Effect of Coinsurance on Use of Physician Services

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This study is concerned with the impact of the introduction of a 25-percent coinsurance provision on the demand for physician services under a comprehensive prepaid plan of medical care. The study findings show that this provision led to a substantial decline in the demand for such services. The per capita number of all physician services went down 24.1 percent and per capita cost 23 8 percent. Physician hospital services declined least, home health visits most. There were few clearly discernible patterns of change that could be attributed to demographic characteristics, such as age, sex, occupation, or insurance status.

COINSURANCE AND DEDUCTIBLES in health insurance have been the subject of considerable interest and discussion ever since the early 1950's, when health insurance coverage began to be widespread. More recently, with the passage of Medicare (health insurance for the aged under the Social Security Act) in 1965 and the strong possibility of some form of national health insurance in the not too distant future, the subject has become of even greater interest and importance. The proponents of coinsurance and deductibles argue that they are needed to keep costs of health insurance programs down to reasonable levels and to discourage overutilization of medical services, while their opponents generally fear that they may prevent necessary services from being obtained.

Despite widespread interest in the subject, few studies of the impact of coinsurance and deductibles on medical care utilization have been made and, by and large, their findings are inconclusive. Moreover, most of the studies that do exist deal with their impact on hospital utilization rather than on the use of physician services. This paucity of information undoubtedly reflects the difficulties encountered in collecting appropriate data.

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Charles P. Hall, author of a comprehensive study of coinsurance and deductibles, points out:

Ideally, such data should be gathered from a group which changed its insurance program solely by introducing, deleting or modifying a deductible or coinsurance arrangement. In practice, it is virtually impossible to locate such a plan. In nearly all cases where modification of these provisions has occurred, the blow has been softened by "sweetening the contract" with other liberalizations in coverage. If all other provisions are not constant, however, it is impossible to measure the exact impact of the . . . change.[1]

This article reports findings from a study of the impact of a coinsurance provision on the use of physician and outpatient ancillary services under a comprehensive prepaid medical care plan. All the criteria for an "ideal" situation have been met: The introduction of a coinsurance provision was the only change made in the plan; all other provisions, such as eligibility requirements and services covered (with one minor exception), remained unchanged. A natural experiment for studying the effects of coinsurance on the demand for medical services is thus provided.

PLAN PROVISIONS

The plan studied is Group Health Plan (GHP), a comprehensive plan of prepaid medical care offered since December 1965 by Stanford University to all its employees who work at least 50 percent of full time. It provides almost complete medical care in and out of the hospital for employees and their dependents. The plan is a successor to an almost identical plan—Family Medical Plan (FMP)—offered by Stanford University since 1952. The only difference between the two plans is that FMP did not include hospital coverage as an integral part of the plan as does GHP. Employees could (and most FMP subscribers did) obtain such coverage by enrolling

[1] Charles P. Hall, Jr., "Deductibles in Health Insurance: An Evaluation," *Journal of Risk and Insurance*, June 1966, page 256.

in a Blue Cross plan also offered by the University. Enrollment in GHP is voluntary (as it is in the other basic health plan—a Blue Cross/Blue Shield plan—that Stanford also began to offer in December 1965). Subscribers paid the full costs of the premiums until October 1969, when the University started to contribute $10 a month toward the premiums of any employee working at least 75 percent of full time.

Under GHP (as under its predecessor), physician services in and out of the hospital, as well as all outpatient ancillary services such as X-rays, laboratory tests, physical therapy, etc., are provided by the Palo Alto Medical Clinic.[2] The Clinic is a multispecialty group practice with an average of 94 physicians on its staff in 1966 (six general practitioners, the rest specialists). It has its own laboratory, radiology equipment, EKG and EEG laboratories, and physical therapy facilities. Unlike the various Kaiser organizations, the Clinic operates mainly on a fee-for-service basis. About 16 percent of its income in recent years was derived from several prepaid plans (including GHP) that it offers. It does not operate its own hospital; most patients requiring hospitalization are treated at the Stanford University Hospital.

Hospital services under GHP during the study period were covered through a contract with a private insurance company. (Blue Cross coverage has since been substituted.) Basic benefits included the full costs of hospital room and board in a 3-bed ward for 70 days and 100 percent of the first $300 of hospital services, plus 80 percent of the balance up to $5,000.

The study is concerned with the services provided by the Palo Alto Medical Clinic under the plan, since it is this part of the plan that was changed by the introduction of a coinsurance provision. When GHP was first offered in December 1965, it provided (as its predecessor had done) that members were entitled without further charge to practically all medical services offered by the Clinic—physician services in and out of the hospital and outpatient ancillary services.

The major exclusions were services related to occupational illness or injury, cosmetic surgery, and psychiatric services beyond six visits for diagnostic services. There were no deductible or coinsurance provisions, and members had first-dollar coverage for these services.

By the end of 1966, the Clinic found that it had seriously underestimated the demand of GHP members for Clinic services under the plan. Accordingly, it began negotiations with representatives of Stanford University employees and of the Stanford University administration on a revision of the plan's financial provisions.

It was agreed that premiums would be raised only slightly (6–8 percent, depending on family size), and that a uniform across-the-board 25-percent coinsurance provision was to be applied. In other words, beginning April 1, 1967, members had to pay, in addition to their premiums, 25 percent of the customary charge for any Clinic service they used—physician visit (office, home, or hospital), surgery, or any ancillary service. In addition, routine eye refractions for glasses were no longer covered at all. None of the other plan provisions for medical care were changed. The hospital part of the plan was left completely unchanged.

THE STUDY POPULATION

To study the impact of the coinsurance provision on the use of physician services and other Clinic services under the plan, utilization of these services by GHP members in 1966 (the calendar year before its introduction) was compared with their utilization in 1968 (the first full calendar year after the change). The study population includes only those GHP members who were covered by the plan the full 12 months of both 1966 and 1968. The larger groups of members who were covered for all of 1966 or all of 1968 or for part of either year were excluded in order to eliminate as far as possible any differences in demographic characteristics (such as sex, occupation, number in family covered, and distance of residence from the Clinic) that might influence utilization. The comparison is thus narrowed to the use of Clinic services by the same persons in the two years.

The study population was grouped by sex, oc-

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[2] Stanford employees have a choice of three other multispecialty group practices in the Palo Alto area. In 1966, only 100 out of 2,268 GHP subscribers in the plan at any time during the year chose any of the other three groups. In view of the small number and disproportionately high cost of collecting data for them, these GHP members are excluded from the study.

cupation, age, and insurance status. In the absence of data on family income, all GHP members were classified in three groups, according to the job held by the subscriber (with dependents classified in the subscriber's occupational group: faculty, other professions, and nonprofessional staff. These groups in descending order can be assumed to reflect both income and education.

Faculty—subscribers with the rank of assistant professor or higher. All of them had more than 16 years of schooling, and the average annual family income of the group was at least $15,000 in 1966 and at least $16,000 in 1968.[3]

Other professional staff—employees in research, technical, scientific, executive, and administrative jobs whose titles suggest that they have at least an undergraduate degree, as well as teaching personnel below the rank of assistant professor (lecturers, acting assistant professors, and instructors). The average family income of this group was probably several thousand dollars below that of the faculty group in both years.

Nonprofessional staff—all other Stanford University employees, including substantial numbers of blue-collar workers (workers employed in maintaining the physical plant, cooks, gardeners, etc.) and white-collar workers (secretaries, stenographers, switchboard operators, etc.) The great majority of them are persons with distinctly less education and a lower family income than the other two groups, although some of them may be secondary wage earners whose family income is comparable to that of the other groups. By and large, however, this can be considered the lowest income-educational group of the three.

Data on the characteristics of the study population are presented in the first three tables. Almost 80 percent of the 859 subscribers were men (table 1). The faculty and other professional staff each accounted for about 35 percent of all subscribers, nonprofessional staff for the remainder. Among men subscribers, the faculty group represented the largest proportion (43 percent); among women subscribers, the nonprofessional group was predominant (72 percent). The 2,567 members were about evenly divided between the sexes. Forty percent of all members belonged to the faculty group, 39 percent to the other professional group, and 21 percent to the non-

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TABLE 1.—Number of GHP subscribers and total membership by sex and occupation, 1966 and 1968

Sex and occupation	Subscribers		Total membership (subscribers and dependents)	
	Number	Percentage distribution	Number	Percentage distribution
Total	859	100 0	2,567	100 0
Faculty	300	34 9	1,037	40 4
Other professional staff	300	34 9	989	38 5
Nonprofessional staff	259	30 2	541	21 1
Male	683	100 0	1,262	100 0
Faculty	291	42.6	524	41 5
Other professional staff	260	38 1	492	39 0
Nonprofessional staff	132	19 3	246	19 5
Female	176	100 0	1,305	100 0
Faculty	9	5 1	513	39 3
Other professional staff	40	22 7	497	38 1
Nonprofessional staff	127	72 2	295	22 6

professional group—with male and female members distributed among the three groups in much the same pattern.

The age distribution of all members in 1966 differed from that of the total U.S. population under age 65 in that year chiefly because the GHP population had a very much smaller percentage of persons in the age group 19–24 and a somewhat higher proportion of persons in the groups aged 25–44 and 45–64. The age distribution in 1966 and 1968 for GHP members and for the U.S. population under age 65 is shown below:

Age group	1966		1968	
	GHP members	U S population [1]	GHP members	U S population [1]
Number	2,567	178,456,000	2,567	182,018,000
Total percent	100 0	100 0	100 0	100 0
Under 5	9 2	11 1	4 9	10 2
5–14	23 7	22 5	23 7	22 6
15–18	7 5	7 9	8 8	8 0
19–24	2 6	10 0	4 9	10 6
25–44	30 1	26 3	26 8	26 2
45–64	26 8	22 2	30 9	22 4

[1] U S. Bureau of the Census, *Current Population Reports*, Series P-25.

In 1968 the age distribution of GHP members differed somewhat more markedly from the national distribution. Besides having a smaller proportion of persons aged 19–24, it had a substantially higher proportion of those aged 45–64 and—not surprisingly, since the study population could not have any children under age 2—a very much smaller proportion of children under age 5. The small percentage of GHP members in the group aged 19–24 reflects the fact that this group

contained relatively few subscribers and dependent spouses and thus was made up largely of dependent children. In 1968, all but five of the 126 members in this age group were dependent children; in 1966 they numbered 44 out of 67. Children older than 18 are eligible for coverage (to age 23) under GHP only if they are full-time students, and thus their number is limited.

In both years, the age distributions for the faculty and for the other professional staff, as shown in table 2, were fairly similar except that the latter group was somewhat younger, with a higher proportion of children—especially children under age 5—and a smaller proportion of persons aged 45–64. The nonprofessional group, on the other hand, was considerably older, with a very much smaller proportion of children of all ages and a high proportion of persons aged 45–64.

The data on insurance status of GHP members indicate that subscribers averaged just under two covered dependents (table 3). Men subscribers in all three occupational groups had a considerably larger average number of dependents than did women subscribers. This difference may reflect the fact that the women subscribers included a higher proportion of single, widowed, and divorced persons and that some of the married women probably were secondary wage earners with husbands and children covered by a plan obtained by the husband at his place of employ-

TABLE 3.—Number of GHP members by insurance status, sex, and occupation, 1966 and 1968

| Sex and occupational group | Sub-scribers | Dependents | | | Depend-ent/sub-scriber ratio [1] |
		Total number	Spouses	Children	
Total_____	859	1,708	626	1,082	1 9700
Faculty_____	300	737	268	469	2 4485
Other professional____	300	689	237	452	2 2890
Nonprofessional_____	259	282	121	161	1.0642
Male_____	683	1,577	601	976	2 2822
Faculty_____	291	734	266	468	2 5137
Other professional____	260	665	232	433	2 5479
Nonprofessional_____	132	181	103	78	1 3116
Female_____	176	131	25	106	7443
Faculty_____	9	3	2	1	3333
Other professional____	40	24	5	19	6000
Nonprofessional_____	127	101	18	83	7953

[1] When Medicare went into effect in July 1966, persons aged 65 and over were no longer eligible for GHP, but their dependents under age 65 could still be members Accordingly, in calculating the dependent-to-subscriber ratios, 8 men aged 65 and over who no longer were GHP members but whose dependents were members were included as subscribers.

ment. In the faculty and the other professional groups, male subscribers had on the average almost twice as many dependents as male subscribers in the nonprofessional group, probably because the latter were considerably older.

EFFECT ON USE OF PHYSICIAN SERVICES

Summary of Findings

According to the study findings, the introduction of coinsurance led to a substantial reduction

TABLE 2.—Percentage distribution of GHP members by age, sex, and occupation, 1966 and 1968

| Age | All occupations | | | Faculty | | | Other professional staff | | | Nonprofessional staff | | |
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
	1966											
Total percent_____	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0
Under 5 [1]_____	9 2	9 8	8 6	9 3	9 5	9 0	11 7	12 4	11 1	4 4	5 3	3 7
2–4_____	5 0	5 1	5 0	5 2	4 8	5 7	6 6	6 9	6 2	1 9	2 0	1 7
5–14_____	23 7	23 4	24 1	25 7	24 0	27 3	26 1	24 8	27 4	15 7	19 1	12 9
15–18_____	7 5	8 8	6 3	8 4	8 8	8 0	6 2	7 1	5 2	8 3	12 2	5 1
19–24_____	2 6	2 4	2 8	2 0	1 7	2 3	2 6	2 0	3 2	3 7	4 5	3 1
25–44_____	30 1	28 9	31 3	29 4	27 5	31 4	34 5	33 9	35 0	23 5	22 0	24 7
45–64 [1]_____	26 8	26 7	27 0	25 3	28 4	22 0	18 9	19 7	18 1	44 4	37 0	50 5
	1968											
Total percent_____	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0	100 0
Under 5 [1]_____	4 9	5 3	4 6	5 2	5 2	5 3	5 8	6 3	5 2	3 0	3 7	2 4
5–14_____	23 7	23 5	23 8	25 7	24 0	27 5	27 1	26 8	27 4	13 5	15 9	11 5
15–18_____	8 8	9 6	8 0	9 1	9 9	8 2	8 6	7 9	9 3	8 7	12 2	5 8
19–24_____	4 9	5 5	4 3	5 1	4 8	5 5	4 6	5 1	4 0	5 2	8 1	2 7
25–44_____	26 8	25 7	27 8	25 1	23 5	26 7	31 2	31 1	31 4	21 8	19 5	23 7
45–64_____	30 9	30 3	31.4	29 8	32 6	26 9	22 8	22 8	22 7	47 9	40 7	53 9
45–62 [1]_____	29 3	28 7	29 9	28 8	31 5	26 1	22 2	22 4	22 1	43 1	35 4	49 5

[1] Only persons who were GHP members the full 12 months of both 1966 and 1968 were included in the study, the data therefore exclude children under age 2 in 1968 and persons aged 63 and over in 1966.

in the use of physician services. For the group as a whole, the per capita number of all physician services declined by 24.1 percent and the per capita costs of these services by 23.8 percent (table 4).[4] These declines are significant in every sense of the term. A decrease in the use of physician visits for the entire study population greater than 3.6 percent is significant with a confidence level of 95 percent. A decrease in expenditures for physician services for the entire population greater than 5.8 percent is significant at the same confidence level.[5]

What is perhaps even more striking about the findings is that, with few exceptions, the use of physician services—in terms of both per capita number of services and per capita costs—declined substantially, whether the data are examined by (1) demographic characteristics of the members (sex, occupation, age, or insurance status) or (2) by type of physician service (place of visit or field of specialty). The most notable exceptions in the first category were the very young (aged 2–4)—for whom the decline in utilization by female members was slight and the utilization by male members actually rose—and the men aged 45–62 in the nonprofessional group, where utilization also rose.

In the second category, the principal exceptions were hospital visits, both surgical and medical. For surgical hospital procedures, the number and costs per capita declined 5 percent and 8 percent, respectively; declines of about 3 percent in the per capita number and of 15 percent in per capita costs were found for medical hospital visits.

Examination of changes in the use of services by different demographic subgroups shows that, apart from the exceptions noted, utilization decreased substantially in most cases. There were few clearly discernible patterns of change in utilization that could be attributed to such factors as sex, age, occupation, or insurance status of members. Changes in utilization often differed substantially between different subgroups, but none of the major differences tested were statistically significant. (See under Methodology, page 17.) Male members as a group reduced their use

[4] Age adjusting the figures did not change them very much. The adjustments were therefore not done for all the tables, and the figures in the text are the actual figures.

[5] For a description of the test used and more details, see page 18.

TABLE 4.—Per capita number and per capita cost of physician visits and of outpatient ancillary services, by type of service, 1966 and 1968

Type of service	1966	1968	Percentage change	Percentage change, age-adjusted [1]
	Per capita number			
Physician visits, total	5 683	4 315	−24 1	−24 8
Outpatient ancillary services, total	6 026	5 349	−11 2	−16 6
Laboratory tests	3 743	3 231	−13 7	−19 2
X-rays	.606	534	−11 9	−19 6
All other	1 677	1 584	−5 5	−9 7
	Per capita cost [2]			
Physician visits, total	$78 47	$59 81	−23 8	−25 7
Outpatient ancillary services, total	30 91	27 37	−11.5	−19 2
Laboratory tests	13 02	12 47	−4 2	−10 0
X-rays	8 55	7.61	−11 0	−20 4
All other	9 34	7 29	−21 9	−30 2

[1] Age adjusted by applying the 1968 age distribution of male and female members aged 2–62 for all occupations to the utilization rates of the different age-sex-occupation groups, with children under age 2 in 1966 and persons aged 63 and over in 1968 excluded Since this correction in most instances did not change the results very much, the calculations were not made for all tables

[2] The services received by GHP members in 1966 and 1968 were priced in terms of the 1968 fee schedules of the different departments of the Palo Alto Medical Clinic The 1968 figures relate to costs before the 25-percent coinsurance payment

of physician services slightly less than female members, in terms of both per capita number of visits and per capita costs. In the number of visits per capita, the decline for male members was 23.4 percent and it was 24.6 percent for female members; the reductions in the per capita costs were 21.2 percent for male members and 25.7 percent for female members.

By occupation, there is some evidence that the lowest socioeconomic group, the nonprofessionals, responded more than the two other occupational categories to the introduction of coinsurance and reduced its use of physician services more (table 5). This difference is especially apparent for female members of this group, but it is also true for male members if those aged 45–62 are excluded. The same tendency is shown by the data on the percentage of members with no physician visit in the two years. For the nonprofessionals this proportion went up from 14.4 percent to 25.5 percent, compared with rises from 11.4 percent to 15.0 percent for the faculty and from 15.0 percent to 22.1 percent for the other professionals.

By age, the effects of the coinsurance provision for all occupational groups and both sexes were most notable for those aged 19–24. For male

TABLE 5.—Per capita number and per capita cost of physician visits, by occupation and sex, 1966 and 1968

Occupation and sex	1966	1968	Percentage change	Percentage change, age-adjusted
	Per capita number			
All occupations	5 683	4 315	−24 1	−24 8
Male	5 048	3 868	−23 4	−22 8
Female	6 297	4 746	−24 6	−26 3
Faculty	5 830	4 486	−23 1	−24 7
Male	5 359	4 168	−22 2	−20 2
Female	6 312	4 811	−23 8	−28 1
Other professional staff	5 487	4 114	−25 0	−23 5
Male	4 945	3 547	−28 3	−26.7
Female	6 024	4 676	−22 4	−21 0
Nonprofessional staff	5 756	4 353	−24 4	−27 4
Male	4 589	3 874	−15 6	−20 2
Female	6 729	4 753	−29 4	−32 4
	Per capita cost			
All occupations	$78 47	$59 81	−23 8	−25 7
Male	68 17	53 71	−21 2	−22 3
Female	88 44	65 72	−25 7	−28 2
Faculty	82 39	58 64	−28 8	−31 3
Male	71 32	53 74	−24 6	−24 5
Female	93 69	63 62	−32 1	−35 9
Other professional staff	74 46	58 23	−21 8	−21 2
Male	66 84	50 72	−24 1	−23 4
Female	82 00	65 66	−19 9	−19 5
Nonprofessional staff	78 31	64 97	−17 0	−21 5
Male	64 13	59 62	−7 0	−13 6
Female	90 14	69 43	−23 0	−26 9

members in this age group, the number of visits per capita declined by one-half; for female members there was a two-thirds decline.

By insurance status, the study found that male subscribers reduced their use of physician services very much less than the other types of members (except for the small number of dependent husbands, whose utilization increased). Among the other types of members, the reduction in utilization differed little. The pattern of the changes in per capita costs by type of member was similar.

With respect to changes in utilization by place of service, the study found that the per capita number of office visits declined by one-fourth and that the per capita costs decreased slightly more. Home visits declined most: Both the per capita number of such visits and the per capita costs dropped by one-half. Hospital visits declined only very little, and it is open to question what effect, if any, coinsurance had on the demand for these services.

By field of specialty, utilization of the services of general practitioners and physicians in the medical specialties declined less than that of physicians in the surgical specialties: The per capita number of visits to physicians in the first two categories went down 21.9 percent and the

number of visits to the third group declined 30.9 percent. In terms of the decline in per capita costs, however, the differences among these three types of physicians are relatively minor, ranging from 22 percent to 24 percent.

The decline in the use of outpatient ancillary services was considerably less than that for physician services but was still substantial. The per capita number and the per capita costs of such services fell about 11 percent. The difference between declines in the use of physician services and the use of ancillary services is not particularly surprising. For one thing, the use of such services is largely determined by the physician, and it is perhaps not appropriate to speak of a "demand" on the part of patients for such services (although some physicians would disagree). For another, there is some evidence that the number of ancillary services per physician service has been rising for some time and is probably still going up.

Sex, Age, and Occupation

Physician utilization by the group aged 19–24 was reduced by one-half after the introduction of coinsurance (table 6). This drastic reduction may be due to the fact that in both years, especially in 1968, that age group was largely composed of dependent children who were full-time students. In 1968, when Clinic services were free, they may have chosen to use Clinic physicians in preference to the (also free) student health services available at their schools; in 1968, when the coinsurance provision was in effect, they may have relied more on the student health services.

With respect to the increased use of physician services by male members aged 45–64 in the nonprofessional group, a detailed examination of the data suggests the presence of some very sick persons in this group in 1968. The per capita number of medical hospital visits of the group in 1968, shown below, indicates their very high use in

Occupational group	Per capita number of medical hospital visits	
	1966	1968
Men aged 45–64, total	0 187	0 292
Faculty	201	018
Other professional	278	018
Nonprofessional	066	1 070

that year. Since this group was relatively small in both years (91 members in 1966 and 100 in 1968), a few seriously ill persons can have a marked effect on the overall utilization rate.

There is some indication that female members in the groups under age 19 reduced their use of physician services less than male members in these age groups, and female members older than 19 reduced it more than male members. In addition, for most of the subgroups aged 15–18 the decline was less than that for the corresponding groups aged 5–14.

Utilization By Identical Persons

Table 6 compares utilization by persons who were in the same age groups in both years. By contrast, table 7 examines utilization by the identical persons in the two years. The age indicated in table 7 was the age of the member in 1966. Thus, for example, table 7 compares utilization by persons aged 5–14 in 1966 with their utilization in 1968 when they were aged 7–16.

Although, as expected, the percentage changes shown for each group in table 7 differ somewhat from those shown iu table 6, the basic picture is not changed. Most of the differences can be explained by the fact that every one was 2 years older in 1968. The data for identical persons show, for example, that the decline in physician utilization by both male and female members in the groups aged 45–64 was slightly less than that shown by the figures in table 6. This result is not surprising since, at that age level, utilization increases with increasing age. Similarly, utilization by both male and female members in most of the subgroups aged 5–14 and 15–18 declined more for the identical persons; at these ages, utilization tends to decline with increasing age.

The same is true for male members aged 19–24 who continued to be the group showing the greatest reduction in the use of physician services. By contrast, the decline in utilization by female members aged 19–24 was considerably less than the drop shown by the figures in table 6, probably because of an increase in the number of maternity cases attributable to the 2-year increase in age. (Of the 37 women aged 19–24 in 1966, 6 were subscribers and 11 were dependent wives.)

For identical persons in the groups aged 25–44, the changes in utilization by both sexes differ relatively little from the other figures: By and large, the use of physician services by the men declined slightly less for identical persons and that by the women declined somewhat more.

TABLE 6.—Per capita number of physician visits by age, occupation, and sex, 1966 and 1968

Age	All occupations			Faculty			Other professional staff			Nonprofessional staff		
	1966	1968	Percentage change	1966	1968	Percentage change	1966	1968	Percentage change	1966	1968	Percentage change
Male												
All ages	5 048	3 868	−23 4	5 359	4 168	−22 2	4 945	3 547	−28 3	4 589	3 874	−15 6
Age-adjusted			−22 8			−20 2			−26 7			−20 2
Under 5	5 919	4 582	−22 6	6 140	5 370	−12 5	6 131	4 452	−27 4	4 077	2 667	−34 6
2–4 [1]	3 922	4 582	+16 8	3 960	5 370	+35 6	4 088	4 452	+8 9	2 600	2 667	+2 6
5–14	5 142	3 670	−28 6	5 556	4 206	−24 3	5 148	3 583	−30 4	4 021	2 231	−44 5
15–18	4 694	3 620	−22 9	4 848	4 000	−17 5	5 029	4 103	−18 4	4 067	2 333	−42 6
19–24	3 400	1 686	−50 4	2 000	1 160	−42 0	4 300	1 720	−60 0	3 727	2 300	−38 3
25–44	4 068	3 253	−20 0	4 618	3 959	−14 3	3 713	3 000	−19 2	3 704	2 250	−39 3
45–64	5 967	4 896	−17 9	6 007	4 591	−23 6	6 103	4 214	−31 0	5 758	6 180	+7 3
45–62 [1]	5 967	4 851	−18 7	6 007	4 455	−25 8	6 103	4 218	−30 9	5 758	6 402	+11 2
Female												
All ages	6 297	4 746	−24 6	6 312	4 811	−23 8	6 024	4 676	−22 4	6 729	4 753	−29 4
Age-adjusted			−26 3			−28 1			−21 0			−32 4
Under 5	5 946	5 200	−12.5	5 978	6 333	+5 9	6 018	4 577	−23 9	5 455	3 143	−42 4
2–4 [1]	5 477	5 200	−5.1	5 966	6 333	+6 2	5 355	4 577	−14 5	3 400	3 143	−7 6
5–14	4 143	3 238	−21.8	4 521	3 674	−18 7	4 125	3 206	−22 3	2 816	1 559	−44 6
15–18	4 317	3 686	−14 6	3 805	4 071	+7 0	4 462	3 978	−10 8	5 467	1 941	−64 5
19–24	5 865	1 982	−66 2	2 667	1 893	−29 0	7 250	1 850	−74 5	7 667	2 625	−65 8
25–44	7 022	5 328	−24 1	7 267	4 781	−34 2	6 782	5 750	−15 2	7 055	5 457	−22 7
45–64	7 994	5 959	−25 5	8 602	6 522	−24 2	7 667	5 770	−24 7	7 732	5 604	−27 5
45–62 [1]	7 994	5 582	−30 2	8 602	5 612	−34 8	7 667	5 709	−25 5	7 732	5 459	−29 4

[1] Only persons who were GHP members the full 12 months of both 1966 and 1968 were included in the study; the data therefore exclude children under age 2 in 1968 and persons aged 63 and over in 1966

The differences between the two sets of data are most pronounced for those aged 2–4—possibly the only group where the differences may not be accounted for by the change in age alone. As table 7 indicates, utilization by male members in this group decreased instead of rising and utilization by female members showed a decline substantially larger than that shown by the figures in table 6.

An especially marked difference is to be expected for this group since physician utilization by very young children tends to decline more quickly with increasing age than it does for older children. The differences between the two sets of figures (for all but the female, nonprofessional group) are so pronounced, however, that at least tentatively the conclusion might be drawn that coinsurance had little impact on physician utilization by children under age 4 and that, beyond that age, it began to lead to a reduction in utilization.

Insurance Status

Why male subscribers reduced their utilization of physician services so markedly less than the other groups is not readily explainable. The difference shown in table 8 between the change in their utilization (17.6 percent) and that of female subscribers (25.1 percent) may reflect the fact that nearly 4 out of 10 male subscribers belonged

to the faculty group, while 7 out of 10 female subscribers belonged to the nonprofessional group. Faculty men in the relevant age groups (25–64) reduced their use of physician services considerably less than female members in the nonprofessional group at the same age levels. This comparison is not strictly valid, however, since these figures refer to members and not to subscribers only: Though all but 2 of the faculty men in the group aged 25–64 in 1966 were subscribers, only 56 percent of the female members in this age

TABLE 8.—Per capita number and per capita cost of physician visits of GHP subscribers and dependents, by insurance status and sex, 1966 and 1968

Insurance status and sex	1966	1968	Percentage change
	Per capita number		
Subscribers	5 296	4 260	−19 6
Male	4 940	4 069	−17 6
Female	6 676	5 000	−25 1
Dependent spouses	7 679	5 858	−23 7
Male	6 120	6 200	+1 3
Female	7 744	5 844	−24 5
Dependent children	4 835	3 466	−28 3
Male	5 132	3 516	−31 5
Female	4 523	3 413	−24 5
	Per capita cost		
Subscribers	$77 73	$65 38	−15 9
Male	74 42	63 68	−14 4
Female	90 59	71 98	−20 5
Dependent spouses	121 14	89 78	−25 9
Male	72 12	98 40	+36 4
Female	123 18	89 42	−27 4
Dependent children	54 37	38 05	−33 0
Male	60 29	39 40	−34 6
Female	48 17	36 64	−23 9

TABLE 7.—Per capita number of physician visits by age in 1966, sex, and occupation, 1966 and 1968

Age in 1966	All occupations			Faculty			Other professional staff			Nonprofessional staff		
	1966	1968	Percentage change	1966	1968	Percentage change	1966	1968	Percentage change	1966	1968	Percentage change
	Male											
All ages	5 048	3 868	−23 4	5 359	4 168	−22 2	4 945	3 547	−28 3	4 589	3 874	−15 6
Under 5	5 919	4 210	−28 9	6 140	4 740	−22 8	6 131	4 180	−31 8	4 077	2 308	−43 4
2–4	3 922	3 766	−4 0	3 960	3 920	−1 0	4 088	3 971	−2 9	2 600	1 600	−38 5
5–14	5 142	3 566	−30 6	5 556	4 183	−24 7	5 148	3 385	−34 2	4 021	2 383	−40 7
15–18	4 694	3 045	−35 1	4 848	2 935	−39 5	5 029	3 771	−25 0	4 067	2 367	−41 8
19–24	3 400	1 400	−58 8	2 000	1 556	−22 2	4 300	1 400	−67 4	3 727	1 273	−65 8
25–44	4 068	3 384	−16 8	4 618	3 799	−17 7	3 713	3 162	−14 8	3 704	2 963	−20 0
45–62	5 967	5 024	−15 8	6 007	4 859	−19 1	6 103	4 155	−31 9	5 758	6 220	+8 0
	Female											
All ages	6 297	4 746	−24 6	6 312	4 811	−23 8	6 024	4 676	−22 4	6 729	4 753	−29 4
Under 5	5 946	4 500	−24 3	5 978	5 348	−10 5	6 018	4 127	−31 4	5 455	2 818	−48 3
2–4	5 477	3 862	−29 5	5 966	4 207	−29 5	5 355	3 645	−31 9	3 400	3 200	−5 9
5–14	4 143	3 115	−24 8	4 521	3 607	−20 2	4 125	3 132	−24 1	2 816	1 237	−56 1
15–18	4 317	3 549	−17 8	3 805	3 488	−8 3	4 462	3 885	−12 9	5 467	3 133	−42 7
19–24	5 865	4 405	−24 9	2 667	1 583	−40 6	7 250	3 313	−54 3	7 667	10 111	+31 9
25–44	7 022	5 174	−26 3	7 267	4 826	−33 6	6 782	5 592	−17 5	7 055	4 945	−29 9
45–62	7 994	6 099	−23 7	8 602	6 885	−20 0	7 667	6 044	−21 2	7 732	5 537	−28 4

bracket in the nonprofessional group were subscribers.

Dependent husbands represented a small (25 persons) and probably somewhat special group. For one thing, a selection factor may have been involved. Some of these persons may have obtained superior coverage by enrolling as dependents under their wives' plan than was available under their own plan. For another thing, some of them may have had worse than average health experience. More than half were nonprofessionals aged 45–64—the group that showed an increase in physician utilization in 1968.

For dependent children the decline in use of physician services is what would be expected since they included some members of the group aged 19–24 whose utilization went down drastically.

Changes in Distribution of Physician Visits

The percentage of members having no physician visit during the whole year increased very substantially. For the study population as a whole, it rose from 13.4 percent in 1966 to 20.0 percent in 1968. As table 9 indicates, it rose slightly less for female members (from 11.9 percent to 17.3 percent) than for male members (from 15.0 percent to 22.7 percent). The percentage of members having no physician visit increased for every occupational group and for both male and female members, but the lowest

socioeconomic group—the nonprofessionals—responded most to the introduction of coinsurance by not seeing a physician at all. This response is especially true of male nonprofessional members, for whom the proportion with no visits doubled.

At the same time that the percentage of members with no physician visit increased, that of members with four or more visits decreased for every group except male and female members of the faculty group. For these members the decline began only after the sixth visit. For all GHP members, the proportion with 4 or more visits decreased from 54.2 percent in 1966 to 43.4 percent in 1968. Again, the change was less for female members than it was for male members, though the difference is slight. Again, male members of the nonprofessional group responded more strongly than any of the other groups.

These changes were offset to some extent by a slight increase in the percentage of members having 1–3 physician visits. For the study population as a whole, the proportion of members with 1 to 3 physician visits went up about four percentage points; it went up slightly more for female members than for male members.

Place of Visit

Office visits, which accounted for the vast majority of physician services in both years, declined somewhat more than all physician services. The per capita number of office visits declined 24.9 percent for the group as a whole—24.4 percent for male members and 25.2 percent for female members (table 10).

Home visits, whose volume was insignificant in both years, showed the greatest decline: The total group used only half as many visits (male members only about one-fourth as many, female members two-thirds as many). This decline probably reflects Clinic practice as well as the effects of coinsurance. For the Clinic as a whole, the volume of home visits in 1968 was 30 percent below that in 1966. By contrast, the volume of office visits and hospital medical visits was about the same in the two years, and the volume of hospital surgical procedures was 16 percent higher in 1968.

The decrease in hospital visits (both surgical and medical) was very much less than that in office and home visits and was not significant statistically. The distribution by occupational group

TABLE 9.—Percent of GHP members with specified number of physician visits, by sex and occupation, 1966 and 1968

Number of physician visits and sex	All occupations		Faculty		Other professional staff		Non-professional staff	
	1966	1968	1966	1968	1966	1968	1966	1968
All members								
0	13 4	20 0	11 4	15 0	15 0	22 1	14 4	25 5
1	10 2	11 7	10 7	11 8	9 8	11 4	10 0	12 0
2–3	22 1	24 9	24 1	27 2	20 4	24 3	21 4	21 6
4–6	22 9	22 6	22 3	25 4	23 5	22 0	23 1	18 5
7–10	17 1	12 0	16 9	12 1	17 4	11 9	17 0	12 0
11–15	8 6	5 4	8 6	5 3	8 7	5 6	8 5	5 2
16 or more	5 6	3 4	6 1	3 3	5 3	2 6	5 5	5 2
Male								
0	15 0	22 7	12 4	16 8	17 7	25 4	15 0	30 1
1	10 8	12 0	9 2	11 6	10 6	11 6	14 6	13 4
2–3	23 2	25 4	25 8	26 3	21 3	25 6	21 5	22 8
4–6	23 1	21 6	24 0	25 4	22 2	19 9	23 2	16 7
7–10	16 8	10 8	16 6	12 4	17 3	10 0	16 3	8 9
11–15	6 9	4 7	7 1	4 2	6 5	5 7	7 3	3 7
16 or more	4 2	2 9	5 0	3 2	4 5	1 8	2 0	4 5
Female								
0	11 9	17 3	10 3	13 3	12 3	18 9	13 9	21 7
1	9 7	11 4	12 3	11 9	9 1	11 3	6 1	10 8
2–3	21 1	24 4	22 4	28 1	19 5	22 9	21 4	20 7
4–6	22 7	23 7	20 5	25 3	24 7	24 1	23 1	20 0
7–10	17 4	13 2	17 2	11 7	17 5	13 9	17 6	14 6
11–15	10 3	6 1	10 1	6 4	10 9	5 4	9 5	6 4
16 or more	7 0	3 9	7 2	3 3	6 0	3 4	8 5	5 8

TABLE 10.—Per capita number and per capita cost of physician visits, by place of visit and sex, 1966 and 1968

Place of visit and sex	1966	1968	Percentage change
	Per capita number		
All members	5 683	4 315	−24 1
Office	5 329	4 004	−24 9
Home	064	031	−51 6
Hospital-medical	207	201	−2.9
Hospital-surgical	083	079	−4 8
Male	5 048	3 868	−23 4
Office	4 843	3 661	−24 4
Home	063	018	−71 4
Hospital-medical	075	125	+66 7
Hospital-surgical	067	064	−4 5
Female	6 297	4 746	−24 6
Office	5 798	4 336	−25 2
Home	065	044	−32 3
Hospital-medical	334	274	−18 0
Hospital-surgical	099	093	−6 1
	Per capita cost		
All members	$78 47	$59 81	−23 8
Office	57 71	41 32	−28 4
Home	99	46	−52 9
Hospital-medical	2 58	2 20	−14 8
Hospital-surgical	17 19	15 84	−7 9
Male	68 17	53 71	−21 2
Office	53 35	37 99	−28 8
Home	95	26	−72 3
Hospital-medical	1 08	1 44	+33 0
Hospital-surgical	12 79	14 02	+9 6
Female	88 44	65 72	−25 7
Office	61 94	44 54	−28 1
Home	1 02	66	−35 5
Hospital-medical	4 03	2 94	−27 2
Hospital-surgical	21 45	17 59	−18 0

showed a decrease in hospital surgery for both male and female members in the faculty group and an increase for both sexes in the other two occupational groups.

The data on hospital medical visits show even wider variations in changes between the two years. The per capita number of such visits declined only slightly for the study group as a whole but was two-thirds higher for the male members and nearly one-fifth smaller for the female members. The increase for male members was attributable entirely to the nonprofessional group, which, as mentioned earlier, must have included some seriously ill persons in 1968; for the other two occupational groups the per capita number of such visits declined substantially. For female members the data by occupational group show a decline in the per capita number of hospital medical visits by the faculty and nonprofessional groups but a considerable increase in their use by the other professional staff. These wide variations are not surprising: The risk of needing hospitalization in any year is relatively low, compared with the risk of needing ambulatory care, and the study population is small; a few lengthy hospital stays can thus have a pronounced effect on the data.

Field of Specialty of the Physician

Utilization rates of general practitioners and physicians in the medical specialties as a whole decreased less than those of physicians in the surgical specialties (21.9 percent for each of the first two categories and 30.9 percent for the third), as table 11 shows. With neurology, neurosurgery, and plastic surgery omitted—specialties for which the number of events in both years was small and where a price increase would probably have little effect on demand—the fields of specialty with declines in utilization rates substantially below the average for all physician visits were dermatology, obstetrics-gynecology, and internal medicine. If the age-adjusted figure is used for pediatrics—a figure that is more relevant for this specialty because of the absence of children under age 2 in 1968—this specialty also shows a below-average decline in use.

TABLE 11.—Per capita number and per capita cost of physician visits by field of specialty, 1966 and 1968

Field of specialty	1966	1968	Percentage change
	Per capita number		
All physician visits	5 683	4 315	−24 1
General practice	453	.354	−21 9
Medical specialty	2 760	2 156	−21 9
Allergy	108	066	−38 9
Dermatology	278	263	−5 4
Internal medicine	1 175	.965	−17.9
Neurology	042	057	+35 7
Pediatrics	1 157	.805	[1] −30 4
Surgical specialty	1 929	1 332	−30 9
General surgery	286	.205	−28 3
Neurosurgery	021	.012	−42 9
Obstetrics-gynecology	326	295	−9 5
Ophthalmology	411	.256	−37.7
Orthopedics	382	226	−40 8
Otolaryngology	283	187	−33 9
Plastic surgery	066	058	−12 1
Urology	154	093	−39 6
Radiology	541	.473	−12 6
	Per capita cost		
All physician visits	$78 47	$59 81	−23 8
General practice	5 06	3 95	−21 8
Medical specialty	.35 70	27 30	−23 5
Allergy	2 74	1 38	−49 5
Dermatology	3 35	3 09	−7 8
Internal medicine	18 05	14 32	−20 7
Neurology	82	1 02	+24 8
Pediatrics	10 74	7 49	[1] −30 3
Surgical specialty	37 72	28 55	−24 3
General surgery	7 37	5 71	−22 5
Neurosurgery	1 09	35	−68 0
Obstetrics-gynecology	7 29	7 52	+3 2
Ophthalmology	7 15	5 28	−26 1
Orthopedics	6 57	3 85	−41 3
Otolaryngology	3 88	2 54	−34 5
Plastic surgery [2]	1 24	1 36	+9 4
Urology	3 13	1 93	−38 3
Radiology	---	---	---

[1] The age-adjusted figures are more relevant for pediatrics, where the absence of children under age 2 in 1968 has a specially marked effect on the 1968 physician utilization rate; on the basis of the adjusted figures the decline was 12 4 percent in per capita number of visits and 13 5 percent in per capita costs

[2] Cosmetic surgery was not covered by GHP in either year.

Fields of specialty with declines in utilization rates that were considerably above average were allergy, orthopedics, otolaryngology, urology, and ophthalmology. When routine eye examinations are excluded from the ophthalmology figures for both years (they were not covered by GHP in 1968 but were included in the study data for both 1966 and 1968), the decline in the utilization rate becomes 28.3 percent—only a little above the average for all physician visits.

EFFECT ON EXPENDITURES FOR PHYSICIAN SERVICES

The data on per capita costs of physician services present much the same picture as those on per capita number of physician visits in the sense that, with very few exceptions, they show a substantial decline. The per capita costs of all physician services declined only slightly less than the per capita number of visits (23.8 percent, compared with 24.1 percent).

By sex and occupation, the data show that the changes in the per capita number of visits and the per capita costs are within a few percentage points of each other, but the differences may go either way. When the data are broken down into smaller subgroups, the differences between the decline in per capita number of visits and per capita costs are sometimes substantial, but again there is no consistent pattern. In view of the limited size of the study population, this finding is not surprising. Some of the subgroups are very small, and random variations in one year or the other— perhaps a few expensive medical procedures or a few very sick individuals—may have a pronounced effect on either the cost or the visit data and hence on the percentage changes between the two years.

CONCLUSIONS

To sum up, there can be little doubt that the introduction of the 25-percent coinsurance provision reduced the demand for physician services substantially. One limitation of the study, of course, was the lack of information on the use of non-Clinic physicians by GHP members in either year. It is generally believed that even before the introduction of coinsurance, when the services of Clinic physicians were "free," some GHP members used a minor amount of outside physician services. Some increase in use of out-of-plan services after the introduction of coinsurance may have occurred, but it is doubtful that it rose substantially. For one thing, paying 25 percent of a physician's fee is much to be preferred to paying 100 percent. For another, the University employees had available to them another University plan, a Blue Cross/Blue Shield plan that provided free choice of physicians, less comprehensive coverage for physician services (dependents were covered for hospital visits only) but much the same coverage for hospital services, and had considerably lower premiums. In 1968, the monthly Blue Cross/Blue Shield premium for a family (an employee with one or more dependents) was $24.68. By contrast, the monthly GHP premium for an employee with one dependent was $24.74, with two dependents it was $33.38, and with three or more dependents $35.38. Thus a family of three (the average family size of GHP subscribers) would have paid $104 a year less in premiums under the Blue Cross/Blue Shield plan. It seems unlikely that such a family would choose to stay with the GHP plan if they wanted to use the services of non-Clinic physicians to any significant extent. Therefore, whatever the increase in the use of non-Clinic physicians, it was probably not very great and would not alter the findings substantially. A follow-up study is planned that will include the collection of information on outside utilization.

There remain the two questions around which the arguments for and against coinsurance have revolved: Did coinsurance reduce "overutilization," "unnecessary services," or "sniffle complaints"? Or did coinsurance discourage persons from seeking "necessary services"? The study unfortunately has no conclusive answers to either of these questions, but the findings may be explored a little for whatever light they may shed. (And the study's failure to produce conclusive answers is perhaps understandable since nobody has ever clearly defined what is meant by "overutilization" or "unnecessary services," or even "sniffle complaints" and "necessary services," much less suggested how to measure them.)

Did Coinsurance Reduce "Overutilization"?

One way of looking at this question is to compare physician utilization by GHP members in 1966 with that of members of other comprehensive health care plans or of other population groups in general, for whom data are available. Such a comparison will not, of course, tell whether or not GHP members were "overutilizers," but it puts their physician utilization rate into some perspective. It should be borne in mind, however, that any such comparison can only give a very rough idea of differences in utilization rates. The different health care plans differ in their coverage of services, the different groups differ in their demographic characteristics, and, last but not least, the definition of what constitutes a physician visit is by no means the same for each of the groups for which there are data.

Table 12 brings together the rather scanty information on this subject, which indicates that GHP members in 1966 were comparatively heavy users of physician services. Only members of Group Health Insurance (GHI) in 1964 had approximately the same number of all physician visits per member per year as did GHP members in 1966 (after correction of the GHP figure for the estimated understatement of hospital surgical visits).[6] Their utilization rate of office and home visits, however, was somewhat lower than that of GHP members. The GHI data are, of course, for 1964, and the study did not have comparable data for 1966.

Members of two other prepaid plans for whom data were available for 1966—Health Insurance Plan of Greater New York (HIP) and Kaiser Foundation Health Plan-Northern California Region—had substantially lower physician utilization rates. To take office and home visits only (since Kaiser has no data on hospital visits), the GHP per capita rate of such visits in 1966 was 5.4 compared with 3.9 for HIP and 3.8 for Kaiser-Northern California. Similarly, the national rates for outpatient visits (excluding telephone calls) for the period July 1966–June 1967 were considerably lower than the GHP rate: 3.8 per person for all regions, 4.3 for the West, and 4.8 for the San Francisco area. By contrast, in 1968 when the 25-percent coinsurance provision was in effect under GHP, physician utilization rates

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[6] See under Methodology, page 17.

TABLE 12.—Per capita number of physician visits for GHP and selected prepaid group health plans and for total U.S. population by type of visit, 1966 and 1968

Selected prepaid plans and U.S population	All visits		Office and home visits	
	1966	1968	1966	1968
GHP [1]	6 0–6 1	4 6–4 7	5 4	4 0
Other prepaid plans				
Health Insurance Plan of Greater New York [2]	4 4	3 9	3 9	3 5
Group Health Insurance [3]	6 0	----------	5 0	----------
Kaiser Foundation-Northern California [4]	----------	----------	3 8	3 9
United States, total	----------	----------	[5] 3 8	----------
West	----------	----------	[5] 4 3	----------
SMSA, San Francisco	----------	----------	[5] 4 8	----------

[1] All under age 65, corrected for understatement of hospital surgical visits
[2] For 1966, all under age 65, for 1968, persons under age 65, living in their own homes Data from *H. I. P. Statistical Reports* for 1966 and 1968
[3] All members of comprehensive plan under age 65, reference period is 1964 Calculated from Helen Avnet, *Physician Service Patterns and Illness Rates*
[4] All ages Data obtained from personal communication
[5] All ages, reference period is July 1966–June 1967, figures adjusted to exclude telephone calls Data from National Center for Health Statistics, *Volume of Physician Visits, U S, July 1966–June 1967*, Series 10, No. 49, pp 16–17.

of GHP members and of members of the two other prepaid plans were much closer. It should be emphasized that these comparisons provide no evidence regarding possible overutilization of physician services by GHP members; they are presented merely to give the data some perspective.

A more promising approach to the problem might be to look more closely into the change in the number of ancillary services per physician outpatient visit in the two years. The number of such services per physician office and home visit under GHP rose 19 percent from 1966 to 1968. It might be inferred therefore that the conditions treated in the latter year included a smaller proportion of "sniffle complaints" and a higher proportion of more serious complaints requiring diagnostic and other tests. A comparison with two other groups for which data were available proved, however, inconclusive.

For all patients of the Palo Alto Medical Clinic (excluding psychiatry, omitted both because it is not included in the GHP data and because psychiatric visits generate few if any ancillary services), the increase of all ancillary services per physician outpatient visit was even higher—39 percent. Although no data are available on the characteristics of the total patient population of the Clinic, it undoubtedly differs considerably from our study population. For one thing, the Clinic population includes persons aged 65 and

older; for another, it probably includes a considerable number of persons who use Clinic physicians not for their regular medical care but for specialized care requiring extensive diagnostic work-ups.

Last but not least, the study population by definition consisted of the same persons in the two years, but the total Clinic population has some turnover, with some patients leaving and new patients coming. About 6 percent of Clinic physician office visits in 1966 and about 7 percent in 1968 were first visits of new patients to the Clinic. Such new patients are likely to have more tests per visit than established patients. These factors, especially the last, probably account for the greater increase in the ratio of ancillary services per physician outpatient visit for the Clinic as a whole than for the GHP population.

A group that might be considered somewhat more comparable to the GHP population is HIP members under age 65. The *H. I. P. Statistical Reports* give ancillary data only for laboratory tests. A comparison of the number of laboratory tests per physician office and home visit for GHP and HIP members in the two years showed an increase for GHP members from 0.69 tests per physician visit in 1966 to 0.80 in 1968, or slightly more than 15 percent; for HIP members the ratio rose from 0.94 in 1966 to 1.05 in 1968, or almost 13 percent.[7] The slight difference between the two plans does not justify an interpretation that the GHP data indicate a decline in "sniffle complaints."

Since the study data on utilization did not shed much light on the possible effects of coinsurance on "overutilization," a separate study was carried out. Data were collected on diagnoses of GHP members directly from their Clinic records for the two years, and the diagnoses were coded according to the *International Classification of Diseases Adapted for Use in the United States* (ICDA, Eighth Revision). This step was taken to get more concrete evidence on whether coinsurance reduced GHP members' demand for care of minor complaints to a greater extent than for care of more serious complaints.

Even this approach did not prove very satisfactory. For one thing, it was found that the Clinic medical records—on the whole, well-kept

and probably above average for outpatient care records—did not always indicate diagnoses in the very narrow, specific way required for coding according to the ICDA. Ambulatory care, of course, is likely to involve more vague and not narrowly diagnosable conditions than hospital care. As a result, the coders (registered nurses) found considerable variation in diagnostic entries for cases that seemed—at least to the coders—much the same: what one physician might enter in the record as an upper respiratory infection, another might enter as a cold or influenza. In addition, the diagnostic entries did not indicate the degree of severity of the case (nor does the ICDA provide such a rating).

It was therefore necessary to decide what conditions to select as possibly minor complaints—not a very satisfactory procedure, since there are undoubtedly differences of opinion about what conditions should be regarded as minor. The conditions selected were: warts, headache, earache, cold, acute pharyngitis, acute tonsillitis, acute upper respiratory infection of multiple or unspecified sites, hay fever, indigestion, constipation, contact dermatitis, back pain and backache, dizziness, palpitation, cough, and fatigue.

The number of attended cases of "minor complaints" declined from 1,423 in 1966 to 1,103 in 1968, or 22.5 percent. By contrast, the total number of all attended cases of illness went from 7,397 to 6,100, a decline of only 17.5 percent; when the "minor complaint" cases are excluded, the decline in the total number is only 16.4 percent. It thus appears that after coinsurance was introduced, GHP members did reduce their demand for care of minor illnesses considerably more than their demand for medical care of other conditions. In view of the reservations about the data, these findings are considered suggestive rather than conclusive.

Were Members Discouraged From Seeking Needed Medical Care

Is there any evidence that coinsurance discouraged GHP members from seeking necessary medical care? If an annual physical examination is considered an essential part of good preventive care, a decline in the number of such examinations might be interpreted as an affirmative answer to this question. Accordingly, the GHP data on the

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[7] Calculated from *H.I.P. Statistical Reports* for 1966 and 1968.

volume of annual physical examinations in the two years were scrutinized. The findings are shown in table 13.

Although the per capita number of such examinations declined less than the per capita number of all physician visits, it still showed a substantial drop of 18.5 percent. Male members cut down on annual examinations considerably more than female members (23.1 percent, compared with 13.9 percent), and adults considerably more than children (25.1 percent, compared with 11.3 percent). What stands out most, however, is the very much greater reduction in the per capita number of annual examinations for the nonprofessional group than the decline for the other two occupational groups. Except for the adult female members, all the members of the nonprofessional group cut down on annual examinations far more than the corresponding members of the other two groups. The reductions were 38.9 percent for male children, 51.2 percent for adult male members, and 57.1 percent for female children.

The reduction by the adult male nonprofessionals is perhaps the most disconcerting, since this group accounts for a much higher percentage of persons over age 40 than did the other two groups. About 6 in 10 of the men in the nonprofessional group were aged 45–64, compared with 1 in 2 in the faculty category and a little more than 1 in

3 of the other professionals. Yet, as table 13 indicates, the adult male nonprofessionals not only cut back on annual examinations much more than the men in the other two occupational groups but also had a very much lower rate of annual examinations in 1968 than the men in the other groups. Whether this reduction was excessive and whether an annual rate of 0.127 physical examinations per adult male is too low are questions for the medical profession rather than for economists.

Another figure in the GHP data suggests that coinsurance may have discouraged the use of physician services by at least one group of members to too great an extent—the proportion (30.1 percent) of all male members in the nonprofessional group who did not see a physician at all during 1968. (This group—the lowest in socioeconomic terms—is also the only one showing a decline in the percentage of members with only one physician visit.) The 30-percent figure seemed high, and an attempt was made to evaluate it on the basis of similar data from other sources. Unfortunately, such data are scarce and none are strictly comparable; most of them include persons aged 65 and over and few have breakdowns by both occupation (or socioeconomic status) and sex. Nevertheless, the available data have been brought together in table 14 to help evaluate the GHP figures on male members of the nonprofessional group.

As the table shows, neither GHI members as a whole nor any of the GHI subgroups in 1964 had nearly as high a percentage of persons with no physician service during the year as did male GHP members in the nonprofessional group after coinsurance went into effect. What is more surprising is how close that figure is to the figure for the U.S. population as a whole (31.9 percent of whom had no physician visit from July 1966 to June 1967) and to the figures for the various national subgroups (white, SMSA's, West, etc.). It must be remembered, of course, that most of the national data include persons aged 65 and older and that sex distributions are not provided for the various subclassifications. The national figures would be somewhat higher if persons aged 65 and older were excluded and if the percentage for males only were given (since all males had a higher proportion without a physician visit than did all females). Nevertheless, it does seem surprising that the percentage of persons with no

TABLE 13.—Per capita number of annual physical examinations and percentage changes in per capita number of annual physical examinations and all physician visits, for adult and child GHP members, 1966 and 1968

Sex and occupation	Per capita number of annual physical examinations			Percentage change in per capita number of all physician visits, from 1966 to 1968
	1966	1968	Percentage change	
All members	0 379	0 309	−18 5	−24 1
Male	377	290	−23 1	−23 4
Female	381	328	−13 9	−24 6
Adults	334	250	−25 1	−21 7
Children	441	391	−11 3	−28 3
Adult members				
Male	312	225	−27 9	−16 8
Faculty	386	294	−23 8	−18 5
Other professional staff	260	204	−21 5	−23 4
Nonprofessional staff	.260	.127	−51 2	−2 7
Female	354	273	−22 9	−24 7
Faculty	415	.298	−28 2	−27 7
Other professional staff	305	250	−18 0	−19 8
Nonprofessional staff	.339	270	−20 4	−26 4
Child members				
Male	460	374	−18 7	−31 5
Faculty	524	424	−19 1	−26 8
Other professional staff	432	383	−11 3	−33 2
Nonprofessional staff	.375	229	−38 9	−41 4
Female	420	409	−2 6	−24 5
Faculty	416	475	+14 2	−16 1
Other professional staff	422	.404	−4 3	−27 2
Nonprofessional staff	431	185	−57 1	−50 0

TABLE 14.—Percent of persons with no physician visit during the year, by selected characteristics, for selected groups and periods

Characteristic	Total	Male	Female
	GHP, 1968		
All members under age 65	20 0	22 7	17 3
Faculty	15 0	16 8	13 3
Other professional	22 1	25 4	18 9
Nonprofessional	25 5	30 1	21 7
	GHI, comprehensive plan, 1964 [1]		
All members (all ages)	20 0	25 0	15 0
Professional	25 0	----------	----------
Executive	19 0	----------	----------
Sales	11 0	----------	----------
Clerical and white collar, unspecified	18 0	----------	----------
Blue collar	21 1	----------	----------
	U S population, July 1966– June 1967 [2]		
All persons	31 9	34 9	29 1
Under age 65	32 2	----------	----------
Male	34 7	----------	----------
Female	29 1	----------	----------
White	30 7	----------	----------
All SMAA's	30 5	----------	----------
West	30 1	----------	----------

[1] Figures refer to percent incurring no claims, since a claim may be for a physician visit or an outpatient ancillary service, the data may be slightly overstated in comparison with the other data
[2] For source, see footnote 5, table 12

physician visit during the year should be so close for a group covered by a prepaid comprehensive medical care plan and for the U.S. population as a whole, a large proportion of whom have little if any insurance coverage for outpatient physician visits.

It may be asked if the 25-percent coinsurance feature of the GHP plan would be suitable for incorporation in a national health insurance plan. In the authors' opinion such a provision applying to all physician services might be suitable for families in the middle to upper income groups. For lower-income families, it may impose too much of a financial barrier, as the study data suggest—particularly the figures showing the high percentage of male members of the nonprofessional group without a physician visit in 1968. Other supporting evidence from the GHP study are the substantial reduction in annual physical examinations and the low rate of annual physical examinations of adult male nonprofessionals after coinsurance was introduced.

In addition, a 25-percent across-the-board coinsurance provision may deprive lower-income families of the adequate protection against heavy medical expenses that is especially important for such families. The burden of paying 25 percent

of a physician's fee for an occasional office visit may not be too much, but paying 25 percent of the fee for an expensive surgical procedure or for medical conditions requiring prolonged physician care is another matter.

SOURCES OF DATA AND METHODOLOGY

Data on GHP Members and Their Characteristics

Copies of the original enrollment forms of all GHP subscribers were obtained, together with information on the date of cancellation or termination of the subscriber's membership. The enrollment forms gave the names of the subscriber and of his dependents, their sex, date of birth, marital status, insurance status, and date of joining. Although address and occupation were also indicated on these forms, they were double-checked on the basis of the latest Stanford University Directory.

Source, Coding, and Pricing of Utilization Data

Utilization data were collected from the charge tags of the Clinic business office. Whenever a patient uses a Clinic service of any kind, a charge tag is made out for that service, showing the patient's name, address, person responsible for the bill if it is not the patient himself, his Clinic medical record number, the code number of the physician, the service performed, and the fee charged. The only exceptions are obstetrical care visits and surgical hospital visits. For obstetrical care, only one charge tag is made out for the entire service, including prenatal and postpartum visits and the delivery itself. On the basis of an earlier study of maternity care using Clinic data, the assumption was made that every maternity case involved 13 visits—12 office visits for prenatal and postpartum care and one hospital visit for the delivery itself; the former were counted as office visits, the latter as a hospital surgical visit.

For hospital surgery, only one charge tag is made out for the procedure. However, although the fee for most hospital surgery includes postoperative office visits, tags for these office visits are made out, marked "no charge." Thus, the Clinic charge tag data on hospital surgery are

complete except for the number of hospital visits.

The Clinic medical records frequently do not indicate length of hospital stay of surgical cases and, because of budgetary limitations, it was not possible to get this information from the patients' hospital records. As a result, only one hospital surgical visit was counted for every hospital surgical procedure. If more than one surgeon was in attendance for such a procedure, however, it was counted as two hospital surgical visits. The per capita number of surgical hospital visits in both years is thus understated. Since the main interest was in the change between the two years, this classification of hospital surgical visits does not, however, affect the study findings on the decrease in physician utilization to any appreciable extent.

A very rough estimate of the understatement can be made on the basis of data on average length of hospital stay in *Length of Stay in PAS Hospitals, United States, Pre- and Post-Medicare* (Commission on Professional and Hospital Activities, Ann Arbor, Mich., 1969). With the group aged 65 and over eliminated from their data for January 1965–June 1967, the average length of stay for those under age 65 was 5.3 days for "single diagnosis, operated" and 6.9 days for "single diagnosis, operated" and "multiple diagnosis, operated" combined. On the basis of the GHP data on the number of surgical hospital procedures in 1966 and assuming one hospital visit per day of hospitalization, the per capita number of surgical hospital visits may be understated by 0.330 using the lower of the above figures and by 0.455 using the higher figure. For 1968, the corresponding understatements of these visits would be 0.315 and 0.434, respectively. Thus, on the basis of the lower figure, the per capita number of all physician visits would become 6.013 in 1966 and 4.630 in 1968 (a decrease in all visits of 23 percent), and on the basis of the higher figure, 6.138 in 1966 and 4.749 in 1968 (a decrease of 23 percent).

All services were coded in terms of the 1964 California Relative Value Studies, which some Clinic departments had began to use as early as 1965 and all Clinic departments were using by 1967. To price services in the two years, the 1968 Clinic fee schedules were used for the different services and departments. Thus the cost figures for the two years are in constant 1968 prices and reflect solely changes in utilization.

Statistical Tests

Two types of tests of significance were performed. The first type was designed to pinpoint the overall significance of the impact of coinsurance on physician utilization and tested the decline in utilization between 1966 and 1968. This decrease was highly significant, except for hospital services. The second set of tests attempted to evaluate the differential impact on physician utilization that might be due to the demographic characteristics of the users. These tests sought to determine if the relative decline in physician utilization by any specific demographic cell was significantly different from that of the remainder of the study population (exhaustive case) or of another specifically chosen cell (nonexhaustive case). These relative differences in the decrease in physician utilization, although interesting, were almost always not statistically significant.

(1) *Relative decreases in utilization.* The differences in physician utilization between 1966 and 1968 were tested for significance by the use of the following formula:[8]

$$\text{Distance from the mean in terms of standard deviations } (z) = \frac{\% \text{ decrease}}{s_{\%} \text{ decrease}}$$

where:

$$s_{\%} \text{ decrease} = \frac{k}{n}$$

$$k = \left(\frac{\bar{x}_1}{\bar{x}_2}\right)^2 \left[\frac{s_{x_1}}{\bar{x}_1^2} + \frac{s_{x_2}}{\bar{x}_2^2} - 2r_{12} \frac{s_{x_1}}{\bar{x}_1} \frac{s_{x_2}}{\bar{x}_2}\right]$$

n = number of members in the cell.

TABLE I.—Tests concerning the significance of the relative decreases in utilization

Hypotheses tested	Number		Cost	
	s	z	s	z
Physician visits 1966–physician visits 1968				
Total	2 2	10 95*	3 5	6 80*
Office	1 8	13 83*	1 8	15 78*
Home	14 2	3 63*	13 8	3 83*
Hospital-medical	33 6	09	28 4	.52
Hospital-surgical	11 9	40	13 5	59

The tests shown in table I are all one-tailed tests—that is, they are concerned only with *decreases.* Any standardized deviation (z) > 1.64 (one-tailed α = 5%) will indicate significance. The significant differences are starred in the table, and the test results given are for the total sample of n = 2567. To test the significance of a decrease in utilization by a particular subcell (for example, male fac-

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[8] Adapted from Hansen, Hurwitz and Madow, *Sample Survey Methods and Theory.*

ulty), the standard error must be recalculated, letting n equal the number of members in the subcell.

The formula above is admittedly less appropriate for use in calculating the standard error of the percentage decreases in hospital visits and in home visits since the distributions of these types of visits are especially skewed. These skewed distributions have large variances (s^2) relative to small means (x); therefore, the standard error calculated is large.

(2) *Differences between the relative decreases of utilization by different demographic cells.* The difference between the percentage decreases for the two cells A and B was tested for significance by the use of the following formula:[9]

$$z = \frac{\left(\dfrac{\bar{x}_1}{\bar{x}_2}\right)_A - \left(\dfrac{\bar{x}_1}{\bar{x}_2}\right)_B}{s_{A-B}}$$

where: $\bar{x}_1 =$ mean of utilization in 1966
$\bar{x}_2 =$ mean of utilization in 1968
$A =$ cell 1
$B =$ cell 2

The variance of the difference between the 2 ratio estimates (s^2_{A-B}) is defined by:

$$s^2_{A-B} = k \cdot \left[\frac{1}{n_A} + \frac{1}{n_B} \right]$$

$$k = \left(\frac{\bar{x}_1}{\bar{x}_2} \right)^2 \left[\frac{s^2_{x_1}}{\bar{x}_1^2} + \frac{s^2_{x_2}}{\bar{x}_2^2} - 2r_{12} \frac{s_{x_1}}{\bar{x}_1} \frac{s_{x_2}}{\bar{x}_2} \right]$$

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[9] See footnote 8.

The variability factor k is assumed to be the same for all subcells. This constant depends upon the ratios themselves, the coefficients of variation and the correlation coefficient. The range across subcells of each of these is small.

TABLE II.—Tests concerning the significance of differences between the relative decreases in utilization by different demographic cells

Hypotheses tested	s (%)	z
	Exhaustive tests	
Cost:		
Male-female	7 0	.64
Number of visits		
Male-female	4 4	27
Male faculty-remainder of sample	5 5	42
Female faculty-remainder of sample	5 5	07
Male other professional-remainder of sample	5 6	90
Female other professional-remainder of sample	5 6	37
Male nonprofessional-remainder of sample	7 5	1 22
Female nonprofessional-remainder of sample	6 9	90
	Nonexhaustive tests	
Number of visits.		
Female nonprofessional-female faculty	8 2	68
Female nonprofessional-female other professional	8 3	.84
Male subscribers-female subscribers	9 5	79
Male subscribers-female dependents	6 3	1 10
Male subscribers-male children	6 4	2 17*
Male subscribers-female children	6 5	1 06

All of the nonexhaustive tests shown in table II are one-tailed. The exhaustive tests are two-tailed; therefore, a standardized deviation (z) > 1.96 is therefore required at $\alpha = 5\%$ to reject the null hypotheses of nonsignificance. The significant differences are starred.