall Be the Gatekeeper? The Role of the Primary Physician in the Health Care Delivery System," *Inquiry*, 20 (Winter, 1983), 301-313; B. Spitz, "National Survey of Medicaid Case Management," *Health Affairs*, 6 (Spring, 1987), 61-70.

full range of health care services used by panels of clients and, in varying degrees, to assume financial risk for those services.

- The *clinical* core of managed care, case management, assigns providers the gatekeeping responsibilities for delivering routine primary care to clients and for orchestrating referrals to specialty and inpatient care. Such arrangements are intended to enhance the continuity, appropriateness, and quality of medical care as well as to limit its costs. Moreover, clients' access to health care services presumably improves by their having selected providers who assume these responsibilities
- The *systemic* features of managed care emerge from referral networks and other arrangements established by providers. To discharge effectively their gatekeeping functions, primary care providers must develop ongoing relationships with specialists and hospitals who accept the roles that case management requires of them
- Managed care permits the introduction of various *financial* schemes to reap savings beyond those that might accrue from the clinical orderliness imposed by case management. Insurers may, for instance, negotiate discounts in prices charged by participating providers, impose fee schedules, or insist upon providers' accepting fixed, prospective payment. While managed care implies no particular mode of paying providers, it conveys the understanding that such decisions are made, not by providers, but rather by insurers acting in their clients' behalf.³

The promise of managed care to enhance families' access to continuously supervised, appropriate health care services recommends it to

³For a discussions of various financing schemes employed in managed care systems, see D.A. Freund, *et al. Medicaid Reform: Four Studies of Case Management* (Washington, D.C.: American Enterprise Institute for Public Policy Research, 1984); M.D. Anderson and P.D. Fox, "Lessons from Medicaid Managed Care," *Health Affairs*, 6 (Spring, 1987), 71-86.

those who seek improvements in the quality of health care. The popularity of managed care among public officials, however, rests principally on its potential for stemming increases in spending. This expectation apparently derives from evidence attesting to the cost efficiencies of health maintenance organizations (HMOs), the most fully developed prototype and prevalent form of managed care in the United States. Being both providers of health care services and insurers, HMOs offer virtually comprehensive services to their members in exchange for fixed (capitated) premiums. The financial risk HMOs thereby assume poses strong incentives for efficiency. In the highly integrated prepaid group practice form of HMO,⁴ these incentives are translated into organizational and financial strategies, which, a quarter century of research has demonstrated, result in overall health care costs among HMO members that are substantially lower than those of families with conventional insurance coverage.⁵

Despite the persuasiveness of accumulated evidence as to HMOs' historical performance, existing knowledge offers little assurance that managed care for Medicaid populations will achieve its various objectives. At least five considerations raise doubts and invite additional research.

- HMOs currently face more cost-conscious competition than before. It is therefore reasonable to question whether their relative cost advantages persist.
- Doubts linger concerning the means by which HMOs achieve their cost efficiencies. Critics contend that they stem at least in part from such undesirable practices by HMOs as the erection of barriers to enrollees' access to services and the provision of less than optimal amounts and quality of care.
- A related concern holds that HMOs' lower costs derive in some degree from HMOs' either strategic or unwitting

⁴The term "HMO" connotes various types of organization among providers, which, as discussed below, result in differing relative cost efficiencies.

⁵H.S. Luft, *Health Maintenance Organizations: Dimensions of Performance* (New York: John Wiley and Sons, 1981); W.G. Manning, *et al.*, "A Controlled Trial of the Effect of a Prepaid Group Practice on Use of Services," *New England Journal of Medicine*, 310 (June 7, 1984), 1505-1510; F.D. Wolinsky, "The Performance of Health Maintenance Organizations: An Analytical Review," *Milbank Memorial Fund Quarterly/Health and Society*, 58 (Fall, 1980), 537-587.

attraction of subscribers who either need few expensive services or are otherwise prone not to demand them.

- As few HMOs have served large segments of their communities' Medicaid populations, existing research reflects almost exclusively experience of members of middle-class families. Accordingly, existing knowledge might not be generalizable to populations of Medicaid recipients, whose health problems and life circumstances differ from those of the more well-to-do.
- Federal and state regulations governing the Medicaid program impose financial arrangements and administrative requirements that differ from those of other sponsors of HMO enrollees. As HMOs have had little experience with Medicaid's procedures, one cannot be confident that HMOs will be either able or willing to achieve cost savings without compromising the care rendered to Medicaid beneficiaries.

The study reported here addresses several questions related to Medicaid's managed care strategy. Specifically, it compares the use of and monetary value of health care services among three populations: (1) Medicaid beneficiaries receiving their health care from fee-for-service providers, (2) other Medicaid recipients enrolled in a large HMO, and (3) other privately-insured members of the same HMO. Our objectives are threefold:

- to provide descriptive information about the overall amounts, types, and economic value of health care services consumed by the three populations;
- to assess the extent to which possible differences between the two Medicaid populations are attributable to characteristics of families who chose to enroll in the HMO versus those of others who opted to receive care from traditional providers; and
- to contrast the three populations' use of maternity services to determine whether the patterns and monetary value of care for a particular condition differ between the fee-for-service sector and the HMO.

This paper presents an overview of the study's major findings. First, we compare overall use and costs of services in 1984. Following this, we examine turnover in eligibility and enrollment and estimate its effect on health care costs during 1984-85. Comparisons of the use and costs of services rendered to pregnant women will be presented at the workshop⁶.

FINDINGS

1984 Use and Costs

On all three of our indicators of use of health services, Medicaid beneficiaries consume more care than the HMO's general membership. Patterns of use differ among Medicaid recipients, however. As shown in Table 1, FFS Medicaid beneficiaries consume 7.4 outpatient services per enrollee year during 1984. Corresponding rates for GHC Medicaid and GHC

⁶Additionally, the workshop will deal with sampling, data-gathering, and other methods that are not discussed in this paper.

Table 1.
Use of Health Services: 1984

	FFS Medicaid	GHC Medicaid	GHC General
Outpatient visits/ enrollee year	7.4 [†] (.2)	6.3 (.1)	4.8 [†] (.1)
Inpatient admissions/ 1,000 enrollee years	213 [†] (9)	269 (15)	180 [†] (9)
Inpatient days/ 1,000 enrollee years	1,081 (132)	1,434 (193)	776 [†] (57)

*Age standardized Standard errors in parentheses [†]p < .05

General members of the HMO are, respectively, 6.3 and 4.8. Most studies comparing staff-model HMOs to the fee-for-service sector find that HMO members have fewer hospital admissions than others. Among Medicaid beneficiaries, we find the opposite pattern. GHC Medicaid members have 269 hospital admissions per enrollee year compared to 213 among FFS Medicaid beneficiaries. Due to large standard errors, the resulting difference between inpatient day rates may not be great. Nevertheless, our data reject the hypothesis that total inpatient days among the HMO's Medicaid members are lower than those of their fee-for-service counterparts.

Because the hospital use by the HMO's Medicaid members either equals or exceeds that by FFS Medicaid beneficiaries, GHC Medicaid enrollees' annual health care costs are not lower than those of Medicaid beneficiaries receiving services in the fee-for-service sector. As shown in Table 2, both have total costs near \$1,500 per enrollee year.

Table 2.
Costs of Health Service: 1984

	FFS Medicaid	GHC Medicaid	GHC General
Total costs/ enrollee year	\$1,320 (82)	\$1,441 (163)	\$821 [†] (42)
Outpatient costs/ enrollee year	\$ 615 [†] (13)	\$ 447 (10)	\$331 [†] (6)
Inpatient costs/ enrollee year	\$ 773 (82)	\$ 995 (164)	\$490 [†] (42)

*Age standardized Standard errors in parentheses [†]p < .05

While Medicaid beneficiaries' annual use and costs do not differ greatly, the HMO's Medicaid members are considerably more costly to serve than other enrollees. GHC Medicaid enrollees consume more outpatient and inpatient services, resulting in annual costs that are nearly twice those of GHC General members.

Turnover and Startup

Annual use and cost rates summarize the aggregate experience of total populations. Administrators of HMOs are interested as well in the marginal effect of adding new beneficiaries to their memberships.⁷ This is especially so for Medicaid beneficiaries, for they are likely to have relatively brief spells of enrollment.⁸ As Welch has shown, a cohort's

⁷N. Baloff and M.J. Griffith. "Policy Implications of Startup Utilization by Enrollees in Prepaid Group Practice Plans," *Health Services Research*, 19 (April, 1984), 23-40.

⁸M.J. Bane, and D.T. Ellwood. *The Dynamics of Dependence: The Routes to Self-Sufficiency*, Final Report on Contract No. HHS-100-82-0038 with the Assistant Secretary for Planning and

average annual costs is influenced by three processes, namely, (1) its rate of turnover, (2) its startup costs, and (3) characteristics of persons who leave.⁹ This section presents findings bearing on the first two of these. Analyses of persons who leave their insurance plans will be reported later.

Turnover

Turnover in a population is indicated by the proportions of an enrollee cohort that remain enrolled over time. We base our computations on the percentages of enrollee cohorts that remain enrolled in their respective plans over the three-month intervals of 1984-85 following their enrollments. For FFS Medicaid beneficiaries being enrolled implies their retaining eligibility for Medicaid benefits; for GHC Medicaid beneficiaries it means continuing both eligibility for Medicaid benefits and remaining enrolled in the HMO; for GHC General members it connotes continuation of enrollment in GHC.

As turnover in plan eligibility may be viewed as a survival process, its trajectory may be described by survival functions.¹⁰ In this study, we depict turnover based on parameters of the Weibull function.¹¹ The Weibull survival function gives the expected probability that one's length of enrollment (T) exceeds time t:

$$S(t) = \exp[-(Lt)^A]$$

The hazard rate, or probability of disenrolling at time t, is

Evaluation, Office of Income Security Policy, U.S. Department of Health and Human Services (Cambridge: Urban Systems Research and Engineering, Inc., 1983).

⁹W.P. Welch "Medicare Capitation Payments to HMOs in Light of Regression Toward the Mean in Health Care Costs," *Advances in Health Economics and Health Services Research*, 6 (1985), 75-96.

¹⁰L. J. Wollstadt, *et al.*, "Disenrollment from a Prepaid Group Practice: An Actuarial and Demographic Description," *Inquiry*, 15 (June, 1978), 142-150; R.N.Forthofer, *et al.* "Life Table Analysis of Membership Retention in an HMO," *Journal of Community Health*, 5 (Fall, 1979), 46-53; W.P.Welch, "HMO Enrollment and Medicaid: Survival Analysis with a Weibull Function," *Medical Care*, 26 (January, 1988), 45-52.

¹¹Welch, "HMO Enrollment and Medicaid: Survival Analysis with a Weibull Function," *op. cit.*

$$h(t) = -[dS/dt]/S = ALAt^{A-1}.$$

$A > 1$ indicates a hazard rate that increases over time; $A < 1$ reflects a decreasing hazard rate. The exponential decay function is thus a special case of the Weibull function in which $A=0$, and the hazard rate is constant.

The expected average survival for a cohort is estimated by

$$E(T) = -[G(1 + 1/A)]/L,$$

where $G(x)$ is the gamma function of x . That function is defined for $x > 0$ as¹²

$$\Gamma(x) = \int_0^{\infty} t^{x-1} e^{-t} dt,$$

and is estimated by

$$\Gamma(x) \approx \sqrt{2\pi} e^{-x} x^{x-0.5}.$$

The turnover rates of the Medicaid populations greatly exceeds that of the GHC General population. As shown in Figure 1, about ten percent of GHC's general members leave the HMO each year; at the end of two years, about eighty percent remain. Approximately one of five persons eligible for Medicaid at the outset of 1984 had left their respective plans by the beginning of 1985. At the end of two years, about sixty percent of FFS Medicaid beneficiaries retain their eligibility; slightly more than half of GHC Medicaid beneficiaries remain enrolled in the HMO's Medicaid plan.

¹²W. Feller, *An Introduction to Probability Theory and Its Applications*, Vol. 1 (New York: Wiley, 1957), 66.

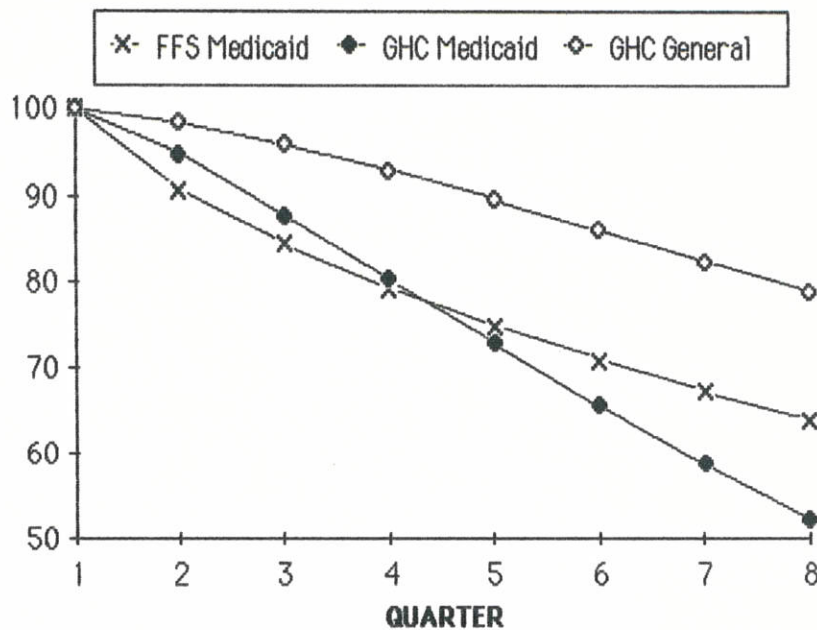


FIGURE 1. PERCENT REMAINING ENROLLED BY ENROLLMENT QUARTER

Patterns of disenrollment differ among the populations. Table 3 shows that during 1984-85 FFS Medicaid beneficiaries experienced a declining rate of attrition from the Medicaid program, as indicated by A being less than unity. GHC members, by contrast, had increasing rates ($A > 1$). The FFS Medicaid beneficiaries' declining rate results in expected spells of enrollment, $E(T)$, that are longer than those of HMO members. Overall, a person entering the FFS Medicaid program can expect to retain eligibility for approximately 5.4 years. GHC Medicaid beneficiaries would remain in the HMO's Medicaid plan an average of 2.2 years; and GHC General enrollees would stay with the HMO about 4.4 years.

Table 3. Disenrollment Parameters and Expected Lengths of Enrollment: Total Samples and New Enrollees

	FFS Medicaid	GHC Medicaid	GHC General
<u>Total Samples</u>			
L	.051	.102	.050
A	.784	1.289	1.374
Expected years of enrollment [E(T)]	5.4	2.2	4.4
<u>New Enrollees</u>			
L	.107	.158	.071
A	.855	1.242	1.372
Expected years of enrollment [E(T)]	2.4	1.4	3.1
Percent remaining after 2 years	46	32	68

Studies of other HMOs find that new enrollees are more likely to disenroll than are continuing members.¹³ Our data confirm this pattern. Medicaid beneficiaries entering GHC's Medicaid program could expect to stay 1.4 years, while new GHC General enrollees would remain in the HMO 3.1 years. The proportions remaining with the HMO after two years are, respectively, 46 and 68 percent. This pattern holds for FFS Medicaid

¹³V.D. Hennelly and S.B. Boxerman, "Disenrollment from a Prepaid Group Practice Plan: A Multivariate Analysis," *Medical Care*, 21 (March, 1983), 1194-1210; K. Lewis, "Comparisons of Use by Enrolled and Recently Disenrolled Populations in a Health Maintenance Organization," *Health Services Research*, 19 (April, 1984), 1-22; D. Mechanic, *et al.*, "The Growth of HMOs: Issues of Enrollment and Disenrollment," *Medical Care*, 21 (March, 1983), 338-347; R.P. Wersinger and A.A. Sorenson, "Demographic Characteristics and Prior Utilization Experience of HMO Disenrollees Compared with Total Membership," *Medical Care*, 20 (December, 1982), 1188-1196

beneficiaries as well.¹⁴ FFS Medicaid recipients who became eligible for assistance during 1984 have an expected eligibility period of 2.4 years, and only 46 percent retain Medicaid eligibility for more than two years.

FFS Medicaid beneficiaries' two-year "survival" rate and their expected average length of eligibility almost exactly equal those observed in the Minnesota AFDC population and closely match corresponding data for a national sample of AFDC recipients.¹⁵ Welch found that about sixty percent of Minnesota's AFDC recipient remain eligible for benefits at least two years, and that population has an expected eligibility period of about 5.6 years.¹⁶ From analyses of the Panel Study of Income Dynamics,¹⁷ he reports that nationally AFDC beneficiaries retain eligibility for an average of 6.2 years.

GHC General enrollees' attrition rate of about ten percent conforms to the disenrollment experience of other mature, staff model HMOs.¹⁸ However, their patterns of disenrollment differ qualitatively from those reported by Welch.¹⁹ His analysis of middle-class Kaiser-Permanente enrollees reveals a declining rate of disenrollment over time, while GHC General members in the present study appear to experience an increasing

¹⁴W.P. Welch, "HMO Enrollment and Medicaid: Survival Analysis with a Weibull Function," *Medical Care*, 26 (January, 1988), 48-49.

¹⁵The Eligibility Generosity of Minnesota and Washington's Medicaid programs are relatively similar: Minnesota ranks 25th and Washington 29th. See Appendix B.

¹⁶Welch, "HMO Enrollment and Medicaid: Survival Analysis with a Weibull Function," *op cit.*, 48-49.

¹⁷M.J. Bane, and D.T. Ellwood. *The Dynamics of Dependence: The Routes to Self-Sufficiency*, Final Report on Contract No. HHS-100-82-0038 with the Assistant Secretary for Planning and Evaluation, Office of Income Security Policy, U.S. Department of Health and Human Services (Cambridge: Urban Systems Research and Engineering, Inc., 1983).

¹⁸P.M. Densen, *et al.*, "Longitudinal Analysis of Four Years of Experience of a Prepaid Comprehensive Medical Care Plan," *Milbank Memorial Fund Quarterly*, 36 (January, 1958), 5-45; R.N. Forthofer, *et al.*, "Life Table Analysis of Membership Retention in an HMO," *Journal of Community Health*, 5 (Fall, 1979), 46-53; H.S. Luft, *Health Maintenance Organizations: Dimensions of Performance* (New York: John Wiley and Sons, 1981); Welch, "HMO Enrollment and Medicaid: Survival Analysis with a Weibull Function," *op cit.*

¹⁹Welch, "HMO Enrollment and Medicaid: Survival Analysis with a Weibull Function," *op cit.*

rate. The Kaiser-Permanente population, accordingly, has a considerably longer expected enrollment period, 16.8 years versus the 4.4 reported above.

Several differences between the two studies might account for these discrepant results. First, the present study includes only young women and their children, while Welch's research was based on Kaiser-Permanente's total population. As younger persons are more likely than others to leave HMOs, we would expect to observe greater attrition in our population. Second, the population from which Welch's sample was drawn was specified to include persons who had been members of Kaiser-Permanente for at least one continuous year.²⁰ The population employed here contains no such restriction. This undoubtedly results in our population's including higher proportions of new members, persons who are more inclined to disenroll. Finally, our sample is concentrated among women in their childbearing years, the group that perhaps is most likely to enroll in and disenroll from HMOs opportunistically. Widespread suspicion and fragments of evidence hold that some women join HMOs to take advantage of liberal maternity benefits and, shortly after delivering, terminate their memberships.²¹

The GHC Medicaid population's 1984-85 turnover is virtually identical to that observed in GHC over 1982-83²² and closely resembles that of other Medicaid populations enrolled in HMOs.²³

²⁰Welch employs data originally gathered by Forthofer and his associates. See Forthofer, *et al.*, "Life Table Analysis of Membership Retention in an HMO," *op. cit.*

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²²K. Wintringham and T.W. Bice, "Effects of Turnover on Use of Services by Medicaid Beneficiaries in a Health Maintenance Organization," *Group Health Journal*, 6 (Spring, 1985), 12-18.

²³L.J. Wollstadt, *et al.*, "Disenrollment from a Prepaid Group Practice: An Actuarial and Demographic Description," *Inquiry*, 15 (June, 1978), 142-150.

Welch erroneously interprets results of an earlier study of turnover in GHC's Medicaid population conducted by the two senior authors. He states that we found an attrition rate of six percent per *month*. The correct rate is six percent per *quarter*, or about two percent per month. The turnover of California's Medicaid population in HMOs is comparable to GHC's experience, both in 1982-83 and 1984-85. See Wintringham and Bice, "Effects of Turnover on Use of Services by Medicaid Beneficiaries in a Health Maintenance Organization," *op. cit.* and Welch, "HMO Enrollment and Medicaid: Survival Analysis with a Weibull Function," *op. cit.*, 49-50.

Of course, the dynamics of turnover differ among our populations. Attrition in the FFS Medicaid program presumably is totally involuntary: people leave the program when they lose eligibility. GHC General members who leave the HMO do so, for the most part, voluntarily. The HMO's loss of GHC Medicaid members results from voluntary disenrollment as well as from loss of eligibility for Medicaid.

We assessed the extent to which each of these processes contributes to turnover among GHC's Medicaid beneficiaries with analyses of the GHC Medicaid match sample. For persons in that subsample we know both the dates that individuals left the HMO and the dates upon which they lost Medicaid eligibility.²⁴ Examination of these pairs of dates reveals that about 48 percent of the Medicaid enrollees who leave the HMO lose their Medicaid eligibility at about the same time they terminate GHC membership.²⁵ We conclude, therefore, that approximately one half of the turnover among GHC Medicaid beneficiaries is voluntary, with the other half being caused by loss of Medicaid eligibility.

²⁴See Appendix A, pages @.

²⁵We considered differences between the dates of thirty or fewer days to signify involuntary disenrollment due to loss of Medicaid eligibility.

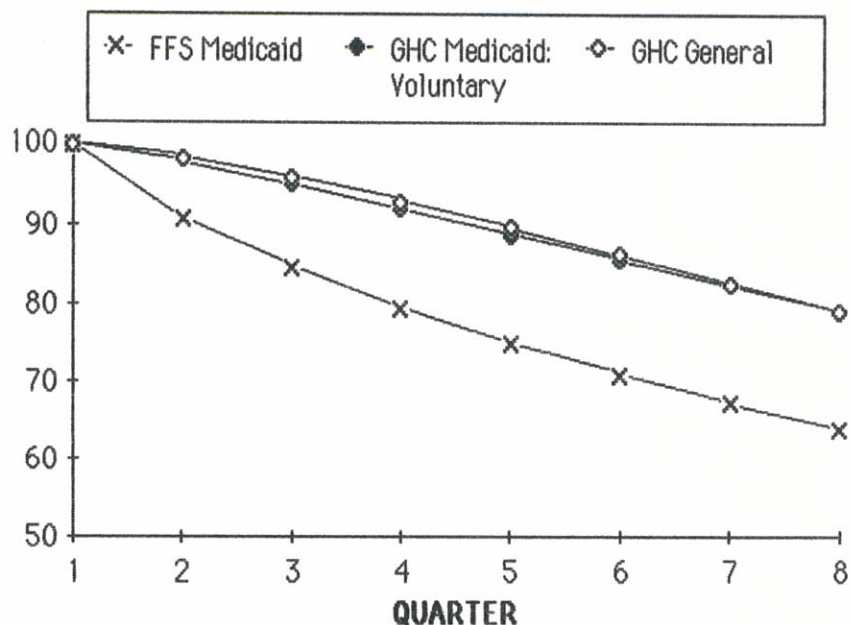


FIGURE 2. PERCENT REMAINING ENROLLED BY ENROLLMENT QUARTER: ONLY VOLUNTARY DISENROLLMENT FOR GHC MEDICAID*

If, as we estimate, half of GHC Medicaid beneficiaries' turnover results from involuntary disenrollment, Medicaid members' retention rates are otherwise very similar to those of other enrollees of the HMO. Figure 2 shows that, when only voluntary disenrollment among the HMO's Medicaid population is considered, GHC Medicaid enrollees and GHC General members' disenrollment patterns are virtually indistinguishable. Voluntary turnover among GHC Medicaid beneficiaries leaves about three-quarters of enrollees with the HMO at least two years, and gives an expected average enrollment period of about five years. The total GHC Medicaid population's exceptionally high turnover thus is attributable principally to public policy.

Startup

Startup refers to the time-dependency of health care use and costs among persons who enter an insurance plan. Specifically it advances the hypothesis that use and cost will be higher than average during the early period of enrollment and later will decline to a steady state. This pattern could result from several processes. The "moral hazard" argument holds

that people who insure against health care costs are inclined to secure benefits. Newly insured persons might exercise this preference early. Likewise, the "need for care" or "adverse selection" argument poses the possibility of persons' acquiring insurance in response to known health problems. Such persons would, again, be likely to seek care shortly after insurance comes into effect. Another view suggests that the mere novelty of a new plan evokes "testing". Finally, plans themselves may stimulate early use by offering intake examinations and the like.²⁶

The existence of startup may be troubling to insurers and particularly so to HMOs, which not only must bear financial risk but must deploy organizational resources to accommodate new members' demands.²⁷ Moreover, rapid growth and turnover among enrollee populations magnifies effects of startup by presenting insurers and HMOs with a profusion of new members. Because turnover heightens effects of startup, we examine these matters in conjunction. First, we gauge the magnitude of startup use and costs, after which we estimate their joint effects on average annual health care use and costs.

The notion that use may begin high and level to a steady state suggests that the pattern can be described by the parameters of the negative exponential function.²⁸ That is

$$u = \gamma + \frac{\alpha}{e^{\beta t}},$$

where

²⁶M.J. Griffith and N. Baloff, "Membership Duration and Utilization Rates in a Prepaid Group Practice," *Medical Care*, 19 (December, 1981), 1194-1210;

²⁷N. Baloff and M.J. Griffith, Policy Implications of Startup Utilization by Enrollees in Prepaid Group Practice Plans," *Health Services Research*, 19 (April, 1984), 23-40.

²⁸M.J. Griffith, *et al.*, "Utilization Patterns of Health Maintenance Organization Disenrollees," *Medical Care*, 22 (September, 1984), 827-834.

- u = regression-predicted use rate,
- γ = asymptotic steady state level of u,
- $\alpha + \gamma$ = level of u at time 0, and
- $\alpha\beta$ = instantaneous rate of decay at time 0.

In cases where this model fit the data reasonably well, results are reported as values predicted by its parameters. Other results are reported as rates predicted from the regressions smoothed by computing means of respective rates and their immediately preceding and succeeding rates.

Figures 3 through 8 depict the trajectories of use for cohorts of new enrollees in each of the populations. Together they show that startup is higher among Medicaid beneficiaries than among GHC General members. Also, GHC Medicaid enrollees' startup effects are larger and more consistent than those of FFS Medicaid beneficiaries.

Figure 3 indicates that new GHC Medicaid enrollees use approximately 10 outpatient services per enrollee year during their first quarters of enrollment in the HMO. This rate declines until, by the close of the first year, it reaches its steady state of about five visits and equals that of other members of the HMO. FFS Medicaid beneficiaries start lower than GHC Medicaid enrollees. However, because their use over time remains rather stable at about 7.5 visits per enrollee year, FFS Medicaid beneficiaries consume more outpatient services over time. GHC General new enrollees have no apparent startup effect. Their use remained rather constant over the two years of our study.

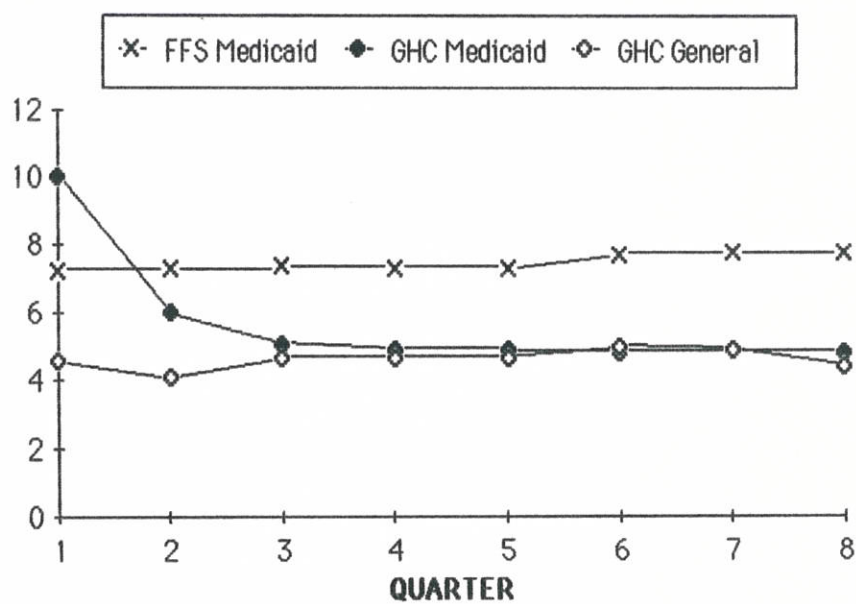


FIGURE 3. OUTPATIENT VISITS PER ENROLLEE YEAR BY ENROLLMENT QUARTER

Both Medicaid cohorts experience rather high startup hospital admissions at about 400 admissions per enrollee year (Figure 4). Both also decline to steady states of about 180 admissions. This rate approximately equals that of the GHC General cohort, which shows no inpatient admissions startup.

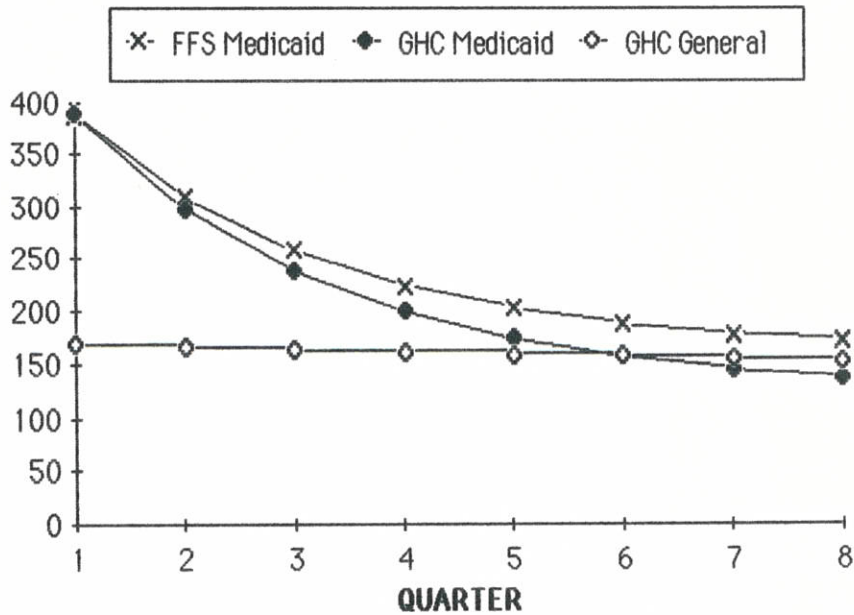


FIGURE 4. HOSPITAL ADMISSIONS PER 1,000 ENROLLEE YEARS BY ENROLLMENT QUARTER

All three cohorts experience at least some startup in hospitals days consumed. Startup is highest among GHC Medicaid enrollees, followed by FFS Medicaid beneficiaries (Figure 5). GHC General members evince only a small startup in hospital days. These data show that, early in their spells of enrollment, GHC Medicaid enrollees consume hospital services at more than twice the rate of other HMO members. After about two years, the rates converge at approximately 500 inpatient days per 1,000 enrollee years. FFS Medicaid beneficiaries' inpatient days start somewhat lower than GHC Medicaid enrollees and also decline rapidly

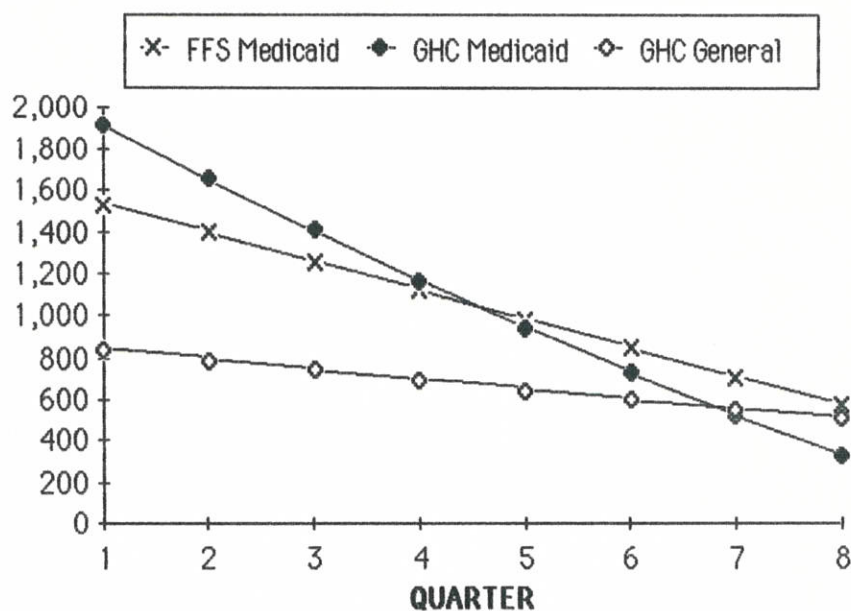


FIGURE 5. HOSPITAL DAYS PER 1,000 ENROLLEE YEARS BY ENROLLMENT QUARTER

Much of the startup in hospital days among Medicaid beneficiaries is due to pregnancies. As shown in Figure 6, nearly all hospital days consumed by FFS Medicaid beneficiaries at the outset of their Medicaid eligibility is pregnancy-related. In contrast, only about half of GHC Medicaid enrollees' early hospital use is due to pregnancy, and GHC General members' use of inpatient services for pregnancies differ only slightly over time.

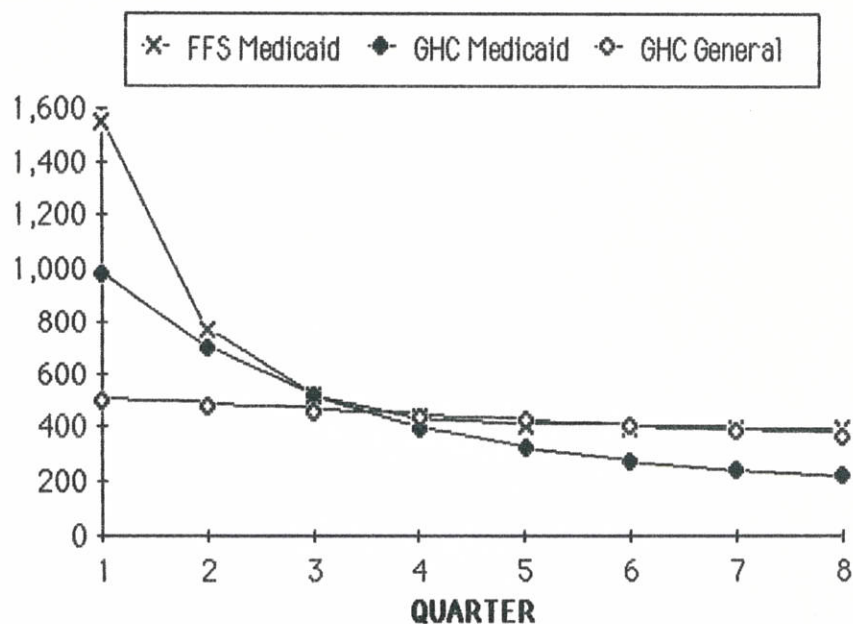


FIGURE 6. PREGNANCY-RELATED HOSPITAL DAYS PER 1,000 ENROLLEE YEARS BY ENROLLMENT QUARTER

The two Medicaid cohorts inpatient costs both begin at about \$1,400 per enrollee year and decline to steady states of less than half that amount. As shown in Figure 7, however, the FFS Medicaid cohort's decline is more rapid. Therefore, during their first year of enrollment, GHC Medicaid beneficiaries' overall inpatient costs are higher. The GHC General cohort experiences only slight changes in inpatient costs over the two years.

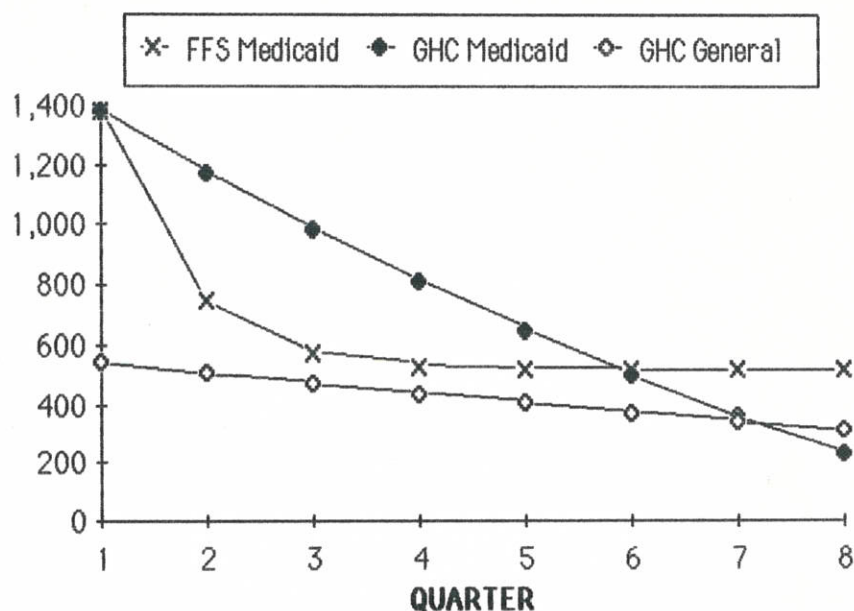


FIGURE 7. INPATIENT COSTS PER ENROLLEE YEAR BY ENROLLMENT QUARTER

The higher inpatient day startup among GHC Medicaid enrollees results in a higher total cost startup. As shown in Figure 8, at the outset of their episode of enrollment in the HMO, GHC Medicaid enrollees' costs are about \$2,000 per enrollee year, compared to approximately \$1,600 among FFS Medicaid beneficiaries. After about one year, total costs for the two Medicaid cohorts are about equal, after which the GHC Medicaid cohort's costs drop below those of the FFS Medicaid beneficiaries.

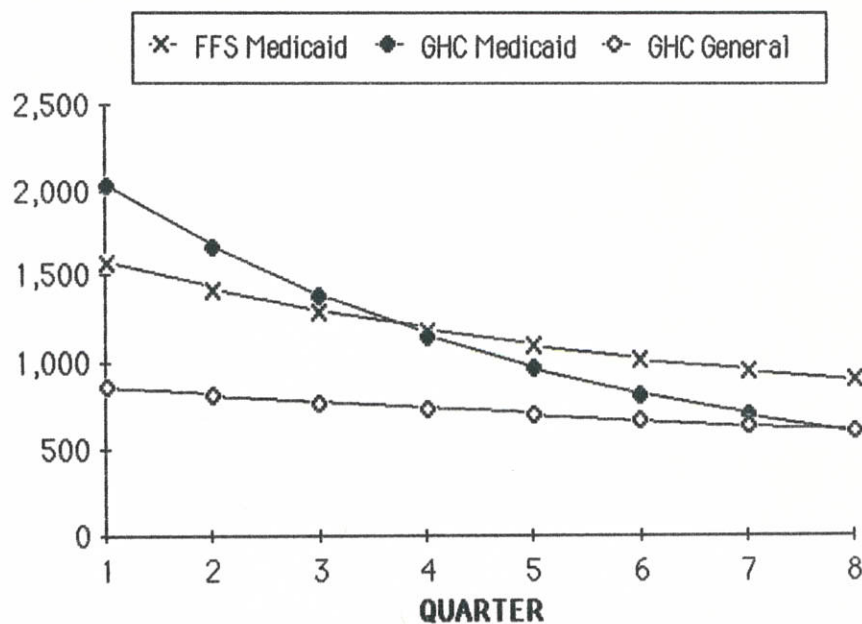


FIGURE 8. TOTAL COSTS PER ENROLLEE YEAR BY ENROLLMENT QUARTER

A new Medicaid enrollee in the HMO is more than twice as costly to serve as others who enter the HMO. That difference diminishes over time, and, after about two years, the two cohorts' total costs are approximately equal.

Effects of Turnover and Startup on Annual Costs

Turnover and startup effects influence cohorts' average annual costs. We estimated those influences using average annual attrition rates and parameters of the negative exponential. As shown in Table 4, startup costs

are highest among GHC Medicaid enrollees, as are estimated average annual total costs.²⁹

Table 4.
Effects of Turnover and Startup on Total Costs

	FFS Medicaid	GHC Medicaid	GHC General
Average annual attrition	18%	24%	10%
Startup costs (t ₀)	\$1,768	\$2,481	\$908
Average annual total cost	\$1,204	\$1,403	\$625

Our finding that about half the turnover in the GHC Medicaid population is attributable to loss of Medicaid eligibility raises the question of what effect this has on GHC Medicaid enrollees' costs. Table 5 shows estimates of startup costs and average annual costs yielded by altering GHC Medicaid's attrition rate. Data in the first column stem from applying GHC Medicaid's estimated attrition rate. The second column applies FFS Medicaid's estimated rate to GHC Medicaid, and the third column applies GHC General's attrition rate.

In each case, GHC Medicaid enrollees' estimated average annual total costs decline, and startup effects are reduced. If the GHC Medicaid population's turnover were equal to that of the FFS Medicaid population, differences between their average annual costs would virtually vanish.

²⁹The annual total cost (ATC) is estimated by

$$ATC = \gamma + \{ \alpha [C / (C + \beta)] \}$$

where α , γ , and β are estimated from the negative exponential and C is the average annual attrition rate estimated from the Weibull.

Were the GHC Medicaid turnover rate to equal that of GHC General members, average annual costs would decline by nearly 25 percent, bringing them closer to annual costs of other HMO members. With GHC General's attrition rate, the GHC Medicaid population's annual costs would be about 50 percent higher than other members' costs rather than 100 percent higher, as is now the case.

Table 5.

Effects of Turnover and Startup on Total Costs with Differing Turnover Rates: GHC Medicaid

	Turnover Rate		
	Actual	FFS Medicaid	GHC General
Average annual attrition	24%	18%	10%
Average annual total cost	\$1,403	\$1,238	\$951

Enrollment Selectivity

When comparing use and costs between HMOs and the fee-for-service sector, the question arises as to why differences occur. One widely held impression is that HMOs enjoy favorable selection, whereby persons who are less prone than others to use services select HMOs. Observed differences in use and costs are therefore attributed, not to the "HMO effect," but to unrecognized differences between the populations.³⁰ That explanation addresses the usual finding that use and costs of persons using the fee-for-

³⁰J. Beebe, *et al.*, "Using Prior Utilization to Determine Payments for Medicare Enrollees in Health Maintenance Organizations," *Health Care Financing Review*, 6 (Spring, 1985), 27-38; P.W. Eggers, "Risk Differential Between Medicare Beneficiaries Enrolled and Not Enrolled in and HMO," *Health Care Financing Review*, 1 (Winter, 1980), 91-99; P.W. Eggers and R. Prihoda, "Pre-Enrollment Reimbursement Patterns of Medicare Beneficiaries Enrolled in 'At-Risk' HMOs," *Health Care Financing Review*, 4 (September, 1982), 55-73

service sector exceed those of HMO members. As our findings show either no differences or the opposite, the favorable selection argument becomes an adverse selection argument. That is, GHC Medicaid members' higher startup and average annual costs result from GHC's attracting persons with higher than average need for care.

The usual approach in testing the selectivity hypothesis entails comparing the prior use and costs of persons who enter HMOs to those of persons who do not join HMOs. Generally, such studies find that persons who eventually join HMOs use fewer services before joining than do others.³¹ Such findings are interpreted as support for the favorable selection hypothesis and raise doubt as to whether HMOs' effect lower use and costs.

This approach has several weaknesses. First, it fails to take account of regression toward the mean. Prior-period differences of the magnitude usually observed could readily vanish or be reversed in later periods.³² A related weakness stems from the failure to test the implied prediction that low users during the pre-HMO period continue to be low users while enrolled in HMOs. Third, analysts typically specify their populations for study as persons who had been continuously covered by insurance for a year or more before entering the HMO. Such selectivity may bias results. Finally, investigators fail to advance a theoretically persuasive case that explains why persons who are relatively well and rarely seek medical care make the effort to join HMOs.

These weaknesses are especially troublesome when studying Medicaid beneficiaries, especially those eligible for categorical AFDC assistance. These are typically young persons with relatively few chronic illnesses and whose health care needs frequently are related to pregnancies. Their health

³¹J. Beebe, *et al.*, "Using Prior Utilization to Determine Payments for Medicare Enrollees in Health Maintenance Organizations," *Health Care Financing Review*, 6 (Spring, 1985), 27-38; P.W. Eggers, "Risk Differential Between Medicare Beneficiaries Enrolled and Not Enrolled in and HMO," *Health Care Financing Review*, 1 (Winter, 1980), 91-99; P.W. Eggers and R. Prihoda, "Pre-Enrollment Reimbursement Patterns of Medicare Beneficiaries Enrolled in 'At-Risk' HMOs," *Health Care Financing Review*, 4 (September, 1982), 55-73.

³²W.P. Welch, "Regression Toward the Mean in Medical Care Costs," *Medical Care*, 23 (November, 1985), 1234-1241.

care use and costs therefore arise principally from stochastic circumstances that predispose volatility in their year-to-year health care needs and use. The practice of studying rather stable populations also is especially questionable, for long-term Medicaid recipients differ from shorter-term beneficiaries.³³ Finally, as Medicaid beneficiaries face zero net prices for health care, their choices presumably reflect considerations other than monetary ones, perhaps, access, reputation for quality, and the like.

The single study of Medicaid beneficiaries' pre- and post-HMO use and costs by DesHarnais embodies all of these weaknesses.³⁴ Nevertheless, she concludes that HMOs in the Detroit area enjoy favorable selection. She reports data showing that beneficiaries' pre-HMO use and costs are lower than those of other Medicaid beneficiaries who did not enroll in HMOs. Further, she shows that enrollees who leave HMOs have higher than average use during their post-HMO period of Medicaid eligibility.

The present study attempts to avoid the methodological pitfalls of this area of investigation by (1) including in our investigation all persons regardless of the length of their Medicaid eligibility spells, (2) observing persons during their periods of HMO enrollment as well as before and after, and (3) examining the dynamics of use and costs over time as well as reporting aggregate annualized rates.

The selection of persons with relatively long spells of Medicaid eligibility is highlighted by our finding that more than a fifth of GHC's new Medicaid members in 1984 were also newly eligible for Medicaid assistance and, therefore, had no immediately prior experience with Medicaid coverage. Another thirty percent had been eligible for Medicaid for less than a half year, leaving only half who had been continuously eligible for Medicaid assistance for at least six months before the outset of 1984.

³³Bane and Ellwood, *The Dynamics of Dependence: The Routes to Self-Sufficiency*, *op. cit.*

³⁴S.I. DesHarnais, "Enrollment in and Disenrollment from Health Maintenance Organizations by Medicaid Recipients," *Health Care Financing Review*, 6 (Spring, 1985), 39-50.

Table 6. Effect of Prior Medicaid Eligibility on Health Care Costs Following Enrollment in the HMO: GHC Medicaid New Enrollees: 1984-85*

	Total Costs	Outpatient Costs	Inpatient Costs
<u>Days eligible for Medicaid before HMO</u>			
None	391.4 (1.97)	114.0 (1.47)	277.4 (1.52)
181+	222.5 (1.32)	181.9 (2.76)	40.6 (.26)
<u>Age group</u>			
2 - 5 years	-84.48 (.33)	13.3 (.13)	-97.8 (.42)
6 - 14	-197.4 (.80)	-100.7 (1.05)	-96.7 (.43)
20 - 29	812.3 (3.05)	-73.7 (.71)	886.0 (3.62)
30 - 45	705.4 (2.43)	79.4 (.70)	626.0 (2.35)
Days enrolled	1.6 (4.42)	0.9 (6.43)	0.7 (2.09)
Constant	-204.2 (.79)	-8.6 (.08)	-195.6 (.82)
R ²	.118	.132	.095

*Unstandardized regression coefficients
t-values in parentheses

One might expect persons newly eligible for Medicaid assistance to be more likely to be high users than others. The data in Table 6 suggest that this is the case. Regressions of HMO use and costs over 1984-85 on the show that having had no prior Medicaid eligibility consistently is associated with higher HMO use and costs. That the coefficients associated with the dummy variable for persons having 181 or more days of Medicaid eligibility are also positively signed indicates that the relationship between costs and prior eligibility is curvilinear. Nevertheless, these findings suggest that the practice of eliminating persons with no prior eligibility probably biases interpretations toward supporting the favorable selection hypothesis.

Our analysis of the HMO enrollment period as well as before and after also underscores the fallacy of drawing inferences from prior and post-enrollment experience. Figure 9 shows that GHC Medicaid enrollees did have lower costs of care than other Medicaid beneficiaries before enrolling in the HMO. Also, those who left the HMO while retaining their Medicaid eligibility had lower costs than others after having disenrolled. However, while enrolled in the HMO, GHC Medicaid beneficiaries' costs were almost identical to those of FFS Medicaid beneficiaries. We conclude from this that the HMO did not inherit low utilizers, or if it did, it converted them into high users.

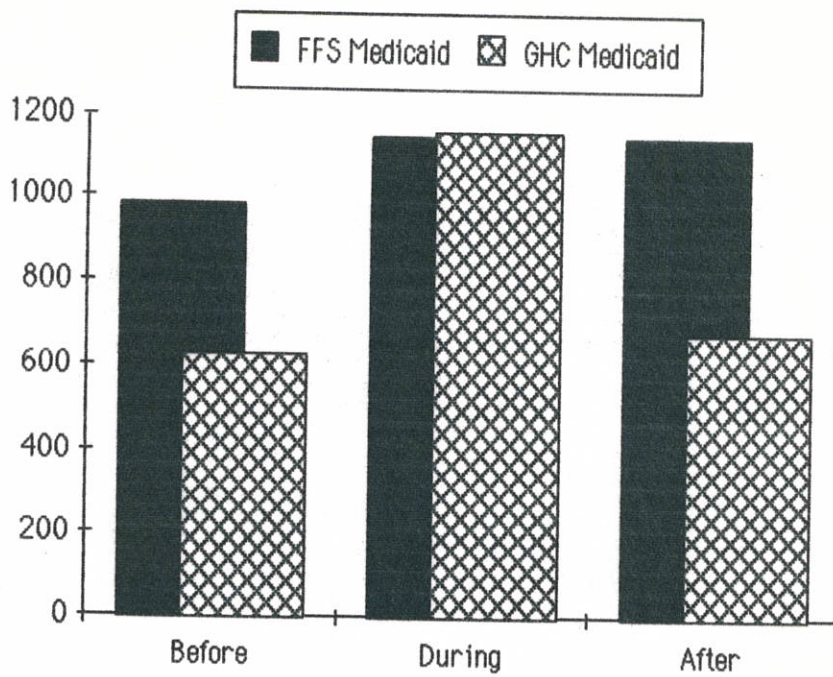


FIGURE 9. TOTAL HEALTH CARE COSTS OF NEW GHC MEDICAID ENROLLEES BEFORE, DURING, AND AFTER ENROLLMENT IN THE HMO COMPARED TO FFS MEDICAID BENEFICIARIES: 1983-85

SUMMARY AND CONCLUSIONS

This section will be presented at the workshop.

AT

November 19, 1988

Ronald Andersen, Ph.D.
Professor and Director
Center for Health Administration Studies
Graduate School of Business
1101 East 58th Street
Chicago, Illinois 60637

Dear Ron:

Enclosed is the listing of expenses associated with my trip to Chicago for the workshop.

Your "needs" paper has not arrived as yet. We'll give it a few more days. If I haven't received it by next Wednesday, I'll give you a call.

Please thank Diane for me for her hospitality, and I extend same to you. As I mentioned, the latch is out for you and Diane whenever you're in the New York area. Our address is:

328 Mill Road
Stamford, CT 06903

(203) 968-8087

Best wishes. Have a happy Thanksgiving.

Sincerely yours,


Thomas W. Bice