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ABSTRACT

Medicare claims for a subset of beneficiaries in the 2001-2003 MEPS public use files have been used to evaluate the accuracy of survey-reported expenditures for hospital and physician care. Hospital and physician expenditures for these beneficiaries were under-reported by about 12 percent in all three years, but under-reporting varies considerably by event type. These findings are significant because they are for a large, although non-random, subset of a nationally representative survey, while most other studies of self-reporting accuracy have been for small, geographically limited samples. The findings may have applicability to other Medicare beneficiaries in MEPS. Medicare beneficiaries are responsible for a disproportionate share of health care spending in the US, and both previous studies and additional analyses in progress with these same data suggest that underreporting increases with the number of provider contacts.

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Introduction

Medical expenditure surveys are routinely used by researchers and policy makers for a variety of purposes, but the accuracy of the data tends to vary across surveys and the types of utilization data collected in them (Bhandari and Wagner, 2006). This uncertainty about the accuracy of self-reported data extends to national surveys such as the Medical Expenditure Panel Survey (MEPS), which is the sole source of household-level information on health care utilization and expenditures in the US. A recent study, for example, found that MEPS estimates of health care spending are 13.8 percent lower than those in the National Health Expenditure Accounts (NHEA) after adjusting the two sources for differences in the scope of populations, services, and revenues (Sing et al., 2006). However, the authors caution that the true difference could be more or less than that amount because of assumptions made in implementing the comparisons of MEPS and NHEA estimates of health care spending by the US civilian non-institutionalized population.

This paper contains the initial findings from the Medicare-MEPS Validation Study (MMVS). The MMVS uses claims for a sample of Medicare beneficiaries in the MEPS as part of a comprehensive study of issues related to the accuracy and completeness of data collected in the Household Component and Medical Provider Components of the survey (see the technical appendix for an overview of the MMVS). In this phase of the study, MEPS estimates of hospital and physician expenditures for survey respondents in the original Medicare fee-for-service program are compared to their Medicare claims for the same types of services. Because the

Medicare claims provide complete documentation on the use of Medicare-covered services by this group of survey respondents, they provide a benchmark for assessing the extent to which expenditures for hospital and physician care by Medicare beneficiaries are under- or misreported in MEPS.

MEPS Use and Expenditure Data

Since 1996, the MEPS has collected information on health care use, expenditures, sources of payments, insurance coverage, and quality of care. The MEPS data are based on a nationally representative sample of the U.S. civilian non-institutionalized population drawn from households that participated in the National Health Interview Survey (NHIS) in the prior year (S. Cohen, 2000; J. Cohen, 1997; S. Cohen, 1997). The MEPS data are collected through two component surveys: the Household Component (HC), and the Medical Provider Component (MPC). The HC is the core survey that provides event-level information used to create the MEPS utilization estimates. Medical providers identified by households in the HC are contacted in the MPC for additional information about the HC-reported events.

The HC has an overlapping panel design, in which a new panel, drawn from the prior year's NHIS, is fielded each year. Through a series of 5 interviews conducted over 2 and one-half years, households provide information about their health care use and expenditures for two full calendar years. The data are collected through computer-assisted personal interviews (CAPI) conducted with an adult member of each household. The sample data are weighted to reflect the complex design of MEPS and provide unbiased national estimates (Cohen, DiGaetano, and Goksel, 1999; Alvarez-Rojas, 2005). Information collected in the MPC is used

to supplement, validate, and improve the quality of the information on health care events collected in the HC (Machlin and Taylor, 2000; J. Cohen, 1997). Medical providers contacted in the MPC include all hospitals, home health agencies, and pharmacies reported by the households, and a sample of the office-based physicians reported by the households. The MPC also contacts physicians identified by the participating hospitals as providing care to a household respondent during a hospital event, but whose services were billed separately from those of the hospital. This group of MPC respondents is referred to as separately billing doctors or "SBDs."

Data from the HC and MPC are edited for consistency (e.g., between reported sources of payment and available health insurance coverage). A statistical matching procedure is used to match household-reported events to those reported by the medical providers. For matched events, the expenditure information reported by the medical providers is used in place of that reported by the households. A weighted hot deck procedure is used to impute missing expenditure data. (Machlin and Dougherty, March 2007; Zodet, Wobus, Machlin et al., March 2007).

The MEPS estimates of health care expenditures are based entirely on medical events reported by household respondents. That is, total expenditures are the sum of the expenditures for individual medical events identified by households. Like other estimates based on household reporting, the MEPS data may underestimate actual expenditures to the extent that household respondents do not report all of their medical events. Medicare administrative records, in contrast, provide comprehensive information on the fee-for-service population's use of covered services and thus provide a reliable benchmark for evaluating the accuracy of MEPS estimates of medical expenditures for Medicare beneficiaries in MEPS.

Medicare Administrative Data

The MMVS uses Medicare program data from the Centers for Medicare and Medicaid Services (CMS) for beneficiaries who were in the 2001-2003 MEPS public use files, provided their social security number (SSN) or Medicare health insurance claim number (HICN), and had valid gender and date of birth information in the MEPS. Information for 4,162 persons (out of 9,015 Medicare beneficiaries in MEPS for 2001-2003) was sought in the CMS data request, and Medicare program data was received for 3,968 of them. This non-random sample of persons providing valid numbers that were matched to CMS records represents 44 percent of the eligible Medicare Population in MEPS. Further exclusions (described below) led to a final analytic sample for this methodological study of 2,649 persons, or 29 percent of the full Medicare sample in MEPS for 2001-2003. Combined with the cumulative overall MEPS response rate of approximately 60 percent, this leads to an effective yield rate of 18 percent of the Medicare population for these analyses.

Two main phases of processing were necessary to prepare the CMS data for the MMVS. In the first phase, claims in the CMS standard analytic files (SAFs) were realigned to better approximate MEPS event types. In the second phase, a subset of the beneficiaries considered most likely to have a full year of Medicare data and survey-reported events was selected as the analytic sample for the MMVS comparisons.

The primary data used in the MMVS are from the CMS Denominator Files, containing basic enrollment data, and the Inpatient, Outpatient, and Carrier (physician/supplier) SAFs for the years 2001-2003. The Denominator Files contain demographic and enrollment information on Medicare beneficiaries. Each record in the file includes a unique identifier, state and county codes, zip code, date of birth, date of death, sex, age, month entitlement indicators (Part A and

Part B or both), reasons for entitlement, state buy-in indicators, and monthly managed care indicators for a Medicare beneficiary. The SAFs contain final action claims by institutional and non-institutional providers for services provided to fee-for-service beneficiaries. For the MMVS, claims in the Inpatient, Outpatient, and Carrier files were used to create hospital and physician service events comparable to those reported by MEPS respondents. The number of records and MEPS sample persons in the four main CMS files (Denominator, Outpatient, Inpatient, and Carrier) for each of the three years is shown in the table below.

Table 1. Number of records and persons in CMS files, 2001-2003

CMS File	2001		2002		2003	
	Records	Persons	Records	Persons	Records	Persons
Denominator	3,514	3,514	3,644	3,644	3,645	3,645
Inpatient	1,025	591	1,102	658	1,301	716
Outpatient	10,521	2,024	11,849	2,192	12,987	2,268
Carrier	56,630	2,818	64,712	3,003	70,690	3,012
Sample		3,968		3,968		3,968

Note: CMS provided Medicare administrative records for all three years, while MEPS respondents were in the survey for at most three years.

Claims in the Inpatient and Outpatient SAFs have revenue center sub-claims for services provided at specific departments and the charges and payments for the services. Each Inpatient SAF record typically contains a hospital's claim for the facility costs associated with services provided to a Medicare beneficiary during an inpatient stay, but it may also include claims for services provided during an emergency room visit that preceded the inpatient stay. Similarly, an Outpatient SAF record contains a hospital's claim for the facility costs associated with services provided during one or more outpatient visits, stand-alone emergency room visits, or a combination of the two.

To align the data in these two files with the structure of the MEPS files, the claims associated with emergency room services were extracted to create a separate set of Medicare

emergency room claims. Each claim record from the Inpatient SAF was retained as an inpatient event record, and a separate emergency room event was created when information for a revenue center indicated services provided in an emergency room. When an Outpatient SAF Claim included sub-claims for services provided in the emergency room, the entire claim was designated as an emergency room visit. Among all other outpatient claims, same-day sub-claims within or across claims records by a provider were combined to create outpatient visits. The emergency room events created from both Inpatient and Outpatient SAFs were moved to a separate Emergency Room visit file. Payments and charges for emergency room events created from the Inpatient SAF were set to zero, with all expenditure amounts remaining with the inpatient claim. Payments and charges for the emergency room events created from the Outpatient SAF, however, were moved with the event to the emergency room file.

Records in the CMS Carrier file also were aligned with MEPS event types. Each Carrier (Part B) SAF claim contains a beneficiary specific claim by a physician or other non-institutional provider for services, procedures or supplies indicated by a series of line item sub-claims. The line item data include charges, payments, type of service, place of service, provider of services, diagnosis and service delivery date information. Line item specific information on place and date of service for a person-provider pair was used to create 'event' records for office-based physician visits; hospital, ambulatory surgical center, or institutional visits by separately billing physicians; separately billing laboratory events; purchases of medical supplies and equipment; and, other events.

The analysis sample for the MMVS was identified in two stages. The first stage verified the match of persons in the CMS and MEPS files. A Cross-Reference file provided by CMS contained a CMS-created beneficiary ID (RDDC_BID) and the MEPS-supplied HICN or SSN,

gender, and date of birth. Of the 3,968 Medicare beneficiaries who matched to a Denominator Record based on the HICN or SSN in the MEPS finder files, a further check on the match between persons in the CMS Denominator and MEPS Finder files using date of birth and gender yielded 3,463 exact matches between the two files. One of the exact matches was dropped because the MEPS data were for a different year than the CMS Denominator File data. The other 3,462 exact matches were found in the Denominator File for at least one of the years of their participation in MEPS. Their distribution by year is shown in Table 2.

Table 2. Number of Persons Successfully Matched to CMS Denominator File, 2001-2003

Denominator File Service Year	Person Count
2001 only	520
2002 only	67
2003 only	961
2001 and 2002	1,112
2002 and 2003	802
Total matches	3,462
Eligible but not matched	10,218

The pool of 3,462 exact matches included persons whose health care events, for a variety of reasons, might not be represented for a full year in either the MEPS or the CMS files. For example, persons who died or were institutionalized during the year or did not participate in both Part A and Part B of Medicare on a fee-for-service basis for the full year might have health care events in one data source but not the other. In the second stage of identifying the analysis sample for the MMVS, the exact matches were restricted to persons who were alive and in-scope for the entire year, were not institutionalized, and had Medicare Part A and Part B fee-for-service coverage for all 12 months of each calendar year they were in MEPS. Of the 3,462 exact matches, 2,649 persons met these criteria. Their distribution by year of MEPS participation is

shown in Table 3. Because 1,396 of these persons contributed two years of data, the total number of person-year observations in the analysis sample is 4,045.

Table 3. Number of Persons in the Analysis Sample by year of MEPS participation

MEPS Participation Year	Person Count
2001 only	407
2002 only	106
2003 only	740
2001 and 2002	796
2002 and 2003	600
Total	2,649

The analysis sample identified in Table 3 is used in the MMVS, but the expenditure comparisons are restricted to Medicare-covered events and to the Medicare payments associated with those events rather than to total expenditures. The first restriction is needed because Medicare claims do not include information on charges and payments for non-Medicare covered services or for services provided by providers who do not bill Medicare (e.g., a VA or military facility). The second restriction is needed because claims show Medicare payments to providers and beneficiaries, but they do not show the amounts actually paid by an individual or supplemental insurance toward the beneficiary's cost sharing liability.

Comparability of MEPS Sample and CMS Sub-Sample

The MMVS comparisons cover the matched subset of MEPS Medicare beneficiaries who had complete year(s) of survey data and had Medicare fee-for-service coverage (Part A and Part B) for the entire year. To determine whether the analysis sample was representative of all beneficiaries in the survey, MEPS estimates of Medicare payments for the analysis sample were compared to those of the entire set of MEPS beneficiaries (See Table 4). The analysis sample was also compared to the group of MEPS beneficiaries matched by CMS and to the group that

was submitted to CMS but not matched. There were no statistically significant differences in average payment between groups of beneficiaries.

Table 4 also shows distributions of the not-matched and matched groups by selected demographic characteristics and data collection methods. In broad terms, the two groups are similar. About three quarters of the persons are age 65 to 84. More than half are female or married, almost 60 percent reported income at least 200 percent of the federal poverty line; nearly a third have one or more limitation on activities of daily living, and 68 percent were in the second year of MEPS participation. However, there are differences within many of the demographic categories. For example, 7 percent more of those in the analysis sample reported private supplemental insurance than in the full MEPS Medicare group, and the number of those in the analysis sample who were self-respondents in MEPS was 12 percent greater than among the full pool of MEPS Medicare beneficiaries.

Table 4. MEPS Medicare Sample Means, 2001-2003 (in constant 2003 dollars)

	FULL MEDICARE		NOT MATCHED		MATCHED			ANALYSIS SAMPLE	
	mean	se	mean	se	mean	se		mean	se
Medicare Payments	$ 3,822	$ 102	$ 3,879	$ 135	$ 3,733	$ 177		$ 3,788	$ 186
Age									
<65	0.13	0.004	0.14	0.006	0.11	0.006		0.12	0.007
65-74	0.44	0.008	0.43	0.010	0.47	0.010	***	0.43	0.012
75-84	0.32	0.007	0.31	0.009	0.34	0.010	***	0.35	0.011
85+	0.10	0.004	0.11	0.006	0.09	0.006	**	0.09	0.007
nonwhite	0.19	0.008	0.22	0.010	0.16	0.009	***	0.14	0.009
female	0.56	0.005	0.57	0.007	0.55	0.008	**	0.55	0.009
married	0.52	0.009	0.51	0.011	0.53	0.011		0.53	0.012
Region									
Northeast	0.21	0.011	0.22	0.014	0.19	0.012	*	0.19	0.012
Midwest	0.23	0.011	0.20	0.012	0.26	0.014	***	0.27	0.015
South	0.37	0.014	0.37	0.015	0.38	0.017		0.41	0.018
West	0.19	0.013	0.21	0.014	0.17	0.015	**	0.14	0.014
Urban	0.77	0.010	0.78	0.011	0.74	0.015	***	0.70	0.017
Family Income									
<100% FPL	0.14	0.004	0.14	0.005	0.13	0.006	*	0.13	0.007
100-199 FPL	0.28	0.006	0.28	0.008	0.27	0.008		0.28	0.010
>=200% FPL	0.59	0.007	0.58	0.009	0.60	0.009	*	0.59	0.011
Education									
<12 years	0.34	0.008	0.36	0.010	0.32	0.011	**	0.32	0.012
12 years	0.34	0.006	0.34	0.009	0.35	0.010		0.35	0.011
>12 years	0.31	0.008	0.30	0.010	0.33	0.011	*	0.33	0.012
Perceived Health									
excellent	0.16	0.005	0.16	0.006	0.15	0.007		0.16	0.009
very good	0.25	0.005	0.24	0.007	0.26	0.008	**	0.25	0.009
good	0.32	0.005	0.32	0.007	0.31	0.009		0.31	0.011
fair	0.18	0.004	0.18	0.006	0.18	0.007		0.19	0.007
poor	0.10	0.004	0.11	0.005	0.09	0.006	**	0.09	0.007
Cognitive	0.13	0.004	0.14	0.005	0.12	0.006	**	0.11	0.007
Activity limitation	0.27	0.007	0.27	0.007	0.28	0.010		0.29	0.012
Private insurance	0.50	0.008	0.47	0.010	0.55	0.013	***	0.57	0.014
Medicaid	0.12	0.005	0.13	0.006	0.10	0.005	***	0.10	0.006
Year									
'2001	0.33	0.009	0.33	0.009	0.32	0.011		0.32	0.012
'2002	0.33	0.004	0.33	0.005	0.33	0.006		0.34	0.007
'2003	0.34	0.007	0.33	0.008	0.35	0.009		0.35	0.010
Non-english	0.03	0.003	0.04	0.004	0.03	0.003	***	0.02	0.003
Proxy interview	0.05	0.003	0.06	0.005	0.03	0.003	***	0.01	0.003
Self-respondent	0.56	0.005	0.50	0.007	0.66	0.008	***	0.68	0.010
2nd year in survey	0.68	0.006	0.67	0.008	0.68	0.009		0.68	0.010
sample size	13,680		5,376		8,304			4,045	

* p<.10, ** p<.05, ***p<.01 for difference between matched and unmatched MEPS samples

Table 5 shows the results of a logistic regression on the likelihood of a beneficiary in MEPS matching to the Medicare records. The dependent variable is binary—one if the person matched and zero otherwise. The right-hand side variables include demographic characteristics of the beneficiaries in MEPS and selected information on how and when the survey data were collected for each of the respondents. Odds ratios in the table capture differences in the likelihood that individuals with certain characteristics would supply their SSN or HICN during an interview while controlling for other variables in the model. Beneficiaries in MEPS between 65 and 84 years of age were more likely to match with the CMS records than those under 65. Persons of non-white racial/ethnic groups were less likely than non-Hispanic whites to match. Persons with limitations on activities or with private supplemental insurance had a higher chance to match. Persons in the 2003 MEPS were more likely than those in the 2001 MEPS to match with CMS records. Finally, self-respondents were substantially more likely to match, reflecting the fact that the household respondent is more likely to have their own Medicare card handy for reporting during the MEPS interview.

While there were no statistically significant differences in mean expenditures between the matched ($3,733) and unmatched groups ($3,879), it is possible that the differences in demographic characteristics identified above may mask underlying differences in expenditures for the matched and unmatched groups using simple means. However, adjusting for differences in these demographic characteristics using multivariate regressions of expenditure (not shown) leads to even smaller (not significant) differences in expenditures between the groups. This provides strong evidence that the matched sample is representative of the population of Medicare beneficiaries.

Table 5. Logistic Regression Results on Probability of Matching to CMS Beneficiary Files, 2001-2003

	Odds Ratio	Std. Err.	Marginal Effect
Age 65-74	1.45	0.13***	0.09
Age 75-85	1.44	0.14***	0.08
Age 85+	1.19	0.12	0.04
Non-white	0.80	0.07***	-0.05
Female	0.75	0.04	-0.06
Married	1.12	0.07*	0.03
Midwest	1.42	0.15***	0.08
South	1.19	0.12*	0.04
West	0.99	0.12	0.00
Urban	0.85	0.07*	-0.03
100-199% FPL	0.96	0.07	-0.01
>=200% FPL	0.96	0.07	-0.01
12 years education	1.00	0.07	0.00
>12 years education	1.01	0.08	0.00
Very good health	1.10	0.09	0.02
Good health	1.05	0.09	0.01
Fair health	1.06	0.10	0.01
Poor health	0.93	0.11	-0.02
Cognitive limitation	1.01	0.08	0.00
Activity limitation	1.41	0.09***	0.08
Private insurance	1.24	0.08***	0.05
Medicaid	0.91	0.07	-0.02
2002	1.06	0.05	0.01
2003	1.10	0.06*	0.02
Non-english interview	1.04	0.15	0.01
Proxy interview	0.82	0.14	-0.04
Self-respondent	2.04	0.11***	0.14
2nd year in survey	1.06	0.05	0.01
Died	0.88	0.13	-0.03
Institutionalized	0.84	0.24	-0.04

* p<.10, ** p<.05, ***p<.01
n=13,680

Expenditure Comparisons

Table 6 presents the CMS and MEPS expenditure comparisons by event type for persons in the analysis sample. Expenditures are compared for each of the years 2001-2003 and for the pooled three years, with dollars in the pooled total adjusted to constant 2003 dollars. Given the selected nature of the analytic sample, the dollar amounts are unweighted totals of Medicare payments.

CMS claims data are shown in the upper pane of the table; MEPS data are in the lower panel. The five event types used in the primary comparison with MEPS (emergency room, inpatient, outpatient, office-based physician, and separately billing doctor) are shown separately for each source, but additional detail is shown for the CMS data. Claims that were only for radiology or pathology and laboratory services by outpatient departments and separately billing doctors, which are not explicitly asked about in the MEPS, are shown as separately billing laboratory subcategories in the CMS outpatient department and separately billing doctor expenditures. In addition, the "below the comparison line" CMS data include all of the remaining Carrier file claims for the analysis sample. These expenditures clearly should not be included in the MEPS and CMS comparisons of hospital and physician expenditures, but they are included in Table 6 to provide a complete accounting of all the CMS claims in the Inpatient, Outpatient, and Carrier files for the analysis sample.

Table 6. CMS and MEPS Expenditure[1] Comparisons, 2001-2003 for Events with a Medicare Payment in the Analysis Sample

	2001 (nominal thousands of dollars)			2002 (nominal thousands of dollars)			2003 (nominal thousands of dollars)			2001-2003 Pooled (in 2003 constant dollars)		
Number of persons[2]	1,203			1,502			1,340			4,045 (person years)		
CMS												
CMS EVENT TYPE	% of Users	Event Count	Medicare Payment	% of Users	Event Count	Medicare Payment	% of Users	Event Count	Medicare Payment	% of Users	Event Count	Medicare Payment
CMS events included												
Emergency Room	18.3	392	60	19.6	552	90	19.0	447	87	19.0	1,391	245
Hospital Inpatient	18.9	381	2,373	19.6	446	3,067	19.3	416	3,020	19.3	1,243	8,755
Hospital Outpatient	65.8	5,028	614	66.6	6,406	875	66.5	6,122	924	66.3	17,556	2,492
Including Separately-billing labs	28.5	725	30	29.2	905	45	28.4	785	34			-
Office-based Physician	87.4	12,300	1,160	89.3	16,536	1,360	89.3	15,197	1,326	88.8	44,033	3,986
Separately-billing Doctors	61.3	6,900	571	61.1	8,546	724	62.7	8,270	688	61.7	23,716	2,053
Including Separately-billing labs	11.0	168	6	11.1	236	6	11.0	219	5			-
Total CMS events included		**25,001**	**4,778**		**32,486**	**6,116**		**30,452**	**6,046**		**87,939**	**17,531**
CMS events not included												
Separately-billing doctors for IC	2.1	126	6	2.2	119	6	2.7	143	6	2.3	388	18
Separately-billing labs	45.1	1,968	63	47.1	2,775	97	46.6	2,444	84	46.3	7,187	252
Other medical supplies	10.2	347	43	11.6	399	69	12.4	268	57	11.4	1,014	175
Other	1.0	13	1	0.6	10	---	1.3	46	5	1.0	69	7
Total CMS events not included		2,454	113		3,303	172		2,901	152		8,658	453
Total CMS events from SAFs		27,455	4,891		35,789	6,288		33,353	6,199		96,597	17,983
MEPS												
MEPS EVENT TYPE	% of Users	Event Count	Medicare Payment	Ratio MEPS/ CMS	% of Users	Event Count	Medicare Payment	Ratio MEPS/CMS	% of Users	Event Count	Medicare Payment	Ratio MEPS/ CMS	% of Users	Event Count	Medicare Payment	Ratio MEPS/CMS
Emergency Room	16.0	267	86	1.43	16.5	386	122	1.36	16.3	316	105	1.21	16.3	969	325	1.32
Hospital Inpatient	19.0	351	2,214	0.93	18.5	406	2,772	0.90	19.0	392	2,915	0.96	18.8	1,149	8,173	0.93
Hospital Outpatient	34.6	1,891	416	0.68	37.2	2,179	455	0.52	38.6	2,098	583	0.63	36.9	6,168	1,503	0.60
Office-based Provider	86.5	9,802	1,059	0.91	90.3	13,541	1,497	1.10	89.5	12,586	1,228	0.93	88.9	35,929	3,921	0.98
Physician (incl SBD)	86.4	9,094	1,010	0.87	90.0	12,462	1,420	1.04	89.1	11,464	1,160	0.87			-	
Non-physician	11.1	708	49	0.04	14.2	1,079	77	0.06	14.6	1,122	69	0.05			-	
Separately-billing Doctor	37.5	1,969	408	0.71	37.0	2,450	499	0.69	40.1	2,606	481	0.70	38.2	7,025	1,437	0.70
Total MEPS events compared		**14,280**	**4,184**	**0.88**		**18,962**	**5,346**	**0.87**		**17,998**	**5,312**	**0.88**		**51,240**	**15,358**	**0.88**

[1]MEPS expenditures used for the comparisons are from either household or provider source or imputed; i.e. HC reported or imputed dollars if unmatched and MPC reported or imputed dollars if matched.
[2]In both CMS and MEPS tables, persons may have events from both sources or one source only.

In each of the three study years, the MEPS estimates of Medicare expenditures for hospital and physician events by the analysis sample were less than the CMS totals by 12 to 13 percent. These differences in expenditures vary substantially by event type, but in assessing differences by event type, it is helpful to keep several factors in mind. MEPS event types are determined by the household respondents, who may classify an event differently than CMS or a medical provider. Comparisons of expenditures for outpatient and office-based physician events are particularly problematic because, in the MEPS household-based design, the household's characterization of the type of event is retained even if the event is matched to an MPC event of a different event type and the MPC-reported expenditures are used for the event. Moreover, MPC events that do not match to a household-reported event are not included in the MEPS public use files, and the MEPS design does not systematically capture data on separately billing laboratory (SBL) services. Factors such as these suggest that expenditure comparisons by type of event should be made cautiously.

In each of the three years, the smallest difference between the two sources was in hospital inpatient expenditures, with the MEPS estimates ranging from 90 to 96 percent of the CMS figures. In the pooled totals for the three years (in 2003 dollars), the MEPS estimate ($8,172,587) is 93 percent of the CMS total. These relatively small differences in inpatient stay expenditures are consistent with a well-documented finding in the survey literature that the saliency of an event is a major factor affecting the accuracy of reporting (e.g., Cannell et al., 1965, Loftus, et al., 1992). Hospital inpatient stays represent arguably the most salient type of medical event a person could have.

For outpatient events with the analysis sample, the MEPS expenditure estimates range from 52 percent of the CMS figure in 2002 to 68 percent in 2001. For office-based providers,

the corresponding ratios for these two years tended in the opposing direction, countering the shift in the outpatient measure. In 2001, when the outpatient measure was higher, the office-based ratio was lower (91 percent); in 2002, when the outpatient measure was lower, the office-based measure was higher --110 percent of the CMS total. Differences in the labeling of these two types of ambulatory events likely account for some of the variation in these expenditure totals. When expenditure totals for the two event types are combined, the MEPS Medicare payments are approximately 80 percent of the CMS total. If the separately billing laboratory component of the CMS total, which is not captured systematically in MEPS, is excluded from the comparison, the MEPS expenditures approach 85 percent of the CMS total with the analysis sample.

Another large MEPS-CMS difference is seen in the total Medicare expenditures for emergency room services, where the MEPS estimates range from 121 to 143 percent of the CMS totals. One reason for the higher MEPS estimates is that the MEPS matching rules allow different types of events in the MPC, including one-day inpatient stays, to match to household-reported emergency room events. When this occurs, the household-reported emergency room event remains in the MEPS files as an emergency room event, but carries the expenditures reported for the one-day inpatient stay. This mismatching of event types would tend to inflate MEPS estimates of expenditures for emergency room events relative to the CMS data.

Expenditures for the remaining event type compared in Table 6, separately billing doctors, range from 69 to 71 percent of the CMS total for the three years. This ratio, however, does not fully reflect the total SBD expenditures captured in MEPS. Table 7, which follows the column format of Table 6, presents a more detailed breakout of the MEPS SBD expenditures.

Table 7. CMS and MEPS SBD Expenditure[1] Comparisons, 2001-2003 for Events with a Medicare Payment in the Analysis Sample

	2001 (nominal thousands of dollars)			2002 (nominal thousands of dollars)			2003 (nominal thousands of dollars)			2001-2003 Pooled (in 2003 constant dollars)		
Number of persons[2]	1,203			1,502			1,340			4,045 (person years)		
CMS												
CMS EVENT TYPE	% of Users	Event Count	Medicare Payment	% of Users	Event Count	Medicare Payment	% of Users	Event Count	Medicare Payment	% of Users	Event Count	Medicare Payment
CMS events compared												
SBD[6]	**61.3**	**6,900**	**571**	**61.1**	**8,546**	**724**	**62.7**	**8,270**	**688**	**61.7**	**23,716**	**2,053**
IC-SBD (**not included**)	2.1	126	6	2.2	119	6	2.7	143	6	2.3	388	18
Total CMS events compared		7,026			8,665			8,413			24,104	
MEPS												
MEPS EVENT TYPE	% of Users	Event Count	Medicare Payment	Ratio MEPS/ CMS	% of Users	Event Count	Medicare Payment	Ratio MEPS/CMS	% of Users	Event Count	Medicare Payment	Ratio MEPS/ CMS	% of Users	Event Count	Medicare Payment	Ratio MEPS/CMS
MEPS Events Compared																
In PUF, as hospital SBDs																
a. MPC hospital events matched			325	0.57			383	0.53			405	0.59			1,151	0.56
b. Imputed HC unmatched hospital events			83	0.15			116	0.16			76	0.11			286	0.14
Total hospital SBDs	37.5		408	0.71	37.0		499	0.69	40.1		481	0.70	38.2		1,437	0.70
In PUF, embedded in MVE																
c. Embedded in the matched MVE			27	0.05			40	0.05			38	0.06			108	0.05
d. Embedded in the unmatched recipient MVE			19	0.03			39	0.05			31	0.04			91	0.04
Total embedded SBDs			46	0.08			79	0.11			68	0.10			200	0.10
Total SBDs in PUF			**454**	**0.80**			**578**	**0.80**			**549**	**0.80**			**1,637**	**0.80**
Supplemental SBD Accounting [3]:																
e. MPC hospital events unmatched			46	0.08			47	0.07			53	0.08			152	0.07
f. SBD collected but not reported by HC			86	0.15			62	0.09			65	0.09			222	0.11
Total supplemental SBDs (not included in PUF)			132	0.23			110	0.15			118	0.17			374	0.18
Total SBD collected in MEPS			586	1.02			687	0.94			667	0.96			2,011	0.97

[1] MEPS expenditures used for the comparisons are from provider source or imputed;

[2] In both CMS and MEPS tables, persons may have events from both sources or one source only.;

[3] .Supplemental SBD Accounting:

c. Reported SBD expenditures embedded in MVE: repoted for an MPC hospital events that matched to an HC office-based event.

d. SBD expenditures imputed to unmatched HC office-based events from MPC donors with associated SBD expenditures.

e. SBD expenditures associated with MPC hospital events that did not match to an HC event. These events underestimate SBD expenditures as they are not edited or imputed. * An additional group of SBD nodes associated with unmatched hospital cases is not included here. This group includes events for which AMT2 is missing and events with nonresponse dispositions. If associated with matched hospital events, these would have been included in the recipient pool for imputation. The totals are: 2003: AMT2 missing: 12, Nonresponse: 301; 2002: AMT2 missing: 16, Nonresponse: 355; 2001: AMT2 missing: 27, Nonresponse: 256.

f. SBD expenditures reported by physician offices during MPC data collection, but not linked to an SBD node reported by a hospital. These events underestimate SBD expenditures as they are not edited or imputed and include some unrecognized duplicates of events collected as SBDs.

The MEPS SBD expenditures for the restricted analysis sample in Table 6 (e.g., $407,919 for 2001) reflect the amounts incorporated into the MEPS public use files as payments for separately billed physician services associated with hospital inpatient, outpatient, and emergency room events. As a result of cross-event type matches, some SBD dollars collected in MEPS are associated with office-based events.[1] These dollars, which are embedded in the office-based totals of Table 6, are shown separately in Table 7. In conjunction with the hospital SBDs, the embedded SBD expenditures account for about 80 percent of the CMS SBD total.

Table 7 also provides a supplemental accounting of additional SBD expenditures that are captured in MEPS but not included in the public use file estimates. These include payments for SBDs associated with hospital events that do not match to a household-reported event and SBD services reported by office-based providers that remain unlinked to a reported hospital event. The expenditure data in these latter two groups are unedited, and there is an undetermined level of duplication between these unused events and those captured in the public use file. They are included in the table to indicate that a substantial portion of the apparent underreporting of SBD expenditures in MEPS is due not to the fact that the SBD data are not collected in MEPS, but to the fact that the collected data cannot be linked to a household-reported event. Additional in-depth analyses in a companion MEPS working paper (Zuvekas and Olin, 2008) provides additional support for this conclusion.

[1] That is, if a hospital outpatient department visit collected in the MPC matches to an office-based visit reported by the household, the payments to the facility and the payments to the SBD are summed together. The sum of the facility and SBD payments are then reported for that office-based visit on the MEPS Public Use Files.

Discussion

In this phase of the MMVS, Medicare claims for a non-random subset of beneficiaries in the 2001-2003 MEPS public use files are used to evaluate the accuracy of survey-reported expenditures for hospital and physician care. The analysis sample in the study includes 2,649 persons who were in MEPS for either one or two full years (4,045 person-year observations), or approximately 30 percent of all Medicare beneficiaries with complete years of survey data in the 2001-2003 MEPS public use files. Hospital and physician expenditures for this subset of the MEPS Medicare population are under-reported by about 12 percent in all three years, but under-reporting varies considerably by event type. Survey-reported expenditures are roughly 95 percent of the Medicare inpatient facility claims totals, 80 percent of the claims totals for office-based care excluding SBDs (outpatient facility expenditures plus office-based physician expenditures), and 70 percent of the claims totals for SBDs. If SBD expenditures embedded in MEPS office-based expenditures are included as well, the ratio of SBD expenditures captured in MEPS rises to 80 percent. Survey-reported expenditures for emergency room facilities, on the other hand, are 21 to 43 percent higher than the Medicare claims totals. This may be partially due to problems in matching like event types from the household and medical provider components of the survey. However, regardless of the cause, the impact on estimates of total under-reporting is minimal because emergency room expenditures are a small percentage of total expenditures for hospital and physician care (2 percent or less).

In general, these findings are significant because they are for a relatively large sample of Medicare beneficiaries in the civilian non-institutionalized population, while most other studies of self-reporting accuracy have been for small, geographically limited samples (Bhandari and

Wagner, 2006**)**. The estimates of total under-reporting by the analysis sample should be accurate because the Medicare claims for full-year, fee-for-service beneficiaries provide comprehensive information on the use of Medicare-covered services and can be compared directly to survey-reported events. Moreover, the findings may potentially be relevant to the other Medicare beneficiaries in MEPS because the matched and unmatched groups are similar in terms of survey-reported expenditures. Comparisons of underreporting by category of health care are less accurate because of errors in the household reporting of event-type.

It is not clear whether under-reporting by other segments of the civilian non-institutionalized population would be of the same magnitude or pattern. Medicare beneficiaries are responsible for a disproportionate share of health care spending in the US. In 2005, for example, they represented approximately 14 percent of the civilian non-institutionalized population and had nearly 41 percent of its medical expenditures (MEPS, 2005). However, previous studies and additional analyses in progress with the MMVS suggest that underreporting increases as the number of provider contacts increases. If so, the underreporting found with this sample of Medicare beneficiaries may represent an upper bound on the underreporting for the full MEPS population.

This methodological study provides a better understanding of the extent of underreporting of expenditures for Medicare beneficiaries in MEPS in aggregate. Future reports will describe the results of analyses currently in progress about the extent to which under-reporting varies by socio-demographic characteristics. Most importantly, these analyses consider the extent to which differential under-reporting affects the kinds of descriptive and behavioral analyses of utilization and expenditures for which MEPS is widely used.

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Technical Appendix

Medicare-MEPS Validation Study: An Overview of the Sample and Data

1. Background

The Medical Expenditure Panel Survey (MEPS) is an annual household survey used by researchers and policy makers for descriptive and behavioral analyses of healthcare utilization and expenditures by the civilian noninstitutionalized population. One concern in using the data for these types of analyses is that the expenditure estimates are low because households in the survey may under-report their medical events, perhaps systematically. To address this concern, the Medicare-MEPS Validation Study (MMVS) uses Medicare claims for a subset of beneficiaries in the 2001-2003 MEPS to evaluate the accuracy of utilization and expenditures data in the MEPS public use files (PUFs).

A description of the task and the request for permission to proceed with it was submitted to the Westat Institutional Review Board (IRB) for review on September 12, 2005 and approved on October 11, 2005 (IRB Approval Number FWA 5551). The full study will include analyses of over- and under-reporting of expenditures by household respondents and medical providers; the accuracy of household-reporting of hospital stays, emergency room visits, and ambulatory visits to physicians' offices and hospital outpatient departments; the impact of dying or being institutionalized during the year on MEPS estimates of expenditures; and issues related to the abstraction and use of medical provider component (MPC) data in the survey. The following sections of this report describe the number and characteristics of beneficiaries used in

the MMVS and the data sources and files used in the comparisons of their health care utilization and expenditures.

2. MEPS Medicare Sample

The MEPS PUFs include 4,376 Medicare beneficiaries in 2003, 4,978 in 2002, and 4,326 in 2001. These survey respondents were covered by Medicare for all or part of each year they were in the survey. To be included in the MMVS, they had to have supplied either their social security number (SSN) or Medicare health insurance claim number (HICN) during a household interview. Without this information, the Centers for Medicare and Medicaid Services (CMS) would not have been able to fulfill the MEPS request for their basic demographic and enrollment data and Medicare claims. The process of identifying MEPS beneficiaries included in the request to CMS for Medicare data, the CMS response, and the final matching of persons in the MEPS request and the CMS response are described below.

2.1 MEPS Request to CMS

The data sought in the MEPS request to CMS included a Denominator Record which contains basic demographic and enrollment about each beneficiary enrolled in Medicare during a calendar year and seven standard analytic files (SAFs) containing all of the final action Part A and Part B claims for the Medicare fee-for-service beneficiaries in the 2001-2003 MEPS PUFs. Separate files were requested for each of the years 2001-2003 for MEPS household respondents who:

- Responded to the MEPS household survey in at least one of the years 2001-2003; and,
- Reported having Medicare coverage and provided their SSN or HICN; and,

- Provided valid gender and date of birth information during a MEPS household interview.

Across the three data years, a total of 4,162 MEPS respondents met these criteria. Of these respondents, 2,451 reported their HICN, which is the unique identifier of a Medicare beneficiary. It usually consists of the nine-digit social security number (SSN) and a two-character code (BIC) that stores the relationship between the beneficiary and the primary holder of the associated SSN. Another 1,712 respondents reported only a social security number. These two groups were submitted to CMS in separate 'finder' files. One file consisted of records with a HICN and the person's gender and date of birth. The other file consisted of records with a SSN and the person's gender and date of birth.

2.2 CMS Response to MEPS Request

CMS returned data for all of the persons in the MEPS request for whom a matching ID (either the HICN or SSN) was found in one of the Denominator Files for 2001-2003. For each person identified in a Denominator File, CMS sent the Denominator Record and their final action claims for Part A and Part B services for each of the years 2001-2003. In addition to these files, CMS provided a cross-reference (link) file, utility files and documentation. The cross-reference file contained a CMS-created unique Beneficiary Identification Number (RDDC_BID) for each person ID in the finder file. The utility file was to help extract data from encrypted ZIP files. The documentation provided information on the contents of each file, including name of file, number of records and persons in each file, and file size.

The CMS response included information for 3,968 of the 4,162 persons in the MEPS finder files. No data were found for 194 persons, probably because the HICN or SSN was not correctly recorded in the household interview. In addition, the Beneficiary Identification

numbers provided as linking IDs in the CMS file (RDDC_BID) were not necessarily unique for persons within a household. Where the MEPS finder files included more than one person in the same household, gender and date of birth from the survey and the Denominator Record were used to correctly match persons in the MEPS finder files with their CMS records. The results of this "exact" matching of persons in the MEPS and CMS files are described below.

2.3 Matching of MEPS and CMS Records

The CMS files included information for 3,968 Medicare beneficiaries who were matched to a Denominator File record based on the ID (HICN or SSN) in the MEPS finder files. As a further check on the match between persons in the CMS and MEPS files, gender and date of birth information from both sources were used to verify the matches. This verification was done by using the following logic to uniquely identify beneficiaries in the CMS files and the MEPS finder files:

- Exact match on ID, gender and date of birth, with Denominator data.
- No match on ID, gender and date of birth, with Denominator data.
- Missing ID, i.e., RDDC is missing.
- Partial match A, i.e., matched on ID and gender but not date of birth with denominator file data
- Partial match B, i.e., ID matched, but neither gender nor date of birth matched with denominator file data

The results of the matching are summarized in Table A1. An exact match on ID (HICN or SSN), gender, and date of birth was found for 3,463 persons in the MEPS finder files. Of these matches, 1 person did not appear in the Denominator file for the year the person was a MEPS respondent. Among those (3,462 persons) appearing in both the Denominator for the years they were MEPS respondents, 3,069 persons had at least 1 Medicare claim in the SAF claim files. 131 persons that had valid IDs did not match exactly on ID, gender and date of birth

with the CMS Denominator File. MEPS respondents that matched exactly with the data in the Denominator file were included in the files constructed for the study. The non-matches and partial matches were excluded from the subsequent file construction and analyses.

Appendix Table A1
Person-level Matching of MEPS and CMS data

Number of Persons	Frequency	Percent	Cumulative Frequency	Cumulative Percent
In MEPS finder files	4,162			
Exact matches in the Denominator file	3,463	83.21	3,463	83.21
MEPS and Denominator year not matched	1	0.02		0.00
MEPS and Denominator year matched	3,462	83.18		
2001 only	520	12.49		
2002 only	67	1.61		
2003 only	961	23.09		
2001 and 2002	1,112	26.72		
2002 and 2003	802	19.27		
Claims in at least one CMS year file	3,069	73.74		
No match in denominator file	131	3.15	3,594	86.35
Missing ID	194	4.66	3,788	91.01
Partial match A	217	5.21	4,005	96.23
Partial match B	157	3.77	4,162	100.00

The 3,462 beneficiaries used in the MMVS represent a combined total for the years 2001-2003. Table A2 shows how many of these beneficiaries were in the MEPS PUFs during each year and the MEPS estimates of their health care expenditures for hospital and physician services by year and match status. The exact matches comprise approximately 40 percent of the beneficiaries in the MEPS public use files for each of the three years. Differences in average expenditures on hospital and physician care for beneficiaries in the two groups are not statistically significant at the 0.05 level.

Appendix Table A2
MEPS Beneficiaries by Match Status and Average Expenditure for Hospital and Physician Care, 2001-2003

	Number of Beneficiaries	Percent of Total	Average Expenditure[1]	Standard Error
2003 MEPS				
Exact Matches	1,763	40.0	5,349	357
All Other	2,613	60.0	5,349	565
2002 MEPS				
Exact Matches	1,981	39.8	4,613	268
All Other	2,997	60.2	5,129	255
2001 MEPS				
Exact Matches	1,632	37.7	4,494	333
All Other	2,694	62.3	4,769	277

[1]Expenditures are total outlays for hospital facility services, separately billed physician services in hospitals, and office-based physician services in nominal dollars.
Source: MEPS full-year consolidated files for the years 2001-2003.

The 5,376 exact matches in Table A2 include 1,112 beneficiaries who were in both the 2001 and 2002 files and 802 people who were in both in the 2002 and 2003 files. These beneficiaries appear in more than one annual file because the survey is designed for households to participate for two full calendar years.

3. Data Used in the MMVS

The analytic files constructed for the MMVS were derived from three primary sources: the MEPS Household Component (HC), the MEPS Medical Provider Component (MPC), and the CMS Denominator Files and claim-level SAFs. A separate set of files was constructed for each of the three calendar years included in the study. The files containing MEPS HC and MPC

data include the expenditure information as originally reported by households and medical providers in the survey, as well as the final expenditure variables on the MEPS PUFs. The original expenditure data were included for investigation of whether differences between MEPS and CMS were associated with the initial reporting of health care expenditures by households and medical providers or with the subsequent processing of the expenditure data. A brief description of the MEPS and CMS data used in the MMVS is provided below.

3.1 MEPS HC Data

In the MEPS HC, survey respondents are asked about all of their medical events and expenditures over the course of the year. This information is incorporated into eight event-type files with a separate record for each event of a particular type reported by a survey respondent during the calendar year. These records reflect the type and number of events reported by households in the survey, and they include a mix of household-reported expenditures for unmatched events, provider-reported expenditures for events matched from the MPC, and imputed amounts for expenditure variables that were missing after data collection and editing. In the comparisons with CMS data, records from the following event type files were used:

- Hospital inpatient stays,
- Hospital outpatient department visits,
- Hospital emergency room visits
- Visits to office-based medical providers, and
- Separately billed services associated with hospital events

The hospital and office-based medical provider files contain all of the household-reported events for care typically covered by Medicare. These events also occur more frequently and have higher expenditures than other types of events in the MEPS. As a result, the MEPS files for events such as dental care, home health care, prescription drug purchases and other medical

expenditures were not used in the initial evaluation of household under-reporting of health care expenditures.

3.2 MEPS MPC Data

The MPC is a survey of physicians, hospitals, home health agencies, and pharmacies identified by respondents in the HC. Medical providers in the survey are asked to provide payments by source and other information about all of the medical events a survey respondent had during the year. This information is used to supplement or replace the expenditures data collected from the household respondents because the providers of care can usually provide more accurate and comprehensive information about payments by third parties such as private insurance and public programs.

MPC data used in the MMVS were restricted to the same types of events abstracted from the HC: hospital inpatient stays, emergency room and outpatient department visits, and office-based physician visits. In addition, MPC data for physicians who billed separately from the hospital for care provided in a hospital setting were included in the MMVS. There is no comparable information on separately billing doctors (SBDs) in the HC because MEPS was not designed to ask household respondents about SBD "events." However, these expenditures are included in the MEPS PUFs and were incorporated into the MMVS analyses of under-reporting of utilization and expenditures data in the MEPS.

3.3 CMS Data

CMS data requested for Medicare beneficiaries in the MMVS included Denominator Records and final action claims in the inpatient, outpatient, carrier (physician/supplier), home health, hospice, skilled nursing facility, and durable medical equipment SAFs for the years 2001-

2003. The MMVS analyses of utilization and expenditure data use Denominator Record information to categorize beneficiaries by type and length of Medicare coverage and the inpatient, outpatient and Carrier files to create hospital and physician "events" comparable to the ones reported by household respondents in the MEPS. The content and use of these files is described briefly below.

Denominator File

Denominator Files contain demographic and enrollment information about each beneficiary enrolled in Medicare during a calendar year. Information in an annual Denominator File is 'frozen' in March of the following calendar year. It includes the beneficiary unique identifier, state and county codes, zip code, date of birth, date of death, sex, race, age, monthly entitlement indicators (Part A or Part B or both), reasons for entitlement, state buy-in indicators, and monthly managed care indicators (yes/no).

These files provided the information necessary to identify beneficiaries who could be used in the MMVS comparisons of utilization and expenditures data. Most of these comparisons focus on survey respondents who were in-scope for the entire calendar year, did not die and were not institutionalized, and had Medicare fee-for-service for the entire year. This group of survey respondents had a complete year of survey data and Medicare claims for all of their covered services, which made comparisons of the survey data to the Medicare claims relatively straightforward.

Inpatient Standard Analytical File

The Inpatient SAFs contain claims from hospitals for reimbursement of facility costs associated with an inpatient stay. Claim-level information includes diagnosis, (ICD-9 diagnosis),

procedure (ICD-9 procedure code), Diagnosis Related Group (DRG), dates of service, reimbursement amount, hospital provider, and beneficiary demographic information. Each claim in these files typically covers the facility costs associated with an entire inpatient stay. All the claims in these files were retained for comparison to household-reported hospital stays. In addition, revenue center information on the individual inpatient claims was used to identify stays where the beneficiary also received services in the hospital emergency room. A separate "ER" event was created from these claims for comparison to household-reported emergency room visits. However, expenditures for these ER events were set to zero because they were already included in the facility expenditures for the inpatient stay. The results of this event allocation are summarized in Table A3.

Appendix Table A3
Events Created from CMS Inpatient File Claims, 2001-2003

	2001		2002		2003	
	Events	Persons	Events	Persons	Events	Persons
Inpatient events	1,025	591	1,102	658	1,301	716
Preceding ER events	550	369	582	403	736	463

Outpatient Standard Analytical File

The Outpatient SAFs contain claims from hospitals for reimbursement of facility costs associated with an outpatient department visit. Claim-level information includes diagnosis and procedure (ICD-9 diagnosis and procedure codes, CMS common procedure codes (HCPCS)), dates of service, reimbursement amount, outpatient provider number, revenue center codes and beneficiary demographic information. Each claim in these files is at the hospital-beneficiary level, but a claim may be for more than one outpatient department visit by the beneficiary. As a

consequence, a separate "OP event" was created for each unique revenue center date within a claim to make the claims more comparable to the type and number of events that a survey respondent might report.

In addition, OP SAFs contain claims for reimbursement of emergency room facility expenses when the beneficiary is not admitted to the hospital. These standalone ER events were identified by using revenue center information on the claims, and separate ER events with the associated expenditure data were created for comparison to household-reported ER events. The results of this event allocation are summarized in Table A4.

Appendix Table A4
Events Created from CMS Outpatient File Claims, 2001-2003

	2001		2002		2003	
	Events	Persons	Events	Persons	Events	Persons
Outpatient events	12,767	1,903	14,000	2,069	15,984	2,139
Stand-alone ER events	1,006	587	1,122	638	1,090	649

Carrier Standard Analytical File

The Carrier SAFs (old file name Physician/Supplier Part B) contain claims from physicians and other non-institutional providers. Claim-level information includes diagnosis and procedure (ICD-9 diagnosis, CMS common procedure Codes (HCPCS)), dates of service, reimbursement amount, non-institutional provider numbers (e.g., UPIN, PIN), place of service, and beneficiary demographic information. Each claim in these files is at the provider-beneficiary level, but the claim itself can cover single or multiple services, procedures or supplies depending on the number of line items on the claim. To make the Part B claims comparable to the types of events reported in the MEPS, the line item detail was used to create separate events for office-

based physician visits, ambulatory surgical center visits, hospital visits by separately billing physicians, and purchases of medical supplies and equipment. The results of this event allocation are summarized in Table A5.

Appendix Table A5
Events Created from Carrier File Claims, by Type, 2001-2003

	2001		2002		2003	
	Events	Persons	Events	Persons	Events	Persons
Office-based doctor	33,017	2,713	36,793	2,873	38,243	2,891
SBDs in hospitals	19,654	1,871	23,237	2,009	27,316	2,075
Other SBDs	433	75	720	108	1,169	155
Other medical supplies	982	421	1,095	475	1,339	559
Separately billing lab	5,185	1,353	6,284	1,524	6,515	1,550
Other providers	83	54	81	45	128	60

Other Standard Analytic Files

None of the SAFs for institutional provider and durable medical equipment claims were used in the initial MMVS comparisons of utilization and expenditures. However, aggregate expenditures from these files will be used in other comparisons with the MEPS utilization and expenditures data.

4. Utilization and Expenditure Comparisons

All of the MMVS comparisons are restricted to Medicare-covered events and Medicare payments rather than total expenditures (Medicare payments plus payments by all other sources). Only Medicare-covered events are compared because Medicare claims do not include information on the beneficiaries' use of non-covered services or care by providers who do not bill Medicare (e.g., a VA facility). In addition, the focus on Medicare payments is necessary

because Medicare claims include the Medicare payment to a provider, but not the amounts actually paid by an individual or supplemental insurance toward the beneficiary's cost sharing liability. As a consequence, the claims are not always a reliable source of information on total expenditures for an event. Medicaid payments to hospitals and physicians for the cost sharing liability of a dually eligible beneficiary, for example, are routinely discounted.