

# Accuracy of Household Reports of Medicare Managed Care Enrollment in the MEPS

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## ABSTRACT

We examine the accuracy of household reports of enrollment in Medicare managed care plans in the Medical Expenditure Panel Survey (MEPS). Our data come from a sample of Medicare beneficiaries in the 2001-2003 MEPS who were matched to their actual Medicare enrollment files. We find that households in our sample accurately report HMO versus traditional fee-for-service Medicare enrollment, although there is an upward bias in the reporting of HMO enrollment. This over-reporting appears systematic in the sample and any bias in behavioral analyses is likely to be small.

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## INTRODUCTION

The Medical Expenditure Panel Survey (MEPS), the only comprehensive source of information on health care use and expenditures of the civilian non-institutionalized population, is frequently used in descriptive and behavioral analyses of health care use and spending by individuals and households. One question that arises when a population-based survey such as the MEPS is used for these types of analyses is whether survey respondents can provide accurate information about their insurance status. Inaccurate or incomplete data affects estimates of the number and characteristics of insured and uninsured populations and the reliability of behavioral analyses of their health care use and expenditures. Such concerns extend to inaccurate reporting of managed care enrollment. For example, survey respondents in the 1996-1997 Community Tracking Survey correctly reported whether or not they were in HMO only three-quarters of the time (Cunningham, Denk and Sinclair 2001).

Hill (2007) uses data from the 1996 MEPS to assess the accuracy of insurance information collected for sample persons under the age of 65. He concludes that MEPS data for persons reporting private insurance or no insurance are accurate and appropriate for tracking trends and analyzing policies. However, less is known about the accuracy of managed care enrollment reporting in MEPS. In aggregate, MEPS estimates of enrollment in private and Medicaid managed care plans are higher than industry sources (Zuvekas and Hill 2004). Medicare managed care enrollment variables were initially released for the 1996 MEPS, and these were also higher compared to aggregate enrollment figures from the Centers for Medicare and Medicaid Services (CMS). The small gap between MEPS household reported and aggregate CMS HMO enrollment figures in the first interview round of MEPS grew substantially over subsequent interview rounds, which used a different method for ascertaining Medicare HMO

enrollment than the first interview round. As a result, the Medicare HMO variables were no longer publicly released beginning with the MEPS 1997. Subsequently, the MEPS questionnaire was revised in 2004 so that Medicare managed care enrollment is obtained in the same manner in all interview rounds. The questionnaire was also revised to collect information on all types of Medicare managed care plans in response to changes introduced by the 2003 Medicare Modernization Act.

We use Medicare administrative records provided by the CMS for a sample of Medicare beneficiaries in the 2001-2003 MEPS to assess the accuracy of Medicare managed care reporting in the MEPS. We focus on the reporting during the first MEPS interview for each Medicare beneficiary during 2001-2003 because this is the method now in place for all interview rounds of MEPS. The ability to distinguish between traditional fee-for-service Medicare coverage and managed care plans is important in evaluating a variety of issues related to the Medicare program and its enrollees. Our analysis of the accuracy of household reporting of Medicare managed care programs also sheds light on household reporting of other types of managed care plans in household surveys.

## **DATA AND ANALYTIC SAMPLE**

The MEPS is a longitudinal survey containing two overlapping panels, with one informant usually reporting for each household. Each panel is interviewed 5 times over a 2-and-a-half year period to collect two calendar years of data (Cohen 1997). During the first interview, survey respondents are asked whether each person in the household is currently covered by Medicare. If a family member is covered by Medicare, the household respondent is then shown a list of Medicare managed care plans specific to their state and asked if that person is enrolled in

one of the plans listed and if so, which one. If not, they are then asked a follow-up question, which initially was “Is... PERSON... signed up with an HMO, that is a Health Maintenance Organization?” but was changed in 2004 to “Even though (PERSON’s) Medicare plan was not listed on the card, is (PERSON) currently enrolled in a Medicare managed care plan such as an HMO...PPO.” Responses to these questions are used to identify Medicare beneficiaries who were enrolled in Medicare managed care plans at the time of the Round 1 interview.

We compare the Round 1 Medicare HMO information for beneficiaries in the 2001-2003 MEPS public use files (PUFs) to Medicare managed care enrollment data from the Centers for Medicare and Medicaid services (CMS). The annual CMS Denominator Standard Analytic Files include monthly entitlement indicators (Part A or Part B or both) and monthly managed care enrollment indicators. We use data for a subset of beneficiaries in the 2001-2003 MEPS PUFs who provided their Medicare health insurance claim number (HICN) or social security number (SSN) during a MEPS interview and were matched exactly to the CMS data using the HICN or SSN and date of birth and gender (see Olin et al. 2008 for additional details). We drop the 12 percent of this matched sample for whom MEPS Round 1 HMO enrollment status was not ascertained. Our final analytic sample includes 2,443 beneficiaries in the 2001-2003 MEPS PUFs, representing 35 percent of all Medicare beneficiaries in panels 6-8 with round one interview data. Beneficiaries living in the Midwest and South census regions and in rural areas are overrepresented in the analytic sample. As a result, MEPS reported Medicare HMO enrollment is lower (16 percent) in the analytic sample than in the full MEPS sample of Medicare beneficiaries (18 percent).

We use the monthly Medicare enrollment data from CMS to construct an indicator of actual Medicare HMO enrollment at the time of the round 1 MEPS interview. We also construct

a number of dichotomous indicators representing socio-demographic and interview characteristics from the MEPS public use files. Descriptive statistics for these covariates are shown in Table 1. FPL is the federal poverty line. Perceived health status is the respondent's self-reported assessment of health relative to other people the same age. Cognitive limitation refers to people who experienced confusion or memory loss, had problems making decisions, or required supervision for their own safety. Activity limitation refers to people who had limited ability to work in a job, do housework, or go to school because of an impairment or physical or mental health problem. Private insurance and Medicaid refer to beneficiaries with supplemental private or public insurance at the time of their first MEPS interview. Non-English interview identifies people who were interviewed in another language; proxy interview indicates that someone outside of the household completed the interview; and, self-respondent indicates that the survey information was provided by the sample person.

## **ANALYSES**

We use descriptive statistics to assess the accuracy of HMO enrollment participation by our analytic sample as a whole and by selected characteristics of the sample and type of interview used to collect the data. Logistic regressions are used to determine whether some segments of the sample systematically misreport their Medicare HMO coverage and to test whether the reporting error would affect behavioral analyses that differentiate between beneficiaries in the original fee-for-service program or a Medicare HMO. All of the analyses use the MEPS person-level sample weights, and standard errors of the statistics are adjusted for the complex sample design of the MEPS using STATA/MP Version 10.1.

## RESULTS

Agreement between MEPS household reported Medicare HMO enrollment and actual HMO enrollment in the CMS files is high (Table 2). The overall agreement rate—defined as “1” if the MEPS response is consistent with the CMS data and “0” otherwise—is 94 percent. The Kappa statistic, which takes into account the agreement occurring by chance, is 0.76 indicating “substantial” agreement (.61-.80) according to the classification scheme of Landis and Koch (1977). There are slightly more false positives (92) than false negatives (51) when the MEPS responses are compared to actual CMS managed care enrollment data (Table 2). The un-weighted positive predictive value, defined as the ratio of true positives reported (284) to all reports of Medicare HMO enrollment in MEPS (376), is 0.76. The symmetrically defined un-weighted negative predictive value is .98 (2016/2067). On balance, the MEPS estimates of Medicare HMO participation are higher compared to the CMS HMO enrollment data (16 percent vs. 14 percent) (Table 3).

The over-reporting of Medicare HMO enrollment in MEPS is spread across a broad spectrum of the sample defined by socio-demographic and interview characteristics as shown in Table 3. The first two columns present, respectively, the mean HMO enrollment reported in MEPS and the mean HMO enrollment contained in the CMS Medicare beneficiary files. The third column reports the ratio of the first two columns. The last three columns report respectively, the positive predictive value, negative predictive value, and overall agreement rates. Beneficiaries living in the Midwest are the only group possibly under-reporting Medicare HMO participation on average: the MEPS reported to actual HMO enrollment is 0.74 at a .10 level of significance). MEPS estimates of HMO enrollment were higher in almost every other group on average, although not all of the differences between groups were statistically significant. Despite

the propensity of MEPS respondents to over-report HMO participation, the agreement rates are still high in all groups of beneficiaries. However, agreement rates were somewhat lower for non-whites compared to whites, beneficiaries with incomes below the poverty line compared to higher income beneficiaries, married beneficiaries, MSA residents, and sample persons were the respondent for the MEPS round 1 interview (differences all significant at the .05 level or better).

We use a logistic regression to isolate the impact of socio-demographic and interview characteristics on HMO enrollment reporting accuracy for our analytic sample (Table 4). The dependent variable in the logistic regression is set to “1” if the MEPS and CMS data agree on whether or not the beneficiary was in a Medicare HMO at the time of the round 1 interview and to “0” if the two sources disagree. The control variables in the model include the categorical variables from Table 3 and year dummy variables to capture differences in reporting accuracy by the three panels in our analytic sample. We report both coefficient estimates and marginal effects expressed as the percentage point difference in reporting accuracy of people in each category relative to its reference group when the other control variables in the equation are held constant. Agreement between the MEPS and CMS data is not affected by most of the variables in the model. However, non-whites (marginal effect = -2.9 percentage points), MSA residents (-2.8 percentage points), and self-respondents (-2.8 percentage points) in our sample are relatively less likely to correctly report their Medicare HMO status (yes or no) than their respective reference groups. Beneficiaries with incomes above the FPL and supplemental Medicaid coverage, on the other hand, are relatively more likely to correctly report their Medicare HMO status.

To assess the impact of reporting error in the MEPS on behavioral analyses, we compare the results of two logistic regressions of the determinants of Medicare HMO enrollment (Table



5). The dependent variable in the MEPS equation is set to “1” if the household respondent reported that the beneficiary was in a Medicare HMO at the time of the first MEPS interview and to “0” otherwise. The dependent variable in the CMS equation is set analogously but is based on the Medicare managed care enrollment for the month of the first MEPS interview from the CMS files. Both equations use the same set of control variables from MEPS.

The results from the two equations are similar in most respects. In every case where a coefficient in one model is statistically significant, the sign of the corresponding coefficient in the other equation is the same. Marginal effects are also similar in both sign and magnitude. The difference in marginal effects is significant at the .05 level for only one variable, Midwest census region and significant at the .10 level for four other variables, age 65-74, age 75-84, 100-199 percent of FPL, and cognitive limitation. Both equations indicate that region of the country has a significant impact on Medicare HMO enrollment. Beneficiaries living in the South are relatively less likely to be in a HMO than their counterparts in the Northeast while the opposite is true of beneficiaries living in the West. In addition, MSA residents are more likely than non-MSA residents to be in a HMO. Beneficiaries with private insurance or Medicaid are less likely to be in a HMO than those without supplemental insurance. Beneficiaries in less than excellent health are relatively more likely to be in an HMO. Finally, both equations show that beneficiaries in the 2002 and 2003 MEPS PUFs are relatively less likely than their counterparts in the 2001 PUF to be in an HMO, corresponding to the dip in Medicare HMO enrollment that occurred at the turn of the century.

## **DISCUSSION**

We find that the MEPS respondents for our analytic sample accurately identified whether the Medicare beneficiaries in the survey were in traditional Medicare fee-for-service or a

Medicare HMO plan. On average, HMO coverage was over-reported by 11 percent, but misreporting reporting cuts across nearly all socio-demographic groups. Moreover, our findings suggest behavioral analyses are unlikely to be affected substantially by misreporting of Medicare HMO coverage. Sing (forthcoming) also finds substantial agreement between MEPS reported HMO enrollment and CMS reported enrollment in aggregate. Based on the findings presented here and aggregate benchmarks, Medicare managed care enrollment variables were released once again for public use beginning with the 2006 MEPS.

One important potential limitation of our study is that our analytic sample is not representative of all Medicare beneficiaries in the MEPS and may not fully generalize to the Medicare population. However, our analytic sample matches well the characteristics of all Medicare beneficiaries in the MEPS in terms of mean expenditures and utilization of inpatient and ambulatory health care services, especially when adjustments for sample differences are made. We find the same thing with reporting of HMO enrollment, enhancing our confidence in the results of our analyses.

It is also unclear the extent to which our analyses of HMO reporting among Medicare beneficiaries generalizes to the reporting of HMO enrollment among other populations. HMO enrollment indicators among those covered by Medicaid/SCHIP programs and private health insurance plans are widely used in analyses based on the MEPS. The accuracy of managed care reports for Medicare in the analytic sample is likely enhanced by the use of state-specific lists of Medicare managed care plans in the MEPS. A similar procedure is used to ascertain managed care enrollment for Medicaid/SCHIP enrollees in MEPS, where there are also a limited number of plans in each state. However, the much larger range of potential managed care plans and the difficulty in differentiating among product lines from a single insurer make such lists impractical

for use with for those covered by private health insurance plans. Consequently, MEPS relies on more open-ended questions of whether privately insured persons are covered by HMO plans, which may be less accurate.

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**Table 1. Means in the Matched Sample, 2001-2003 MEPS**

	<b>Mean</b>	<b>Standard Error</b>
<i>Age</i>		
<65	0.12	0.007
65-74	0.45	0.012
75-84	0.34	0.013
85+	0.08	0.007
Nonwhite	0.15	0.010
Female	0.55	0.010
Married	0.52	0.013
<i>Region</i>		
Northeast	0.18	0.013
Midwest	0.26	0.016
South	0.39	0.018
West	0.17	0.016
MSA	0.73	0.017
<i>Family Income</i>		
<100% FPL	0.12	0.007
100-199 FPL	0.29	0.012
>=200% FPL	0.59	0.013
<i>Education</i>		
<12 years	0.32	0.012
12 years	0.34	0.011
>12 years	0.34	0.012
<i>Perceived Health Status</i>		
Excellent	0.17	0.010
Very good	0.26	0.012
Good	0.29	0.011
Fair	0.19	0.009
Poor	0.09	0.007
Cognitive limitation	0.11	0.008
Activity limitation	0.28	0.012
Private insurance	0.52	0.014
Medicaid	0.10	0.006
Non-English interview	0.03	0.004
Non-resident proxy	0.01	0.002
Self-respondent	0.69	0.010

N = 2,443 people

**Table 2. Comparison of MEPS and CMS Medicare HMO Data**

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	CMS HMO Enrollment			
		No	Yes	Total
MEPS HMO Enrollment	No	2,016	51	2,067
	Yes	92	284	376
	Total	2,108	335	2,443
Agreement rate (unweighted)	94.2			
Agreement rate (weighted)	93.9			
Kappa statistic	0.76			

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**Table 3. HMO Enrollment at Time of MEPS Round 1 Interview by Socio-demographic Characteristics, 2001-2003 pooled MEPS Sample**

	MEPS Reported Enrollment	Actual Enrollment From CMS	MEPS/ CMS Ratio	Positive Predictive Value <sup>a</sup>	Negative Predictive Value <sup>b</sup>	Overall Agreement Rate <sup>c</sup>
<i>Overall</i>	0.16	0.14**	1.11	0.76	0.97	0.94
<i>Age</i>						
<65	0.14	0.07***	1.97#	0.46###	0.99##	0.92
65-74	0.17	0.16	1.04	0.81	0.97	0.94
75-84	0.16	0.15	1.07	0.78	0.97	0.94
85+	0.13	0.11	1.13	0.71	0.97	0.94
<i>Race/ethnicity</i>						
white	0.15	0.13*	1.10	0.77	0.98#	0.95###
non-white	0.21	0.18*	1.15	0.68	0.95	0.89
<i>Sex</i>						
male	0.15	0.14	1.10	0.74	0.97	0.93
female	0.16	0.14**	1.12	0.77	0.98	0.94
<i>Marital Status</i>						
not married	0.17	0.14*	1.15	0.69##	0.96#	0.92###
married	0.15	0.14	1.08	0.82	0.98	0.96
<i>Region</i>						
Northeast	0.20	0.17**	1.23###	0.72###	0.98##	0.93
Midwest	0.08	0.11*	0.74	0.80	0.95	0.94
South	0.10	0.07***	1.41	0.60	0.99	0.95
West	0.35	0.33	1.08	0.86	0.97	0.93
<i>MSA Status</i>						
Non-MSA	0.06	0.04	1.37	0.58##	0.99##	0.97###
MSA	0.19	0.18*	1.09	0.78	0.97	0.93
<i>Family Income</i>						
<100% FPL	0.17	0.12**	1.48	0.51###	0.96	0.88##
100-199 FPL	0.13	0.13	1.01	0.82	0.97	0.95
>=200% FPL	0.17	0.15*	1.10	0.78	0.97	0.94
<i>Education</i>						
<12 years	0.14	0.14	1.00	0.77	0.96##	0.93
12 years	0.16	0.14	1.14	0.73	0.97	0.93
>12 years	0.17	0.14***	1.20	0.77	0.99	0.95
<i>Perceived Health Status</i>						
excellent	0.12	0.11	1.11	0.79	0.99##	0.96
very good	0.19	0.16**	1.16	0.77	0.98	0.94
good	0.14	0.14	1.01	0.74	0.96	0.93
fair	0.18	0.17	1.11	0.75	0.97	0.93
poor	0.15	0.12**	1.31	0.71	0.99	0.95



	MEPS Reported Enrollment	Actual Enrollment From CMS	MEPS/ CMS Ratio	Positive Predictive Value <sup>a</sup>	Negative Predictive Value <sup>b</sup>	Overall Agreement Rate <sup>c</sup>
<i>Cognitive Limitation</i>						
no	0.15	0.14	1.07#	0.78#	0.97	0.94
yes	0.19	0.13**	1.45	0.62	0.98	0.91
<i>Activity limitation</i>						
no	0.17	0.16	1.03###	0.80###	0.97###	0.94
yes	0.14	0.09***	1.47	0.62	0.99	0.94
<i>Private Insurance</i>						
no	0.20	0.18*	1.09	0.79	0.97	0.93
yes	0.12	0.11*	1.15	0.72	0.98	0.95
<i>Medicaid</i>						
no	0.16	0.15**	1.11	0.76	0.97	0.94
yes	0.11	0.10	1.15	0.67	0.98	0.94
<i>Interview Language</i>						
English	0.16	0.14**	1.12#	0.75	0.97	0.94
non-English	0.17	0.19	0.92	0.88	0.96	0.94
<i>Non-Resident Proxy</i>						
no	0.16	0.14**	1.11	0.76#	0.97	0.94
yes	0.18	0.10	1.81	0.34	0.95	0.85
<i>Self-respondent</i>						
no	0.14	0.13	1.08	0.83##	0.98##	0.96###
yes	0.16	0.15**	1.13	0.73	0.97	0.93

<sup>a</sup> Positive Predictive Value=(true positives)/(true positives + false positives)

<sup>b</sup> Negative Predictive Value=(true negatives)/(true negatives + false negatives)

<sup>c</sup> Agreement rate = (true positives + true negatives)/(total cases)

\* p<.10, \*\* p<.05, \*\*\* p<.01 for difference in means between CMS and MEPS.

# p<.10, ## p<.05, ### p<.01 for difference by group characteristic

n=2,443

**Table 4. Logistic Regression on MEPS-CMS HMO Enrollment Agreement, 2001-2003 pooled MEPS Sample**

	Agreement			Marginal Effect
	Coefficient	Standard Error		
Age 65-74	0.36	0.34		0.016
Age 75-85	0.39	0.39		0.017
Age 85+	0.62	0.52		0.022
Non-white	-0.54	0.25	**	-0.029
Female	0.36	0.20	*	0.017
Married	0.41	0.25	*	0.019
Midwest	0.16	0.35		0.007
South	0.36	0.34		0.016
West	0.00	0.37		0.000
MSA	-0.71	0.35	**	-0.028
100-199% FPL	0.95	0.33	***	0.036
>=200% FPL	0.57	0.32	*	0.027
12 years education	-0.05	0.25		-0.002
>12 years education	0.34	0.25		0.015
Very good health	-0.43	0.36		-0.021
Good health	-0.70	0.38	*	-0.036
Fair health	-0.57	0.40		-0.030
Poor health	-0.24	0.64		-0.012
Cognitive limitation	-0.37	0.34		-0.019
Activity limitation	0.33	0.30		0.014
Private insurance	0.04	0.25		0.002
Medicaid	0.70	0.33	**	0.025
Non-English interview	0.71	0.53		0.024
Non-resident proxy	-1.53	0.81	*	-0.137
Self-respondent	-0.57	0.23	**	-0.023
2002	0.26	0.30		0.011
2003	-0.45	0.31		-0.022
Constant	2.71	0.74	***	

\* p<.10, \*\* p<.05, \*\*\* p<.01

n=2,443

**Table 5. Comparison of MEPS and CMS HMO Enrollment Logistic Regressions, 2001-2003 pooled MEPS Sample**

	MEPS			CMS			Marginal effect difference <i>p</i> -value		
	coeff.	std. err	Marginal effect	coeff.	std. err	Marginal effect			
Age 65-74	0.29	0.30	0.03	0.89	0.36	**	0.08	0.06	
Age 75-84	0.13	0.35	0.01	0.70	0.39	*	0.06	0.07	
Age 85+	-0.01	0.42	0.00	0.55	0.43		0.06	0.15	
Non-white	0.19	0.20	0.02	0.11	0.25		0.01	0.49	
Female	0.10	0.15	0.01	0.07	0.14		0.01	0.74	
Married	0.01	0.15	0.00	0.07	0.15		0.01	0.68	
Midwest	-0.97	0.27	***	-0.08	-0.37	0.26	-0.03	0.00	
South	-0.74	0.22	***	-0.07	-0.87	0.23	***	-0.07	0.89
West	0.89	0.28	***	0.11	1.09	0.26	***	0.12	0.88
MSA	1.41	0.40	***	0.12	1.72	0.38	***	0.11	0.95
100-199% FPL	-0.32	0.27		-0.03	0.09	0.29		0.01	0.08
>=200% FPL	-0.13	0.23		-0.01	0.14	0.29		0.01	0.30
12 years education	0.18	0.18		0.02	-0.04	0.23		0.00	0.15
>12 years education	0.06	0.21		0.00	-0.18	0.26		0.01	0.12
Very good health	0.66	0.26	**	0.08	0.65	0.26	**	0.06	0.39
Good health	0.44	0.25	*	0.05	0.64	0.24	***	0.06	0.58
Fair health	0.78	0.29	***	0.10	0.98	0.30	***	0.11	0.87
Poor health	0.81	0.37	**	0.11	1.11	0.38	***	0.13	0.73
Cognitive limitation	0.49	0.25	*	0.06	0.18	0.27		0.02	0.08
Activity limitation	-0.34	0.22		-0.03	-0.65	0.22	***	-0.05	0.17
Private insurance	-0.72	0.23	***	-0.07	-0.86	0.21	***	-0.07	0.99
Medicaid	-0.93	0.30	***	-0.07	-0.76	0.32	**	-0.05	0.15
2002	-0.46	0.20	**	-0.04	-0.66	0.23	***	-0.05	0.48
2003	-0.34	0.19	*	-0.03	-0.45	0.21	**	-0.04	0.44
Constant	-2.64	0.56	***		-3.74	0.61	***		

\* *p*<.10, \*\* *p*<.05, \*\*\* *p*<.01

n=2,443