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# Use of Preventive Care Services, Beneficiary Characteristics, and Medicare HMO Performance

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*Medicare health maintenance organization (HMO) enrollees use more preventive care services than their fee-for-service (FFS) counterparts. This may be because those who enroll in HMOs have characteristics that make them more disposed to use preventive care. To investigate this possibility, we examined the use of four preventive care services by respondents to the 1996 Medicare Current Beneficiary Survey (MCBS). Unadjusted preventive care use rates for HMO enrollees were slightly higher than rates for non-HMO enrollees with private supplemental insurance. However, after adjusting for enrollee characteristics (sociodemographics, health behaviors, health status, and functioning) we found that preventive care use rates for HMO enrollees were substantially higher—consistent with HMO enrollees being less disposed to use preventive care. In comparing preventive care service rates across groups, managers and policymakers may want to consider taking into account beneficiary characteristics that are correlated with the disposition to use preventive care.*

The superior performance of HMOs in providing preventive care—both in the population at-large (Miller and Luft, 1994), and within the elderly Medicare population (Ballard et al., 1997; Potosky et al., 1998; Retchin and Brown, 1990)—may be due to the favorable organizational, infrastruc-

al, or cultural characteristics of managed care systems. For example, HMOs have historical roots in a health maintenance and wellness orientation (Lawrence, Mattingly, and Ludden, et al., 1997). HMOs also encourage patients to have a primary care provider, and they have been leaders in the use of technologies like computerized reminder systems, which are effective in promoting the regular use of preventive care services (Mandelson and Thompson, 1998).

However, other factors may also contribute to HMO successes in the preventive care arena. Managed care enrollees typically face few financial barriers to care. To the extent that HMOs offer no-cost or low-cost preventive care services, and to the extent that cost is a barrier to receiving preventive care in the FFS sector, HMOs are likely to perform better. It is also possible that those who enroll in HMOs are attitudinally and behaviorally more receptive to preventive care. For example, some studies have found HMO enrollees to be better educated, healthier, and more optimistic about the benefits of preventive care than their FFS counterparts (Bernstein, Thompson, and Harlan, 1991; Porrell and Turner, 1990; Lichtenstein et al., 1992).

To what extent do lowered financial barriers and the attraction of receptive beneficiaries underlie HMO success in delivering preventive care to the Medicare population? Many plans offer a broad array of preventive care services at no cost (Barents Group LLC, 1999). However, lowered costs are not unique to managed care. Within the Medicare FFS sector, out-

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pocket costs for preventive care services vary significantly across supplemental insurance groups. Some beneficiaries with private supplemental insurance enjoy generous first-dollar coverage, while those without supplemental insurance face substantial copayments and deductibles for many preventive care services (National Bipartisan Commission on the Future of Medicare, 1999). In terms of enrollment of more receptive beneficiaries, the impact is also unclear. Since plans attract healthier individuals (Riley et al., 1996; Physician Payment Review Commission, 1996), HMOs will perform better to the extent that healthier individuals are more receptive to preventive care. However, analyses have also shown that Medicare HMO enrollees are less affluent and less educated than their FFS counterparts (Retchin and Brown, 1990; Blustein and Hoy, 2000). Insofar as lower socioeconomic status is associated with a decreased utilization of preventive care services, Medicare HMOs' performance may actually suffer as a result.

The present study has two goals. The first is to report preventive service use rates within the HMO and FFS sectors of the Medicare program, using an up-to-date data source. The second is to try to understand differences in utilization—both across sectors, and between different supplemental insurance groups within the FFS sector—in the context of the enrollment of different types of beneficiaries. These issues are directly relevant to management and policymaking. As preventive care utilization rates are increasingly used to assess performance, systems attracting individuals who are predisposed to use preventive care will appear to perform better. Conversely, systems attracting individuals who are attitudinally or behaviorally less inclined to prevention will appear to perform worse.

## **METHODS**

### **Design, Data Source, and Sample**

The findings from this cross-sectional study are based on responses to the 1996 MCBS, a face-to-face nationally representative survey of participants in the Medicare program. Questions posed in the MCBS cover a range of topics, including beneficiaries' personal and social circumstances, health status, access to health care, and prior utilization of certain health care services.

The MCBS has been fielded in a rotating panel fashion since 1991. Some of the subjects who responded to the survey in 1996 had participated during previous years, while others were first-time responders. The response rate for those who joined in 1996 was 83 percent; details of response rates of other cohorts have been published elsewhere (Health Care Financing Administration, 1997). Subjects included in the present study were those who were age 65 or over, and who had not been in a long-term care facility during 1996 (14,060 of 17,794 respondents). All subjects participated in an interview conducted during fall 1996, from which most of the information used in the study was derived.

### **Measures**

#### **Use of Preventive Care**

Our analyses of utilization were confined to the subset of preventive care services that were included in the MCBS. Additionally, since measures of use were based on self-report, we analyzed those services for which subjects were asked to recall recent use (over the past year). The four services meeting these criteria were mammography, pap smear, eye examination, and influenza vaccine. For mammog-

raphy and pap smear, subjects responded to the questions “Have you had a mammogram or a breast X-ray within the past year?” and “Have you had a Pap smear within the past year?” In both cases, the at risk population was all female subjects. For influenza vaccine, use was ascertained based on replies to “Did you have a flu shot last winter (September-December)?” the entire population was considered to be at risk. We identified those who had received vision screening tests based on responses to the question “Have you had an eye examination by a doctor within the past year?” It should be noted that for this item, while subjects were not explicitly asked whether the eye examination included a screening examination for diminished visual acuity using a Snellen chart (U.S. Preventive Services Task Force, 1996) we assumed that it did. All non-blind individuals were assumed to be at risk.

In understanding utilization and financial barriers to preventive care it is important to note that in 1996, when the data were collected, the Medicare FFS program offered less comprehensive coverage of preventive care services than it does now. For example, in 1996, in order to receive screening mammograms and Pap smears, beneficiaries were responsible for deductibles and coinsurance payments (CCH Inc., 1997).

#### Sector/Supplemental Insurance Group

Subjects were first categorized as belonging either to the HMO or the FFS sector of Medicare. They were classified as being in the HMO sector if they were enrolled in a Medicare HMO at the time of their fall interview, according to CMS administrative records. Those not meeting this criterion were assumed to participate in the FFS sector.

Within the FFS sector, subjects were assigned to one of four supplemental insurance groups: employer sponsored, self-purchased, Medicaid, or no supplement. Assignment was based on self-report (augmented with CMS administrative data, in the case of Medicaid enrollment). Those having more than one type of supplemental insurance were placed in the highest possible category, within this ascending hierarchy: Medicaid, self-purchased, employer sponsored. For the analyses presented in this article, comparisons were between enrollees in different sector/supplemental insurance groups (i.e., HMO versus self-purchased FFS versus employer sponsored FFS versus Medicaid FFS versus FFS with no supplement).

#### Sets of Control Variables

Based on prior studies of the determinants of preventive care service use, three sets of control variables that were available in the MCBS were used to adjust the relationship between sector/supplemental insurance and preventive care use. The first set of variables, sociodemographics, included age, sex, race, income, educational attainment, marital status, and area of residence (metropolitan and non-metropolitan, based on residence in a metropolitan statistical area). A second set of control variables, health behaviors, included current smoking status and obesity. Current smokers were those who answered affirmatively to the question “Do you smoke now?” Obese individuals were those who had a body mass index of 30 k/m<sup>2</sup> or more, based on self-reported height and weight (National Heart, Lung, and Blood Institute, 1998). The third set of control variables, health status and functioning, included information on general health status, number of activity of daily living (ADL) limitations, and number of instrumental activities of daily living (IADL) limitations.

## Analytic Approach

The sample was first categorized with respect to sector/supplemental insurance, sociodemographic characteristics, health behaviors, and health status and functioning. Bivariate associations between the use of preventive care services and sector/supplemental insurance, and associations between the three sets of control variables and the use of preventive care were examined. Then, to assess the impact of adjusting for the three sets of control variables, a series of odds ratios was computed, comparing the likelihood of preventive care services use for the sector/supplemental insurance groups. For each of the four clinical services, three sets of adjusted odds ratios were computed corresponding to three sets of models, in which sets of control variables were entered in the following order: sociodemographics, health behaviors, health status and functioning. Although this was the order in which the models were built, the estimates presented here are based on logistic regression models in which the independent variables in each model were entered simultaneously.

For the odds ratios, the comparison sector/supplemental group was those with private employer-sponsored insurance in the FFS sector. This group was selected because it is composed of individuals of relatively high socioeconomic status, who face relatively low out-of-pocket costs in using services. We felt that if HMOs could outperform this group in terms of preventive service use, this would be a meaningful benchmark.

All statistics reported here are weighted to reflect the MCBS sampling strategy, as well as non-response to the survey (Judkins and Lo, 1992). SUDAAN software was used to adjust variance estimates for biases resulting from the MCBS cluster sample (Shah, Barnwell, and Bieler, 1997).

## RESULTS

Sociodemographic and health characteristics of the sample are presented in Table 1. Over one-half of the respondents were between the ages of 65 and 74. Only one-third reported a household income of more than \$25,000, and fewer than one-third had any formal education beyond high school. More than three-quarters reported no limitations in ADL. Most of the subjects were in the FFS sector, and had private supplemental insurance (34 percent had self-purchased insurance, and 34 percent had employer-sponsored supplements). A relatively small percentage (9 percent) had Medicaid as their supplemental insurer. Ten percent had no supplemental insurance. Only 14 percent of subjects were in the HMO sector.

The distribution of the three sets of control variables in the various sector/supplemental insurance groups is presented in the same table. As noted by numerous previous investigators, beneficiaries with employer-sponsored supplemental insurance are the most socioeconomically advantaged of Medicare beneficiaries; those with Medicaid supplemental insurance and those without supplemental insurance are the least advantaged. HMO enrollees most closely resemble those with self-purchased supplemental insurance; they have substantially lower incomes, are less educated, and are somewhat less likely to be white than those with employer sponsored supplements.

There was a significant association between sector/supplemental insurance group and both of the health behaviors (smoking and obesity; Table 1). HMO members had 1.32 times the odds of smoking than those with employer sponsored supplemental insurance (95 percent confidence interval = 1.08-1.60), and 1.17 times the odds of being obese (95 percent

**Table 1**  
**Characteristics of the Sample All Subjects, by Sector/Supplemental Insurance Group<sup>1</sup>**

| Characteristic                   | All Subjects | Sector Supplemental Insurance Group |                    |                |          |      |
|----------------------------------|--------------|-------------------------------------|--------------------|----------------|----------|------|
|                                  |              | HMO                                 | Employer-Sponsored | Self-Purchased | Medicaid | None |
| All Subjects                     |              | 13.6                                | 33.5               | 33.6           | 9.0      | 10.3 |
| <b>Sociodemographics</b>         |              |                                     |                    |                |          |      |
| <b>Age</b>                       |              |                                     |                    |                |          |      |
| 65-74 Years                      | 54.0         | 55.4                                | 57.2               | 49.5           | 52.2     | 58.3 |
| 75-84 Years                      | 36.2         | 36.3                                | 35.2               | 39.2           | 33.8     | 32.2 |
| 85 Years or Over                 | 9.7          | 8.4                                 | 7.6                | 11.3           | 14.0     | 9.6  |
| <b>Sex</b>                       |              |                                     |                    |                |          |      |
| Male                             | 42.1         | 42.4                                | 45.6               | 39.7           | 28.0     | 50.0 |
| Female                           | 57.9         | 57.6                                | 54.4               | 60.3           | 72.0     | 50.0 |
| <b>Race/Ethnicity</b>            |              |                                     |                    |                |          |      |
| Hispanic                         | 5.7          | 9.0                                 | 2.4                | 2.2            | 22.5     | 8.4  |
| Black                            | 7.6          | 7.4                                 | 5.0                | 2.9            | 22.4     | 19.1 |
| White, Non-Hispanic              | 84.6         | 80.5                                | 91.6               | 93.6           | 48.3     | 69.7 |
| Other                            | 2.1          | 3.1                                 | 0.9                | 1.3            | 6.9      | 2.8  |
| <b>Household Income</b>          |              |                                     |                    |                |          |      |
| Less than \$10,000               | 22.3         | 19.5                                | 7.3                | 16.8           | 86.7     | 36.8 |
| \$10,000 to \$25,000             | 38.1         | 42.4                                | 39.4               | 41.9           | 10.4     | 39.9 |
| More than \$25,000               | 32.5         | 31.4                                | 46.1               | 33.1           | 0.5      | 15.9 |
| Preferred not to Report          | 7.0          | 6.7                                 | 7.2                | 8.2            | 2.4      | 7.4  |
| <b>Education</b>                 |              |                                     |                    |                |          |      |
| Grade School                     | 21.4         | 18.0                                | 12.0               | 18.2           | 59.7     | 34.0 |
| High School                      | 48.6         | 50.6                                | 50.6               | 50.8           | 32.9     | 46.2 |
| College                          | 29.9         | 31.3                                | 37.4               | 31.1           | 7.4      | 19.8 |
| <b>Marital Status</b>            |              |                                     |                    |                |          |      |
| Married                          | 57.8         | 57.0                                | 67.4               | 60.1           | 24.1     | 49.9 |
| Not Married                      | 42.2         | 43.0                                | 32.6               | 39.9           | 75.9     | 50.1 |
| <b>Area of Residence</b>         |              |                                     |                    |                |          |      |
| Metropolitan Area                | 74.6         | 95.6                                | 77.9               | 66.0           | 68.6     | 69.1 |
| Non-Metropolitan Area            | 25.4         | 4.4                                 | 22.1               | 34.0           | 31.4     | 30.9 |
| <b>Health Behaviors</b>          |              |                                     |                    |                |          |      |
| <b>Smoking Status</b>            |              |                                     |                    |                |          |      |
| Current Smoker                   | 12.2         | 13.2                                | 10.4               | 10.2           | 16.3     | 19.9 |
| Not a Current Smoker             | 87.7         | 86.7                                | 89.6               | 89.8           | 83.5     | 80.1 |
| <b>Obesity</b>                   |              |                                     |                    |                |          |      |
| Obese                            | 16.1         | 17.3                                | 15.1               | 15.2           | 20.5     | 16.6 |
| Not Obese                        | 83.9         | 82.7                                | 84.9               | 84.8           | 79.5     | 83.4 |
| <b>Health Status Functioning</b> |              |                                     |                    |                |          |      |
| <b>General Health</b>            |              |                                     |                    |                |          |      |
| Excellent                        | 18.9         | 22.0                                | 21.4               | 18.3           | 8.8      | 18.0 |
| Very Good                        | 28.2         | 29.4                                | 31.1               | 30.1           | 14.3     | 23.3 |
| Good                             | 30.8         | 31.0                                | 29.9               | 31.8           | 31.6     | 29.8 |
| Fair                             | 15.8         | 13.4                                | 13.5               | 14.0           | 27.8     | 21.7 |
| Poor                             | 6.3          | 4.2                                 | 4.1                | 5.9            | 17.5     | 7.2  |
| <b>ADL Limitations</b>           |              |                                     |                    |                |          |      |
| None                             | 73.5         | 76.2                                | 78.1               | 73.9           | 53.4     | 70.8 |
| 1                                | 11.6         | 11.2                                | 10.4               | 11.9           | 14.2     | 13.2 |
| 2 or More                        | 14.8         | 12.5                                | 11.4               | 14.2           | 32.1     | 15.8 |
| <b>IADL Limitations</b>          |              |                                     |                    |                |          |      |
| None                             | 65.6         | 69.7                                | 70.3               | 66.4           | 9.8      | 63.8 |
| 1                                | 17.6         | 16.4                                | 17.1               | 17.6           | 21.6     | 16.8 |
| 2 or More                        | 16.8         | 13.7                                | 12.5               | 15.9           | 38.2     | 19.1 |

<sup>1</sup> For all of the characteristics, the association with sector/supplemental insurance group was statistically significant at  $p < .01$ , by chi-square analysis.

NOTES: HMO is health maintenance organization. ADL is activities of daily living. IADL is instrumental activities of daily living.

SOURCE: 1996 Medicare Current Beneficiary Survey.

confidence interval=1.01-1.37). Further bivariate analyses showed that lower socioeconomic status was also associated with less healthy behaviors. For example, among those with household incomes of less than \$10,000, 15.0 percent smoked and 18.7 percent were obese; among those with household incomes greater than \$25,000, 9.9 percent smoked and 13.0 percent were obese ( $p < .001$  for both chi-square tests of association).

In bivariate analyses, sector/supplemental insurance was associated with the use of preventive care services (Table 2). Generally, HMO members were most likely to receive clinical preventive services, followed by those in the FFS sector with private supplemental insurance, followed by Medicaid FFS beneficiaries, and then by those in the FFS sector without supplemental insurance. Other factors associated with use of preventive care services in bivariate analyses were age, income, education, and area of residence.

Table 3 presents further analyses of the relationship between sector/supplemental insurance status and preventive care use. The figures in the table show odds ratios from the sequence of models. For all four outcomes, unadjusted analyses suggest that those in HMOs are somewhat more likely to receive preventive care services than those in the FFS sector with employer-sponsored insurance, although the contrast falls just short of statistical significance in three of the four cases. Those in the FFS sector with Medicaid and those without supplemental insurance are substantially and significantly less likely to receive preventive care services than those with employer-sponsored supplements. Use rates for these last two groups is roughly the same for all four preventive care services.

Consistent with the enrollment of relatively disadvantaged beneficiaries into HMOs, the discrepancy between preven-

tive care rates in the HMO and FFS employer-sponsored groups becomes substantially larger and statistically significant for all four preventive care services, after adjusting for beneficiary sociodemographics (Table 3). At the same time, the difference in the rate of preventive care use between those with Medicaid insurance and those with employer-sponsored insurance is attenuated, after taking into account sociodemographic characteristics. The odds of use by those with Medicaid are closer to that of those with employer-sponsored supplements, after taking into account their relative socioeconomic disadvantage. In contrast, a substantial and significant discrepancy remains for those with no supplemental insurance for all four preventive care services as shown in Table 3.

When characteristics like health behaviors and health status and functioning are also considered, these trends become slightly more pronounced. For all four services, enrollees in HMOs are substantially and significantly more likely to receive care than those in the private FFS sector, after taking all three sets of factors into account. The odds of preventive care services use among those with self-purchased and employer-sponsored supplemental insurance are essentially the same for all four services. Use rates for Medicaid beneficiaries are nearly identical to those found among beneficiaries with private supplemental insurance, when the three sets are accounted for; only flu vaccine rates are significantly lower (adjusted OR = 0.82 for the Medicaid/employer sponsored comparison,  $p = 0.03$ ). Those without any supplemental insurance continue to lag behind, even after accounting for the full set of control variables.

In analyzing these multivariate relationships, we built other sequences of regression models, varying the order of entry of the three sets of control variables. The

**Table 2**  
**Use of Clinical Preventive Services, by Groups of Beneficiaries with Various Characteristics**

| Characteristic                             | Preventive Services |           |             |                 |
|--|---------------------|-----------|-------------|-----------------|
|  | Mammogram           | Pap Smear | Flu Vaccine | Eye Examination |
| All Subjects                               | 42.6                | 33.0      | 64.4        | 56.9            |
| <b>Sector/Supplemental Insurance Group</b> |                     |           |             |                 |
| HMO  | *50.9               | *39.2     | *69.4       | *61.2           |
| Employer-Sponsored FFS                     | 47.3                | 35.6      | 67.7        | 58.8            |
| Self-Purchased FFS                         | 42.3                | 33.7      | 68.1        | 59.6            |
| Medicaid FFS                               | 30.5                | 23.8      | 51.1        | 49.1            |
| None                                       | 30.0                | 23.3      | 46.2        | 42.4            |
| <b>Sociodemographics</b>                   |                     |           |             |                 |
| <b>Age</b>                                 |                     |           |             |                 |
| 65-74 Years                                | *50.4               | *39.9     | *60.9       | *52.6           |
| 75-84 Years                                | 38.6                | 29.5      | 68.8        | 62.4            |
| 85 Years or Over                           | 21.4                | 14.1      | 67.3        | 60.1            |
| <b>Sex</b>                                 |                     |           |             |                 |
| Male                                       | —                   | —         | *64.9       | *53.8           |
| Female                                     | 42.6                | 33.0      | 64.0        | 59.1            |
| <b>Race/Ethnicity</b>                      |                     |           |             |                 |
| Hispanic                                   | 36.8                | 32.6      | *52.6       | *52.2           |
| Black                                      | 38.6                | 30.6      | 45.2        | 48.6            |
| White, Non-Hispanic                        | 43.6                | 33.4      | 67.0        | 58.1            |
| Other                                      | 37.4                | 28.5      | 58.6        | 49.3            |
| <b>Household Income</b>                    |                     |           |             |                 |
| Less than \$10,000                         | *43.2               | *34.7     | *63.9       | *60.5           |
| \$10,000 to \$25,000                       | 29.9                | 24.2      | 53.1        | 50.3            |
| More than \$25,000                         | 43.1                | 32.1      | 65.9        | 57.1            |
| Preferred not to Report                    | 55.8                | 43.4      | 70.5        | 60.2            |
| <b>Education</b>                           |                     |           |             |                 |
| Grade School                               | *31.2               | *23.6     | *55.1       | *51.4           |
| High School                                | 43.2                | 33.4      | 64.4        | 56.7            |
| College                                    | 50.5                | 39.6      | 71.2        | 61.5            |
| <b>Marital Status</b>                      |                     |           |             |                 |
| Married                                    | *50.5               | *38.7     | *60.3       | 56.5            |
| Not Married                                | 36.4                | 28.5      | 67.4        | 57.1            |
| <b>Area of Residence</b>                   |                     |           |             |                 |
| Metropolitan Area                          | *44.2               | *34.4     | 64.4        | *58.1           |
| Non-Metropolitan Area                      | 38.1                | 28.8      | 64.4        | 53.1            |
| <b>Health Behaviors</b>                    |                     |           |             |                 |
| <b>Smoking Status</b>                      |                     |           |             |                 |
| Current Smoker                             | *35.3               | 29.7      | *55.1       | *48.0           |
| Not a Current Smoker                       | 43.5                | 33.4      | 65.7        | 58.1            |
| <b>Obesity</b>                             |                     |           |             |                 |
| Obese                                      | 45.0                | 33.0      | 63.0        | 57.7            |
| Not Obese                                  | 42.1                | 33.3      | 64.9        | 56.9            |
| <b>Health Status Functioning</b>           |                     |           |             |                 |
| <b>General Health</b>                      |                     |           |             |                 |
| Excellent                                  | *43.5               | *35.4     | *59.1       | 55.7            |
| Very Good                                  | 45.2                | 35.3      | 64.4        | 56.2            |
| Good                                       | 43.8                | 34.8      | 66.3        | 58.1            |
| Fair                                       | 38.7                | 26.3      | 65.2        | 57.9            |
| Poor                                       | 33.2                | 24.2      | 68.2        | 55.0            |

See footnotes at end of table.

**Table 2—Continued**  
**Use of Clinical Preventive Services, by Groups of Beneficiaries with Various Characteristics**

| Characteristic          | Preventive Services |           |             |                 |
|-------------------------|---------------------|-----------|-------------|-----------------|
|                         | Mammogram           | Pap Smear | Flu Vaccine | Eye Examination |
| <b>ADL Limitations</b>  |                     |           |             |                 |
| None                    | *46.9               | *36.7     | *63.6       | 56.9            |
| 1                       | 37.1                | 27.7      | 67.8        | 58.3            |
| 2 or More               | 29.5                | 21.8      | 65.7        | 55.4            |
| <b>IADL Limitations</b> |                     |           |             |                 |
| None                    | *47.3               | *37.6     | *62.7       | *56.1           |
| 1                       | 42.8                | 32.2      | 68.3        | 60.2            |
| 2 or More               | 28.6                | 20.4      | 66.6        | 56.2            |

\*Statistically significant at  $p < .05$ , by chi-square analysis.

NOTES: HMO is health maintenance organization. FFS is fee-for-service. ADL is activities of daily living. IADL is instrumental activities of daily living.

SOURCE: 1996 Current Beneficiary Survey.

**Table 3**  
**Odds Ratios for the Use of the Four Clinical Preventive Services<sup>1</sup>**

| Preventive Service     | Odds Ratios        |                    |  |  |
|------------------------|--------------------|--------------------|--|--|
|                        | Unadjusted         | Adjusted for       |  |  |
|                        |                    | Sociodemographics  | Sociodemographics and Health Behaviors | Sociodemographics, Health Behaviors, and Health Status and Functioning |
| <b>Mammogram</b>       |                    |                    |  |  |
| HMO                    | 1.15               | 2 <sup>1</sup> .3  | 2 <sup>1</sup> .35                     | 2 <sup>1</sup> .36   |
| Employer-Sponsored FFS | (1.00)             | (1.00)             | (1.00)                                 | (1.00)   |
| Self-Purchased FFS     | 2 <sup>0</sup> .81 | 0.97               | 0.99                                   | 0.99   |
| Medicaid FFS           | 2 <sup>0</sup> .49 | 0.89               | 0.93                                   | 0.99   |
| None                   | 2 <sup>0</sup> .48 | 2 <sup>0</sup> .60 | 2 <sup>0</sup> .64                     | 2 <sup>0</sup> .63   |
| <b>Pap Smear</b>       |                    |                    |  |  |
| HMO                    | 2 <sup>1</sup> .17 | 2 <sup>1</sup> .25 | 2 <sup>1</sup> .29                     | 2 <sup>1</sup> .29   |
| Employer-Sponsored FFS | (1.00)             | (1.00)             | (1.00)                                 | (1.00)   |
| Self-Purchased FFS     | 0.92               | 1.08               | 1.10                                   | 1.10   |
| Medicaid FFS           | 2 <sup>0</sup> .57 | 0.87               | 0.91                                   | 0.99   |
| None                   | 2 <sup>0</sup> .55 | 2 <sup>0</sup> .65 | 2 <sup>0</sup> .68                     | 2 <sup>0</sup> .69   |
| <b>Flu Vaccine</b>     |                    |                    |  |  |
| HMO                    | 1.08               | 2 <sup>1</sup> .25 | 2 <sup>1</sup> .27                     | 2 <sup>1</sup> .29   |
| Employer-Sponsored FFS | (1.00)             | (1.00)             | (1.00)                                 | (1.00)   |
| Self-Purchased FFS     | 1.02               | 1.04               | 1.03                                   | 1.03   |
| Medicaid FFS           | 2 <sup>0</sup> .50 | 0.91               | 0.91                                   | 2 <sup>0</sup> .82   |
| None                   | 2 <sup>0</sup> .41 | 2 <sup>0</sup> .55 | 2 <sup>0</sup> .56                     | 2 <sup>0</sup> .56   |
| <b>Eye Examination</b> |                    |                    |  |  |
| HMO                    | 1.10               | 2 <sup>1</sup> .14 | 2 <sup>1</sup> .13                     | 2 <sup>1</sup> .14   |
| Employer-Sponsored FFS | (1.00)             | (1.00)             | (1.00)                                 | (1.00)   |
| Self-Purchased FFS     | 1.03               | 1.06               | 1.06                                   | 1.06   |
| Medicaid FFS           | 2 <sup>0</sup> .67 | 0.90               | 0.94                                   | 0.92   |
| None                   | 2 <sup>0</sup> .52 | 2 <sup>0</sup> .62 | 2 <sup>0</sup> .63                     | 2 <sup>0</sup> .63   |

<sup>1</sup> Unadjusted, adjusted for a series of sets of variables.

<sup>2</sup> Odds ratios that are different from 1 at  $p < .05$ . For all four preventive care services, beneficiaries in employer-sponsored FFS plans are the reference group for the odds ratios. Odds ratios are derived from logistic regression models in which all of the listed independent variables were entered simultaneously.

NOTES: HMO is health maintenance organization. FFS is fee-for-service.

SOURCE: 1996 Medicare Current Beneficiary Survey.

series of models shown in Table 3 were selected because they yielded the highest increment in the HMO/employer-sponsored FFS odds ratios in the first step (with

the addition of the sociodemographic variables). While fully-specified models for the four preventive care services varied in terms of the control variables that were sta-

tistically significant predictors, higher rates of preventive care use were consistently associated with higher income, more formal education, and non-smoking status.

## DISCUSSION

These data from 1996 are consistent with prior reports showing that Medicare beneficiaries in HMOs receive more preventive care than their counterparts who remain in the FFS sector. Interestingly, the findings also suggest that beneficiaries who enroll in managed care plans have characteristics that make them less prone to use preventive care services. For example, Medicare HMO enrollees are socioeconomically disadvantaged and less inclined to engage in healthy behaviors, relative to those with employer-sponsored supplemental insurance. Socioeconomic disadvantage and unhealthy behaviors are negatively associated with the propensity to use preventive care services. Thus, compared with the unadjusted odds, the adjusted odds of receiving preventive care services are greater for those in HMOs, compared with those with employer-sponsored supplemental insurance.

This suggests that unadjusted measures of performance may not fully credit HMO performance. Put another way, if Medicare HMOs enrolled beneficiaries with characteristics like those who remain in the privately insured FFS sector, then HMOs might perform even better with respect to preventive care use. As emphasized at the outset, this is important because the provision of preventive care is generally viewed as a valid measure of health system performance. The notion that HMOs may enroll individuals with a propensity to perform poorly may seem surprising, in view of the much-noted favorable selection of healthier beneficiaries into Medicare HMOs. However, among beneficiaries, a major rea-

son for joining an HMO is to reduce health care costs; this is especially true for recent HMO enrollees (Blustein and Hoy, 2000). It is therefore not surprising that relatively disadvantaged beneficiaries are disproportionately found in HMOs.

We also found substantial variation in preventive care use within FFS Medicare. Beneficiaries with private supplemental insurance generally receive significantly more preventive care than those without private supplemental insurance, in unadjusted analyses. However, this too may partly reflect the concentration of beneficiaries with different characteristics in different supplemental insurance categories. While those with Medicaid supplements receive low levels of preventive care, this can be almost entirely accounted for by differences in the characteristics between those with private and Medicaid supplemental insurance. In contrast, those with no supplemental insurance have relatively low levels of utilization, even after taking their characteristics into account. This residual difference may reflect residual economic barriers to care, or other unmeasured factors.

## Limitations of the Study

This exploratory study is subject to several caveats. The first of these pertains to the possibility of bias in our estimates. In modeling the influence of various factors on preventive care service use, we were constrained to choosing from among variables that were included in the MCBS. To the extent that omitted factors correlate positively with preventive care service use and HMO membership, but negatively with socioeconomic status, our estimate of the adjusted impact of HMO membership is biased upward (i.e., HMO enrollees are inherently more disposed to use preventive care than we have suggested here).

Within our data, we cannot quantify the magnitude of this bias. However, we believe that it is minimal, since many of the omitted factors known to increase preventive care service use are positively correlated with socioeconomic status and, therefore, would bias our estimates in the opposite direction. These known factors include having a regular primary care provider (Rimer et al., 1991), having more frequent physician visits (Hayward et al., 1988); knowledge of preventive care services (Jepson et al., 1991); and belief in the efficacy of preventive care services (Grady et al., 1992; Jepson et al., 1991).

A related limitation pertains to inferences about causality. Given the cross-sectional design, it is not possible to resolve whether the propensity to seek preventive care causes individuals to enroll in HMOs, or if joining an HMO increases the propensity to use preventive care. This issue requires further investigation through stronger designs. Nonetheless, for some of the reported associations, the direction of causality is clear: notably, the relationship between socioeconomic status and the propensity to use preventive care services, and the relationship between socioeconomic status and joining an HMO, can only operate in one direction.

Another potential limitation of the work arises from the use self-report to measure preventive care. Studies have found that self-reported screening rates are generally higher than those derived from administrative records (McGovern et al., 1998). While this could bias our findings in terms of absolute levels of preventive care service use, we are not aware of studies showing that underreporting or overreporting differs by supplemental insurance group.

An additional caveat pertains to the temporal nature of the outcomes that were measured. Subjects were asked about use during the prior year. However, sector/

supplemental insurance status was ascertained at a single point in time (the fall 1996 interview). In order to assess the extent to which sector switching might have explained our finding of an HMO/FFS difference in use, we performed auxiliary analyses in which those MCBS respondents who reported having joined their HMO within the prior year were dropped from the HMO group. For all of the four outcomes, the odds ratios for the HMO group increased relative to their values when all HMO members were included. This is consistent with longer time enrollees having higher preventive care use rates than those who recently joined their plans. Similarly, the HMO group included a relatively small percentage (3.9 percent) of dually eligible beneficiaries. The presence of this group might explain the relatively lower socioeconomic status found among managed care enrollees. We explored this possibility by excluding dually eligible beneficiaries from the HMO group, and found that although the remaining HMO enrollees had a slightly higher socioeconomic status on average, the difference was not substantial.

Finally, we began this article by noting that the dynamics underlying the superior performance of Medicare HMOs are unclear. We proposed three possible explanations: lower out-of-pocket costs to enrollees, organizational/operational aspects, and enrollment of favorably disposed beneficiaries. While this study argues against the latter as a strong contributing factor, we cannot resolve the extent to which the other two are important. In this context, it should be noted that the term HMO does not refer to a single type of operational entity. Even within a single Medicare HMO, variations in setting have been shown to give rise to differences in preventive care service rates (Briggs Fowles, and Beebe, 1998). Benefit packages—and hence,

financial barriers to care—vary significantly across Medicare HMOs (Barents Group LLC, 1997). Unfortunately, our data did not permit us to explore this important issue.

### **Implications for Performance Measurement**

Our findings complement a number of studies showing an association between sociodemographic characteristics and the use of preventive care services, when financial barriers are held constant. Lower social class has been linked to decreased pap smear and immunization rates in Great Britain, where medical care is delivered without cost (Maheed et al., 1994; Jones and Moon, 1991). Pap smear and mammography rates vary by income in Canada, another nation with universal health insurance (Katz and Hofer, 1994). A recently published study of U.S. health plan enrollees showed that preventive care service use rates vary by socioeconomic status, within plans (Zaslavsky et al., 2000). This apparently robust association casts doubt on the validity of using crude preventive service use rates to measure provider performance. Using rates that are stratified by or adjusted for sociodemographics would more fairly credit the efforts of providers who take on more challenging patients (Blustein, Hanson, and Shea, 1998; Fiscella et al., 2000; Romano, 2000). On the other hand, using adjusted rates might excuse poorer performance by those providers, and provide a disincentive for developing strategies and programs that address the particular needs of vulnerable populations. As noted by the developers of the Health Employer Data Information Set, in adjusting performance measures “...caution must be taken to ensure that all differences in relative risk are not adjusted away. We need to be careful not to imply that a lower standard of care is appropriate for

(for example) the poor, for whom barriers to care may exist but cannot be acceptable” (National Committee on Quality Assurance, 1998). A decision as whether and how to consider enrollee characteristics and a discussion of related matters such as the feasibility of plans collecting data on enrollee characteristics—are beyond the scope of this work. However, these issues merit further debate and research, as performance measurement takes on a central role in American health care.

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