Effects of Supplemental Coverage on Use of Services by Medicare Enrollees

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This article estimates the extent to which private insurance supplements affect use of services by Medicare enrollees. Three types of supplements to Medicare's coverage are examined—Health Maintenance Organizations (HMOs), medigap (MGP) plans, and employment-based indemnity (EBI) plans. While each kind of supplement reduces cost sharing on Medicare-covered services, only HMOs do so without increasing enrollees' overall use of services. Use of services by HMO enrollees is about 4 percent lower than use by similar Medicare enrollees with no insurance supplement. By contrast, use of services by enrollees with MGP coverage is 28 percent higher, and use of services by enrollees with EBI plans is 17 percent higher.

INTRODUCTION

Most Medicare enrollees have some kind of coverage to supplement Medicare. About 15 percent receive full or limited Medicaid benefits, while about 70 percent have private supplementary insurance. This article estimates the extent to which private supplements affect use of health care services by Medicare enrollees, using survey data for 1994. It examines three kinds of private insurance supplements—HMOs, MGP, and EBI plans. Each type of supplement interacts with Medicare's coverage in a different way, and therefore may affect enrollees' use of services differently.

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Previous studies of the effects of insurance supplements on use of Medicare-covered services were based on data for 1984 or earlier, before HMOs were a realistic option for Medicare enrollees. Further, most did not distinguish between the two main types of private indemnity supplements (Christensen et al., 1987; Link et al., 1980; McCall et al., 1991; Wolfe and Goddeeris, 1991). Previous studies of the effect of HMOs were made during the early start-up years for Medicare enrollment and were unable to identify whether or what kind of supplementary coverage non-HMO enrollees had (Brown et al., 1993; McCombs et al., 1990; Nelson and Brown, 1989).

DATA

The data used for this study were taken from the 1994 National Health Interview Survey (NHIS) conducted by the National Center for Health Statistics, which includes a health insurance supplement that describes the type of insurance plans each respondent had.[1] The NHIS is an annual survey of about 120,000 individuals from 46,000 households who are representative (when weighted appropriately) of the civilian noninstitutional population of the United States.

The analysis used only adults (age 19 or older) who reported having Medicare coverage.[2] Respondents who did not know whether they had private insurance or who

[1] Respondents were asked to classify their plan or plans by type, but were also asked to identify the plans by name. Plan names were used later to verify and, if necessary, correct the plan type given by the respondent.

[2] There were only seven Medicare respondents less than age 19 in the primary sampling units (PSUs) selected for the study.

had other public insurance in addition to Medicare were excluded.[3] Also excluded were people in areas where there were fewer than 30 Medicare respondents in each of the insurance categories defined for this study—an exclusion that was always determined by the number of HMO respondents in the area. The last condition was imposed because no reliable comparison between enrollees with different kinds of supplements would be possible in areas with too few respondents in each insurance category. After these exclusions, the sample for the Medicare population included 2,363 respondents in eight primary sampling units (PSUs). The metropolitan areas with sufficient HMO representation to be included in the sample were New York, Philadelphia, Chicago, Cleveland, Los Angeles, San Francisco, Phoenix, and Seattle.

While the reduced sample used here is no longer nationally representative, it should give more accurate estimates of the effect of insurance type on use of services than a sample using all PSUs would if, as is likely, use of services varies systematically between areas with and without HMOs. HMOs are more likely to enter markets in high cost/use areas because they are more likely to be profitable in those areas. If the sample was not limited to those PSUs with significant Medicare enrollment in HMOs, the estimated insurance effects would inappropriately include the effects of this bias in where HMOs choose to enter the Medicare market, probably resulting in an underestimate of HMO effects. Further, the effects of indemnity supplements may be different in those areas where they must compete with HMOs.

[3] Those with Medicaid or other public insurance (other than Medicare) were excluded because of uncertainty about what that coverage provided. Even for Medicaid, coverage could mean coverage for all medical expenses, coverage only for Medicare's cost-sharing and premiums, or coverage only for Medicare's premiums.

METHODS

Two sets of multivariate regression equations were estimated—one to explain respondents' use of outpatient medical visits during the 12 months prior to the survey, and the other to explain their use of hospital inpatient days. In each case, two equations were used to explain respondents' use of services—logistic regression to estimate the probability that the respondent had any use (one or more outpatient visits, or one or more inpatient stays) during the year; and ordinary least squares regression to predict the amount of use (number of outpatient visits for those with any visits during the year, or number of inpatient days for those with at least one hospital admission). The predicted probability of any use times the predicted amount of use for each user gives an estimate of the total amount of use for a respondent with a given set of characteristics.[4]

The explanatory variables were the same for each of the four regression equations. All explanatory variables were coded as sets of categorical or dummy variables. The set of greatest interest is the one describing the primary private health insurance plan the respondents had at the time of the survey. Medicare enrollees were classified into one of four insurance categories, depending on the type of private insurance supplement they had—an HMO, a MGP policy, an EBI plan, or no insurance supplement (the reference insur-

[4] Preliminary tests using the Heckman procedure (Heckman, 1979) found no significant correlation between the error terms in the equations for probability of use and for extent of use. However, even with such correlation, Monte Carlo results indicate that the two-part model used here performs as well as or better than selection models in analyses of this type—where the main objective is to get accurate predicted values rather than parameter estimates, a substantial proportion of cases make no use of services, and the same variables explain both whether to use services and how much to use (Manning and others, 1987).

ance category).[5] Respondents unable to identify whether their private insurer was an HMO or not were included in the non-HMO category because analysis of unpublished data by NHIS staff indicated that these people generally had indemnity coverage. Those with private indemnity insurance were classified as having an EBI plan if it was obtained through a current or previous employer, or having a MGP plan otherwise.

A number of additional categorical variables were used to control for demographic factors other than insurance that might affect respondents' use of medical services, in an effort to correct for selection bias that might otherwise distort the estimates. These included variables for race, age, sex, education, income, health status, and presence of chronic and limiting conditions that would typically require continuing and costly medical care.

Finally, a set of dummy variables representing each PSU used in the study was also included in each equation. This fixed-effects formulation was used to control for unobserved differences across areas (such as practice norms and availability of providers) that might affect patients' use of services independent of their insurance type.

Because the NHIS uses a complex sampling scheme rather than simple random sampling, estimated coefficients were obtained using weighted data. Test statistics appropriate to weighted data were calculated (using the survey procedures described in StataCorp, 1997). Predicted values for the probability of using services, the extent of use for users, and the total use of services were calculated for each record in the sample. Then weighted averages of each use measure were calculated for each of the four insurance groups defined.[6]

FINDINGS

Table 1 shows the dependent and independent variables used for this analysis, along with their definitions. The table also shows weighted means for each of the variables, not only for the overall sample but also for each of the four insurance groups. Because all of the explanatory variables are binary, the means are also frequency distributions for each set of categorical variables.

In the sample used for this analysis, 24 percent of enrollees were in HMOs, 30 percent had MGP coverage, 26 percent had EBI coverage, and 20 percent had no Medicare supplement (none). Enrollee characteristics differed appreciably among these four groups of enrollees, especially with respect to health status. Those with no insurance supplement were more likely to report chronic conditions and poor health than were those with any kind of private supplement. Among those with private supplements, enrollees in HMOs were less likely than other groups to report chronic conditions or that their health was less than good.

Table 2 shows the average use predicted by the equations estimated here for each of the insurance groups, both for outpatient visits and for inpatient days. (See Appendix Table A-1 and Table A-2 for the outpatient and inpatient regressions.) Table 3 uses those predicted levels to calculate the percentage difference in use of

[5] HMOs are of two main types, but PSU-specific sample sizes in this study were too small to distinguish among them. One type is the group or staff model, in which physicians treat only HMO patients. The second type is the Independent Practice Association (IPA), in which physicians treat a variety of patients from both IPA and indemnity plans. The general consensus is that group/staff HMOs are able to exert considerable influence on their providers' practice patterns because the HMO provides physicians with their entire patient load. IPAs are thought to be less effective, partly because they have less exclusive arrangements with providers. In IPAs, providers typically treat patients from a number of health plans, thus reducing the influence of any one insurer on practice patterns.

[6] The smearing retransformation developed by Naihu Duan was used in calculating the predicted values for the extent of use from our logarithmic equations (Duan, 1983).

Table 1

Variable Definitions and Weighted Means

Name	Definition	Weighted Sample Means by Type of Insurance Supplement				
		Full Sample	HMO	MGP	EBI	None
outpuse	1 if Respondent Had Any Outpatient Visits During Year	0.893	0.917	0.914	0.893	0.834
ln (outpvsts)	Natural Log of Number of Outpatient Visits for Users	1.265	1.218	1.298	1.278	1.256
inpuse	1 if Respondent Had Any Inpatient Stays During Year	0.164	0.164	0.177	0.151	0.164
ln (inpdays)	Natural Log of Number of Inpatient Days for Users	0.294	0.240	0.331	0.286	0.314
chronic	1 if Has Certain Chronic and Limiting Conditions[1]	0.139	0.122	0.135	0.124	0.182
black	1 if Black	0.088	0.095	0.041	0.055	0.191
fe19-64	1 if Female 19-64 Years of Age	0.032	0.022	0.008	0.029	0.081
fe65-69	1 if Female 65-69 Years of Age	0.148	0.186	0.138	0.145	0.123
fe70-79	1 if Female 70-79 Years of Age	0.263	0.249	0.281	0.266	0.247
fe80+	1 if Female 80 Years of Age or Over	0.130	0.087	0.173	0.106	0.146
ma19-64	1 if Male 19-64 Years of Age	0.026	0.024	0.012	0.017	0.062
ma65-69	1 if Male 65-69 Years of Age	0.131	0.182	0.104	0.147	0.090
ma70-79	1 if Male 70-79 Years of Age	0.190	0.189	0.178	0.222	0.169
ma80+	1 if Male 80 Years of Age or Over	0.080	0.062	0.105	0.067	0.082
hlth1	1 if Reported Health is Excellent	0.162	0.198	0.167	0.165	0.111
hlth2	1 if Reported Health is Very Good	0.271	0.280	0.275	0.286	0.237
hlth3	1 if Reported Health is Good	0.321	0.304	0.331	0.318	0.331
hlth4	1 if Reported Health is Fair	0.166	0.146	0.169	0.158	0.196
hlth5	1 if Reported Health is Poor	0.079	0.072	0.058	0.073	0.125
educ1	1 if Years of Family Head's Education is Under 12	0.193	0.155	0.198	0.140	0.295
educ2	1 if Years of Family Head's Education is 12	0.363	0.338	0.350	0.382	0.389
educ3	1 if Years of Family Head's Education is 13-16	0.197	0.241	0.167	0.225	0.153
educ4	1 if Years of Family Head's Education is 17 or More	0.247	0.266	0.285	0.253	0.163
lowncome	1 if Family Income is Under $35,000	0.506	0.485	0.512	0.480	0.557
midncome	1 if Family Income is Between $35,000–$50,000	0.089	0.108	0.097	0.092	0.053
hincome	1 if Family Income is $50,000 or More	0.142	0.164	0.145	0.176	0.070
unkncome	1 if Family Income is Not Reported	0.262	0.243	0.247	0.253	0.319
PSU01	1 for New York-New Jersey-Connecticut	0.338	0.205	0.346	0.320	0.505
PSU02	1 for Philadelphia-Wilimington-Trenton	0.109	0.072	0.099	0.179	0.076
PSU11	1 for Chicago-Gary	0.118	0.057	0.145	0.134	0.125
PSU13	1 for Cleveland-Akron	0.065	0.046	0.071	0.101	0.033
PSU42	1 for Los Angeles	0.176	0.311	0.153	0.104	0.147
PSU43	1 for San Francisco	0.096	0.192	0.077	0.066	0.051
PSU44	1 for Phoenix 0.043	0.048	0.038	0.047	0.038	
PSU49	1 for Seattle-Tacoma	0.055	0.069	0.070	0.048	0.026
hmo	1 if Private Supplement is an HMO of Any Type	0.235	1.000	0.000	0.000	0.000
mgp	1 if Private Supplement is a Medigap Plan	0.301	0.000	1.000	0.000	0.000
ebi	1 if Private Supplement is Employment-Based Indemnity	0.261	0.000	0.000	1.000	0.000
none	1 if Respondent Has No Private Supplement	0.202	0.000	0.000	0.000	1.000
Sample Size		2,363	550	681	624	508

[1] Cancer, cardio- or cerebrovascular disease, diabetes, asthma, or emphysema.

NOTES: Sample included only Medicare enrollees in primary sampling units with at least 30 respondents in each insurance category. HMO is health maintenance organization; MGP is medigap plan; and EBI is employment-based indemnity plan.

SOURCE: Authors' tabulations from the 1994 National Health Interview Survey (National Center for Health Statistics, 1995).

Table 2

Average Annual Expected Use of Services, by Type of Insurance Supplement

Supplement	Outpatient Visits	Inpatient Days
	Probability of Any Use (Percent)	
None	82.0	13.8
HMO	*91.7	17.3
Indemnity Plan		
Medigap	*91.5	*18.1
Employment-Based	*89.8	16.1
	Extent of Use for Users[1]	
None	6.98	2.60
HMO	6.88	*1.95
Indemnity Plan		
Medigap	7.53	2.78
Employment-Based	7.47	2.73
	Total Use of Services[2]	
None	6.07	0.56
HMO	6.48	0.51
Indemnity Plan		
Medigap	7.09	0.75
Employment-Based	6.93	0.67
Average Total Use of Services for:		
All Enrollees With Indemnity Plans	7.01	0.72
All Non-HMO Enrollees	6.77	0.68

* Indicates use was significantly different from use by those with no supplements at the 0.05 level or better.

[1] Extent of use was estimated using Duan's smearing retransformation (Duan, 1983).

[2] Total expected use for each record equals (probability of any use) times (estimated extent of use).

NOTES: Sample included only Medicare enrollees in primary sampling units with at least 30 respondents in each insurance category. HMO is health maintenance organization.

SOURCE: Authors' regressions from the 1994 National Health Interview Survey (National Center for Health Statistics, 1995).

services expected for enrollees with a given type of supplement, compared with the use expected for enrollees with no supplement to Medicare.

OUTPATIENT VISITS

The first column in Table 3 shows the implications derived from the two regressions for use of outpatient visits. Enrollees in HMOs had nearly 7 percent more outpatient visits than similar Medicare enrollees with no supplemental insurance. That higher total use was due entirely to a statistically significant difference in the probability of having at least one visit during the year. The extent of use for users was slightly (and non-significantly) lower for HMO enrollees than for those with no supplemental insurance.

The percentage difference in use of outpatient visits among Medicare enrollees with private insurance supplements, compared with those with no supplement, was similar whether the supplement was a MGP or an EBI plan. The probability of having at least one visit during the year was significantly higher for both groups (by 10-12 percent), while the extent of use for users was non-significantly higher (by 7-8 percent). Overall, use of outpatient visits was higher by 14 percent for those with EBI coverage and by nearly 17 percent for those with MGP plans.

HOSPITAL INPATIENT DAYS

The second column in Table 5 shows the implications derived from the two regressions for use of inpatient hospital days. The probability of an inpatient stay

Table 3
Regression Estimates for Outpatient Visits for the Medicare Population

	Logistic Regression For Probability of Any Outpatient Visits			Least Squares Regression For Number of Outpatient Visits (Log Form)		
Explanatory Variable	Estimated Coefficient	Standard Error	Significance Level	Estimated Coefficient	Standard Error	Significance Level
intercept	0.280	0.359	0.445	0.661	0.131	0.000
chronic	1.376	0.364	0.001	0.412	0.040	0.000
black	0.635	0.224	0.010	0.079	0.056	0.172
fe19-64	0.679	0.672	0.324	0.349	0.139	0.020
fe65-69	0.403	0.229	0.094	0.026	0.058	0.658
fe70-79	0.288	0.239	0.243	0.151	0.073	0.052
fe80+	0.483	0.271	0.090	0.194	0.085	0.034
ma19-64	-0.107	0.543	0.846	0.352	0.163	0.043
ma65-69*	—	—	—	—	—	—
ma70-79	0.318	0.222	0.166	0.095	0.067	0.174
ma80+	0.805	0.353	0.034	0.264	0.096	0.012
hlth1*	—	—	—	—	—	—
hlth2	0.782	0.214	0.002	0.210	0.065	0.004
hlth3	0.802	0.183	0.000	0.412	0.067	0.000
hlth4	1.179	0.269	0.000	0.754	0.072	0.000
hlth5	1.642	0.384	0.000	1.342	0.127	0.000
educ1*	—	—	—	—	—	—
educ2	-0.158	0.207	0.453	0.098	0.042	0.029
educ3	0.138	0.192	0.480	0.157	0.031	0.000
educ4	0.368	0.248	0.153	0.175	0.059	0.008
lowncome*	—	—	—	—	—	—
midncome	-0.473	0.243	0.066	0.047	0.108	0.670
hincome	0.521	0.239	0.042	0.056	0.074	0.460
unkncome	-0.228	0.183	0.225	-0.136	0.063	0.044
PSU01*	—	—	—	—	—	—
PSU02	-0.014	0.236	0.952	0.101	0.057	0.093
PSU11	-0.252	0.143	0.093	-0.142	0.062	0.032
PSU13	0.110	0.219	0.621	-0.017	0.106	0.874
PSU42	0.164	0.317	0.611	0.065	0.088	0.470
PSU43	0.361	0.226	0.127	0.041	0.054	0.450
PSU44	0.087	0.284	0.764	-0.038	0.043	0.389
PSU49	-0.217	0.136	0.127	-0.256	0.093	0.012
hmo	0.931	0.181	0.000	-0.013	0.092	0.886
mgp	0.916	0.181	0.000	0.077	0.069	0.277
ebi	0.698	0.150	0.000	0.069	0.073	0.356
none*	—	—	—	—	—	—
Sample Size	2,363			2,109		

* Denotes the reference category.

NOTES: Sample included only Medicare enrollees in primary sampling units with at least 30 respondents in each insurance category.

SOURCE: Authors' regressions from the 1994 National Health Interview Survey (National Center for Health Statistics, 1995).

was appreciably higher for each group of enrollees with supplemental coverage compared with those who had no supplement, but the difference was statistically significant only for those with MGP coverage. Among HMO enrollees who were admitted to the hospital, the number of days used was significantly lower—by 25 percent, compared with those who had no supplement. By contrast, the number of inpatient days used by enrollees with private indemnity supplements was slightly (but non-significantly) higher. Compared with those who had no supplement, total use of hospital inpatient days was about 9 percent lower for those in HMOs, 34 percent high-

Table 4

Regression Estimates for Inpatient Days for the Medicare Population

	Logistic Regression For Probability of Any Inpatient Days			Least Squares Regression For Number of Inpatient Days (Log Form)		
Explanatory Variable	Estimated Coefficient	Standard Error	Significance Level	Estimated Coefficient	Standard Error	Significance Level
intercept	-2.370	0.318	0.000	1.563	0.248	0.000
chronic	1.023	0.134	0.000	.037	0.129	0.775
black	0.182	0.169	0.296	-0.084	0.110	0.454
fe19-64	-0.159	0.317	0.622	-0.192	0.351	0.590
fe65-69	-0.344	0.263	0.206	-0.273	0.173	0.130
fe70-79	0.127	0.187	0.503	-0.091	0.135	0.508
fe80+	0.378	0.218	0.098	0.165	0.166	0.334
ma19-64	0.025	0.280	0.931	0.347	0.251	0.182
ma65-69*	—	—	—	—	—	—
ma70-79	0.073	0.181	0.693	-0.162	0.161	0.326
ma80+	0.394	0.248	0.128	0.157	0.214	0.471
hlth1*	—	—	—	—	—	—
hlth2	0.010	0.195	0.961	0.339	0.185	0.082
hlth3	0.295	0.203	0.162	0.238	0.163	0.160
hlth4	0.661	0.197	0.003	0.667	0.240	0.012
hlth5	1.585	0.236	0.000	0.880	0.197	0.000
educ1*	—	—	—	—	—	—
educ2	-0.023	0.148	0.877	0.059	0.125	0.642
educ3	-0.179	0.206	0.395	-0.044	0.138	0.752
educ4	-0.248	0.211	0.254	-0.097	0.129	0.461
lowncome*	—	—	—	—	—	—
midncome	-0.051	0.221	0.821	0.153	0.139	0.283
hincome	-0.094	0.255	0.715	0.070	0.220	0.754
unkncome	-0.105	0.084	0.230	-0.162	0.070	0.032
PSU01*	—	—	—	—	—	—
PSU02	-0.145	0.220	0.518	-0.306	0.204	0.148
PSU11	-0.263	0.289	0.373	-0.140	0.175	0.432
PSU13	-0.137	0.183	0.463	-0.099	0.214	0.650
PSU42	-0.018	0.228	0.939	-0.209	0.104	0.058
PSU43	0.074	0.197	0.711	-0.331	0.135	0.024
PSU44	-0.324	0.152	0.046	-0.143	0.131	0.288
PSU49	-0.114	0.206	0.584	-0.660	0.097	0.000
hmo	0.302	0.174	0.098	-0.288	0.118	0.024
mgp	0.357	0.163	0.040	0.065	0.120	0.595
ebi	0.198	0.244	0.425	0.047	0.164	0.778
none*	—	—	—	—	—	—
Sample Size	2,363			380		

* Denotes the reference category.

NOTES: Sample included only Medicare enrollees in primary sampling units with at least 30 respondents in each insurance category.

SOURCE: Authors' regressions from the 1994 National Health Interview Survey (National Center for Health Statistics, 1995).

er for those with MGP coverage, and 19 percent higher for those with EBI plans.

OVERALL USE OF MEDICAL SERVICES

The results discussed previously are combined in the third column in Table 5 to obtain an estimate of the effects of supplementary coverage on overall use of medical services. For this estimate, it was assumed that the resource costs of all outpatient care were proportional to the number of outpatient visits made, and that the resource costs of all inpatient care were proportional to the number of inpatient days

Table 5

Percentage Differences in Use of Services by Type of Insurance Supplement, Relative to a Reference Group With No Supplement

Supplement	Outpatient Visits	Inpatient Days	Medical Services[1]
	Probability of Any Use		
HMOs	*11.8	25.5	—
Indemnity Plans			
Medigap	*11.6	*30.7	—
Employment-Based	*9.5	16.3	—
	Extent of Use for Users		
HMOs	-1.3	*-25.0	—
Indemnity Plans			
Medigap	8.0	6.7	—
Employment-Based	7.1	4.8	—
	Total Use of Services		
HMOs	6.7	-9.2	-3.9
Indemnity Plans			
Medigap	16.7	33.7	28.1
Employment-Based	14.1	19.1	17.4

* Indicates use was significantly different from use by those with no supplements at the 0.05 level or better.

[1] Calculation of effects on total use of medical services weights outpatient visits by 0.33 and inpatient days by 0.67 to reflect the mix of spending on outpatient and inpatient services for Medicare enrollees.

NOTES: Sample included only Medicare enrollees in primary sampling units with at least 30 respondents in each insurance category.

SOURCE: Calculated from average levels of use shown in Table 2, derived from the 1994 National Health Interview Survey (National Center for Health Statistics, 1995).

used. For the Medicare population, about 33 percent of spending on insured services is for outpatient care, while 67 percent is for inpatient care.[7] These values were used to weight the results discussed above to estimate the effects of supplements on the overall use of medical services.

For each insurance group, use of outpatient visits was higher than would be expected for similar Medicare enrollees with no supplementary coverage. By contrast, use of inpatient days was lower for enrollees in HMOs but higher for those with supplementary indemnity coverage, compared with those who had no Medicare supplement.

For those in HMOs, the overall effect on use of medical services was a small reduction (-4 percent) when compared with enrollees lacking an insurance supplement. In other words, the management techniques of HMOs (where cost-sharing requirements were negligible) were at least as effective in constraining use of services as Medicare's cost-sharing requirements were for those without a supplement.

For those with indemnity supplements, use of services overall was higher by 28 percent for those with MGP coverage and 17 percent for those with EBI plans, when compared with those who had no supplement. These overall effects are consistent with expectations based on the extent to which Medicare's cost-sharing requirements would typically be covered by these two kinds of supplementary insurance. The most frequently purchased MGP plans cover virtually all of Medicare's cost-sharing requirements (McCormack et al., 1996). Some enrollees with EBI coverage have their cost-sharing liabilities under Medicare paid by their private plan, but most (more than 75 percent) have carve-out plans, which means that the pri-

[7] Based on tabulations from the 1987 National Medical Expenditure Survey. Outpatient care includes facility, physician, and other professional costs for services provided in a hospital outpatient department, an office, or the patient's home. Inpatient care includes facility, physician, and other professional costs for services provided to hospital inpatients.

Table 6

Percentage Differences in Total Use of Services—Alternative Comparisons

Comparison	Outpatient Visits	Inpatient Days	Medical Services[1]
For All Enrollees With Indemnity Supplements Relative to Enrollees With No Supplement	15.5	26.9	23.1
For All HMO Enrollees Relative to All Other Enrollees (With or Without a Supplement)	-4.2	-24.2	-17.6

[1] Calculation of effects on total use of medical services weights outpatient visits by 0.33 and inpatient days by 0.67 to reflect the mix of spending on outpatient and inpatient services for Medicare enrollees.

NOTES: Sample included only Medicare enrollees in primary sampling units with at least 30 respondents in each insurance category.

SOURCE: Calculated from average levels of use shown in Table 2, derived from the 1994 National Health Interview Survey (National Center for Health Statistics, 1995).

vate plan's benefits are reduced dollar-for-dollar for any reimbursements from Medicare (Morrisey et al., 1990). Hence, enrollees with employment-based supplements are generally liable for the lesser of the cost-sharing requirements imposed by Medicare and their private plan.

There are at least two additional reasons to expect MGP coverage to increase use of services by more than EBI supplements do. First, most EBI plans now incorporate elements of managed care that help to constrain use of services, while MGP plans typically do not. Second, most EBI plans cover prescription drugs, while few MGPs purchased do. To the extent that the prescribed use of drugs reduces the need for other medical services, the increase in use of services by those with EBI supplements will be less than the increase by those with MGP coverage.

DISCUSSION

Our results indicate that Medicare enrollees with indemnity supplements use more of both inpatient and outpatient services than they would if they had no supplement. On average, the overall increase in their use of services is about 23 percent. This average is composed of a larger effect (an increase of 28 percent) for those with MGP coverage, and a smaller effect (an increase of 17 percent) for those with EBI plans. This finding reflects differences in the extent to which each type of indemnity supplement covers Medicare's cost-sharing requirements. MGP plans often cover all of Medicare's cost-sharing amounts, while EBI plans typically reduce but do not eliminate cost-sharing expenses for Medicare enrollees.

Our results also indicate that, while enrollees in HMOs use more outpatient visits than do those with no supplement, they use fewer inpatient days. Consequently, their overall use of medical services is about 4 percent lower than it is for enrollees with no supplement, and it is much lower than for enrollees with indemnity supplements. The different effects that HMOs and indemnity supplements have on the number of inpatient days used by Medicare enrollees is not the result of different out-of-pocket costs for patients, because HMOs eliminate Medicare enrollees' costs for inpatient care. Instead, it probably reflects the different incentives HMO providers face compared with providers in Medicare's fee-for-service sector. In tightly managed HMOs, physicians are rewarded for keeping costs down or penalized for failing to do so, and keeping patients out of the hospital when

that is medically feasible is the single most effective way to keep costs down. By contrast, physicians in Medicare's fee-for-service sector are generally not penalized for high cost treatment patterns and often benefit financially when their patients are in the hospital.

COMPARISON WITH PREVIOUS RESEARCH

Among previous studies (mostly for non-Medicare groups) that made credible attempts to deal with selection bias, there is a clear consensus in the literature for two findings. First, use of services by people with indemnity coverage is inversely related to the cost-sharing requirements they face. Second, people in HMOs use fewer hospital inpatient days than similar patients in indemnity plans, an effect that is only partly offset by higher use of outpatient visits.[8] Our results are consistent with these findings. Comparisons with results from the few studies focused on the Medicare population, however, are more relevant to this study.

Our results are roughly consistent with those from an earlier study of the aged Medicare population using data from the 1984 NHIS (Christensen and others, 1987). That study estimated the effects of private supplementary insurance on use of hospital and physician services, finding that use of each set of services was higher by about 24 percent compared with enrollees having no supplement. However, the study did not distinguish between different types of private supplementary insurance, so that the effects of MGP and EBI plans were combined. (HMO coverage was not generally available to Medicare enrollees in 1984.) In our study, the average effect of supplementary indemnity coverage (whether MGP or EBI) is to increase use of outpatient services by about 15 percent and to increase use of inpatient services by about 27 percent, for an overall increase of 23 percent (see Table 4). Thus, we find that the effect of indemnity supplements on overall use of services is virtually identical to that found by the previous study for 1984, although the relative contribution of outpatient visits and inpatient days is different. This difference may reflect a change in the effects of indemnity supplements on enrollees' use of services between 1984 and 1994. Or it may instead reflect differences in the samples used for the two studies. The 1984 study included only aged Medicare enrollees, while our study includes both aged and disabled enrollees. The 1984 study used a nationally representative sample, while our study uses only 8 PSUs.

An analysis by the Physician Payment Review Commission (1996) of nationwide spending data from the Medicare Current Beneficiary Survey for 1993 found that enrollees with either MGP or EBI supplements cost Medicare about 28 percent more than fee-for-service enrollees with no supplement. Those findings are identical to ours for MGP supplements, indicating that MGP effects based on use of services from a small number of metropolitan areas may nevertheless be generalized. However, the effects found by PPRC for EBI supplements are larger than ours, probably indicating that EBI supplements in metropolitan areas with significant HMO penetration differ appreciably from those in other areas.

The effects of HMOs on use of services found in our study are more favorable than those reported in a study using 1989 data for the Medicare population (Brown et al., 1993). That study found that, on average over all HMO types, Medicare's risk-based HMOs increased the number

[8] For results from randomized studies, see Manning and others (1984, June 1987). For reviews of the observational literature, see Luft (1981) and Miller and Luft (1994).

of outpatient visits slightly, reduced use of inpatient services by nearly 17 percent, and reduced overall use of services by about 11 percent, when compared with use of services by similar Medicare enrollees not in HMOs (whether or not they had supplementary coverage).[9] We find that HMOs reduce use of outpatient services by about 4 percent, inpatient services by 24 percent, and overall use of services by 18 percent, when compared with all non-HMO Medicare enrollees (see Table 4). Again, these differences might reflect a change in the effects of HMOs between 1989 and 1994, or they could be the result of sampling differences.

LIMITATIONS

This study has at least three limitations. First, it examines only eight metropolitan areas of the country because only in those areas were there at least 30 Medicare respondents in each insurance category defined. This restriction on the sample was made to ensure that comparison among enrollees with different types of supplements to Medicare would pick up only differences due to insurance coverage, rather than differences in practice patterns between areas in which HMOs operate and other areas. Because the share of Medicare enrollees who choose HMOs is increasing rapidly, future analysis of later data should permit inclusion of more areas.

A second limitation is that the NHIS data do not distinguish between HMOs that serve Medicare enrollees on a risk basis and those that operate on a cost basis.[10] In 1994, about 30 percent of Medicare's HMO enrollment was cost-based (Health Care Financing Administration, 1994). Because Medicare enrollees in cost-based HMOs are free to use fee-for-service providers whenever they want to, cost-based HMOs cannot control enrollees' use of services as effectively as risk-based HMOs can. Thus, the estimates here may understate the effects that risk-based HMOs produce.

A third limitation is that this study may not adequately control for the effects of selection bias. There are two approaches taken in the literature to estimating the effects of type of insurance plan on use of services. The most reliable approach is a controlled experiment where patients are randomly assigned to different plans, so that any differences in their use of services are likely to reflect only differences in type of insurance coverage. This study uses the second and more common approach, which is a non-experimental or observational study where differences in use of services by patients who self select into different types of plans are measured.

In observational studies, it is necessary to control for any differences in patient characteristics other than choice of insurance that might affect use of services in order to accurately assess the effects of plan type. Otherwise, the estimated effect of a given type of insurance supplement on use of services would be biased to the extent that plans experience either favorable or unfavorable selection not captured by the control variables. This study included controls for chronic illness and self-reported health status, because previous studies indicate that inclusion of such health status measures helps to correct for selection bias (Feldman et al., 1989; Dowd et al., 1991). However, some distortion may remain. Only experimental studies, with randomized assignment to different types of insurance, can be confident that results are not distorted by selection bias.

If our results are distorted by selection bias, they probably understate the extent to which supplements increase use of ser-

[9] Although the study also reported results by HMO type, differences by type were not statistically significant.

[10] Medicare permits HMOs to serve Medicare enrollees on a cost basis at their option.

vices, because enrollees with supplemental coverage are less likely to report poor health or chronic conditions than are those with no supplement. But they may also overstate the extent to which HMOs constrain use of services relative to indemnity supplements, because HMO enrollees report fewer health problems than other enrollees with supplements.

However, comparison of our findings with those from the RAND health insurance experiment is instructive. In that experiment, the effects of health insurance were assessed based on the use of services by people who were randomly assigned to various insurance plans, so that selection bias was not an issue. RAND found that overall use of medical services was about 23 percent higher for people who got free care, compared with those who paid a coinsurance rate of 25 percent (Manning et al., June 1987). We find that enrollees with MGP plans (which typically eliminate Medicare's cost-sharing) use 28 percent more services than those with no supplement (who typically face a coinsurance rate of 20 percent at the point of contact with the health care system). Thus, it does not appear that our findings understate the effects of MGP supplements, although understatement of this effect is what we would expect if selection bias were present. That expectation is because the selection that seems to be relevant in the market for MGP coverage is that plans are not affordable for those who are poor and in poor health.

RAND also found that the main effect of HMOs was to reduce use of inpatient services by 40 percent, relative to fee-for-service plans with no cost-sharing (Manning et al., 1984). Our results indicate that HMOs reduce use of inpatient services by 32 percent compared with MGP plans.[11] Thus, the HMO effect we find is not obviously overstated, although overstatement is what we would expect if our health status controls did not adequately account for the favorable selection bias that Medicare's HMOs are known to experience.

[11] This can be seen from Table 2 by comparing total use of inpatient days for the HMO group with days for the MGP group (0.51/0.75 = 0.68, so that HMO use is 32 percent less than MGP use).

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