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Medicare Coverage and Reporting: A Comparison of the Current Population Survey and Administrative Records

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Abstract

Medicare coverage of the older population in the United States is widely recognized as being nearly universal. Recent statistics from the Current Population Survey Annual Social and Economic Supplement (CPS ASEC) indicate that 93 percent of individuals aged 65 and older were covered by Medicare in 2013. Those without Medicare include those who are not eligible for the public health program, though the CPS ASEC estimate may also be impacted by misreporting. Using linked data from the CPS ASEC and Medicare Enrollment Database (i.e., the Medicare administrative data), we estimate the extent to which individuals misreport their Medicare coverage. We focus on those who report having Medicare but are not enrolled (false positives) and those who do not report having Medicare but are enrolled (false negatives). We use regression analyses to evaluate factors associated with both types of misreporting including socioeconomic, demographic, and household characteristics. We then provide estimates of the implied Medicare-covered, insured, and uninsured older population, taking into account misreporting in the CPS ASEC. We find an undercount in the CPS ASEC estimates of the Medicare covered population of 4.5 percent. This misreporting is not random - characteristics associated with misreporting include citizenship status, year of entry, labor force participation, Medicare coverage of others in the household, disability status, and imputation of Medicare responses. When we adjust the CPS ASEC estimates to account for misreporting, Medicare coverage of the population aged 65 and older increases from 93.4 percent to 95.6 percent while the uninsured rate decreases from 1.4 percent to 1.3 percent.

Keywords: Medicare, survey measurement error, administrative records, health insurance

Introduction

As the U.S. population ages, meeting the health care needs of the older population will become increasingly challenging (Grady 2011). A critical aspect of meeting this challenge is having an accurate understanding of the health insurance coverage of older individuals, as health insurance coverage has been shown to be directly associated with access to care and better health outcomes (Bernstein et al. 2010; Institute of Medicine 2002; Wilper et al. 2009). The Current Population Survey Annual Social and Economic Supplement (CPS ASEC) indicates that only 1.6 percent of individuals aged 65 and older are uninsured and approximately 93 percent have Medicare (Smith and Medalia 2014) while a comparison survey (from the National Health Interview Survey) indicates 1.1 percent uninsured and 93.8 percent have Medicare (authors' own calculations). Previous research has found that survey data undercounts enrollment figures for some types of insurance, specifically Medicaid (Call et al. 2008; Davern et al. 2008; Davern et al. 2009; Klerman et al. 2005; Klerman et al. 2009; Lewis et al. 1998; Noon et al. 2016). Potential misreporting of Medicare coverage has been unexplored, thus we do not know the extent to which survey data may undercount Medicare coverage.

Our research evaluates the accuracy of reports of Medicare coverage among older individuals in the CPS ASEC and focuses on three main research questions. First, does the CPS ASEC undercount the Medicare enrolled population? Second, to what extent do individuals misreport their Medicare coverage in the CPS ASEC, and what characteristics are associated with misreporting? Finally, how does misreporting impact estimates of Medicare coverage and the uninsured population among persons aged 65 and older? We answer these questions using data from the 2014 CPS ASEC and the 2014 Medicare Enrollment Database (MEDB) from the Centers for Medicare and Medicaid Services (CMS). For the first research question, we compare estimates of the Medicare covered population from the CPS ASEC to the count of enrollees from the MEDB file. For the remaining two questions, we link individual person records between the two files and compare CPS ASEC responses about Medicare coverage to whether individuals are present in the MEDB file. We use descriptive analysis and logistic regression techniques to evaluate the characteristics associated with misreporting Medicare coverage.

Our findings indicate there is an undercount in the CPS ASEC estimates of the Medicare covered population of 4.5 percent and that misreporting of Medicare coverage is not randomly distributed across the older population. Characteristics associated with misreporting include citizenship status, year of entry, labor force participation, Medicare coverage of others in the household, disability status, and imputation of Medicare responses. When we adjust the CPS ASEC estimates to account for misreporting, Medicare coverage of the population aged 65 and older increases from 93.4 percent to 95.6 percent while the uninsured rate decreases from 1.4 percent to 1.3 percent. While our results indicate that most people accurately report their Medicare coverage in the CPS ASEC, these findings should be considered by researchers studying insurance coverage and policy makers working to improve health insurance coverage for the older population. Additionally our analysis points to the useful role administrative records may have in the imputation of Medicare coverage when survey responses are incomplete.

Background

Medicare

Medicare is a public health insurance program that was implemented in 1966 in an effort to improve health insurance coverage of the older population (Klees et al. 2010; Moon 1996). At the time of its implementation, just over half of older individuals had health insurance coverage whereas today Medicare alone provides coverage for most people aged 65 and older (Lew 2000; Moon 1996; Smith and Medalia 2014).

There are several parts to Medicare including hospital insurance, medical insurance, and prescription coverage, and eligibility requirements differ for each (CMS 2012). Eligibility rules vary for the different types of coverage and include factors related to age, residency, and employment history (CMS 2012). While there are exceptions for certain health and disability related conditions, most people first become eligible for Medicare when they turn 65. Some individuals are automatically enrolled in Medicare when they turn 65, whereas others need to sign up. For example, individuals who receive Social Security or Railroad Retirement Board benefits and meet eligibility criteria are automatically enrolled in

Medicare when they turn 65. Those who are not receiving Social Security or Railroad Retirement Board benefits need to sign up for Medicare, which can be done during several enrollment periods (CMS 2012).

According to recent statistics from the CPS ASEC, about 93 percent of individuals aged 65 and older had Medicare in 2013 (Smith and Medalia 2014). Some individuals had other insurance coverage along with Medicare-in 2013, 49 percent of individuals reported being covered by Medicare and private insurance while around 6 percent were covered by Medicare and Medicaid-while others have Medicare as their only source of insurance (Smith and Medalia 2014).

Medicare is often thought of as providing universal insurance coverage for the older population, but it does not (Birnbaum and Patchias 2010; Gray et al. 2006). Individuals who do not have Medicare coverage may be ineligible for coverage if they do not meet residency requirements. Others may be eligible for coverage but due to their work history may be ineligible for premium-free coverage and may not enroll if unable to pay premiums. Research evaluating Medicare Part A (hospital insurance) coverage found that lack of coverage is particularly high for older individuals in certain states-namely California, New York, Texas, and Florida (Birnbaum and Patchias 2010). Another study focusing on New York found that 16 to 20 percent of older individuals in the state lacked Medicare, much higher than the nationwide 7 percent reported by the 2013 CPS ASEC (Gray et al. 2006). This study found lack of Medicare coverage to be particularly pronounced for immigrants; coverage was also found to be associated with country of origin, years in the United States, age at arrival, and current age (Gray et al. 2006).

Survey reporting of health insurance

Health insurance research often relies on survey data. Along with the CPS ASEC, the National Health Interview Survey, the American Community Survey, Medical Expenditure Panel Survey (Household Component), and the Survey of Income and Program Participation are important sources of information on health insurance coverage and the uninsured. Thus, an understanding of the accuracy and reliability of health insurance data in surveys is critical for researchers and policy makers. Previous research has examined response error of Medicaid reporting, with recent results finding that the CPS

ASEC undercounts the Medicaid enrolled population by between 35 and 39 percent (Noon et al. 2016). Researchers have evaluated two types of response errors – false negatives (persons who reported not having Medicaid coverage in the CPS ASEC but were present in enrollment data) and false positives (persons who reported having Medicaid coverage in the CPS ASEC but were not present in enrollment data) and found that both types of response errors are not randomly distributed across the population (Noon et al 2016).

There are several reasons why survey respondents may misreport their Medicare coverage. Individuals with multiple types of insurance coverage may not accurately report their coverage when responding to a survey (Noon et al.2016). Correct reporting of Medicare coverage may also be tied to usage of health services-those who seek more medical care may be more aware of their insurance coverage and more likely to report it accurately. Persons with disabilities, for example, may need more medical care and thus be more aware of their health insurance coverage. Some individuals with disabilities may also have been eligible for Medicare prior to turning 65, and having Medicare coverage for many years may result in more accurate reporting. Previous research has found racial disparities in access to care, leading groups with greater access to care to report their Medicare coverage more accurately (AHRQ 2012).

Accuracy in reporting has been shown to be affected by survey design features (Bowling 2005). For example, the person responding to the question may not know the health insurance coverage of each member of the household. Reporting may also be influenced by the insurance coverage of other members of the household. If multiple people in the household have Medicare, it may be more likely that the survey respondent is more aware of the coverage and more likely to report it. On the other hand, if respondents mistakenly report having Medicare coverage when they do not, they may be more likely to report this for another individual in the household. Also, if one older person in the household is enrolled in Medicare, the survey respondent may assume that all older persons in the household are enrolled in Medicare.

Misreporting may also occur due to confusion regarding the question and insurance options. Previous research has found that confusion between Medicare and Medicaid may lead to misreporting of

insurance in surveys - similarities in the names of the programs may lead people to report coverage through one program when their coverage is really through the other (Pascale 2004). Factors such as educational attainment, which are associated with general difficulties in responding to surveys (Holbrook et al. 2006), may also result in misreporting of Medicare enrollment.

Data and Methods

In this analysis, we use data from the 2014 CPS ASEC and the 2014 MEDB. The 2014 CPS ASEC data were collected between February and April 2014 for a sample of approximately 98,000 households (U.S. Census Bureau 2014). The universe for the CPS ASEC is the civilian non-institutional population. We use survey weights that account for factors such as coverage and non-response (U.S. Census Bureau 2006). We restrict our analysis to those aged 65 and older at the time of the survey, resulting in a sample of 24,144 unweighted individuals or 44,360,179 million people (weighted to the population). The 2014 CPS ASEC asks respondents to indicate their current health insurance coverage as well as when that coverage began and which months they held that coverage (Medalia et al. 2014). For the majority of people, Medicare responses were reported by respondents, but some cases were imputed due to a missing or invalid response.[1]

The 2014 MEDB file is the CMS database of Medicare beneficiary enrollment information. We make some adjustments to account for universe differences between the CPS ASEC and MEDB file. We exclude individuals who live in group quarters, as the CPS ASEC includes only the civilian noninstitutionalized population. We also restrict the MEDB file to persons aged 65 and older with addresses in the 50 states or District of Columbia. We remove duplicate records and records that have a listed date of death on the MEDB file.

[1] To impute Medicare coverage, a hot deck method is used in which the Medicare coverage response is assigned from "donors" with similar characteristics that are predictive of health insurance coverage. In the case of Medicare these characteristics include age, work disability, Social Security, public assistance or Social Security Income, veterans status, and family relationship (Bordreaux and Turner 2011).

To estimate the Medicare undercount, we compare estimates of the Medicare covered population from the CPS ASEC to counts of the enrolled population in the MEDB, using each file separately. To evaluate misreporting in the CPS ASEC, we use linked CPS ASEC-MEDB data. In order to link the CPS ASEC and MEDB files, unique, protected identifiers are first assigned to each file through probabilistic matching techniques which use personally identifiable information on the files such as name, date of birth, address, gender, and in the case of MEDB Social Security Number. After the assignment of these unique identifiers, all personal information is removed to preserve confidentiality. For more information about the linking process, see Wagner and Layne (2014).

Once the unique identifiers are assigned to each file, we link the files. For the 2014 CPS ASEC, 87.5 percent of individuals received a unique identifier whereas for the 2014 MEDB, over 99.9 percent of cases received a unique identifier. Previous research has found that the assignment of these identifiers has biases that result in lower rates for some groups such as immigrants, recent movers, non-employed individuals, and low-income individuals (Bond et al. 2014). To account for observations that cannot be linked because they were not assigned a unique identifier, we re-weight the CPS data using adjustment factors based on characteristics we find to be associated with the assignment of unique identifiers. These characteristics include race, Hispanic origin, age, imputation status of age, sex, nativity, marital status, recent migration, and household income. Because the assignment of unique identifiers is so high on the MEDB file across characteristics, we do not use adjustment factors for that file.

Using the linked CPS ASEC-MEDB data, we measure two types of reporting errors: false negatives and false positives. False negatives are defined as individuals who do not report having Medicare in the CPS ASEC but are found in the MEDB file, indicating Medicare enrollment. The universe for measuring false negatives is all records in the CPS ASEC-MEDB linked data. False positives are defined as individuals who report having Medicare in the CPS ASEC despite not being present in the MEDB file. The universe for measuring false positives includes all linkable records (i.e. individuals with unique identifiers) in the CPS ASEC that do not match to the MEDB file.

We use descriptive analysis and two logistic regressions to evaluate characteristics associated with both types of misreporting. One model assesses characteristics associated with reporting a false negative response among individuals in the CPS ASEC-MEDB linked dataset and the second model assesses characteristics associated with false positive reporting among linkable CPS ASEC records that are not in the MEDB. We include sex, race and Hispanic origin, educational attainment, citizenship and year of entry, marital status, income to poverty ratio for the health insurance unit,[2] labor force participation, disability status, Medicare coverage of other individuals in the household, coverage through private insurance, and CSP ASEC imputation status of Medicare coverage as independent variables in each model.

The final step of our analysis is to calculate adjusted Medicare coverage and uninsured rates for the population aged 65 and older, taking into account false negative and false positive misreporting. To estimate the adjusted Medicare coverage rate, we start with the CPS ASEC estimate of the Medicare covered population and add false negative reports and subtract false positive reports. To estimate the adjusted uninsured rate, we start with the CPS ASEC estimate of the uninsured older population and subtract false negatives that did not report any other health insurance coverage and add false positives that did not report any other health insurance coverage. Persons who report false negatives or false positives and who have other insurance coverage do not affect estimates of the uninsured.

Results

We first compare the CPS ASEC estimate of those with Medicare coverage to the count of Medicare enrollees from the MEDB file to determine if the CPS ASEC undercounts the Medicare population. Table 1 shows that, according to the CPS ASEC, 41.4 million individuals aged 65 and higher

[2] We calculate income to poverty for the health insurance unit rather than for the household or family to account for complicated interfamily relationships, for more information see SHADAC (2012).

Table 1. Medicare Undercount
Universe: Ages 65 and older

Number Who Report Medicare Coverage in 2014 CPS ASEC	2014 MEDB Count	2014 CPS ASEC Medicare Undercount
41,424,095	43,384,391	4.5

Source: 2014 Current Population Survey Annual Social Economic Supplement (CPS ASEC) and 2014 Medicare Enrollment Database (MEDB)
Notes: The MEDB count is adjusted to exclude individuals living in group quarters and those individuals on the file who are deceased.

have Medicare. Enrollment data however show 43.4 million individuals aged 65 and older are covered by Medicare, indicating that the CPS ASEC undercounts the Medicare population by 4.5 percent.

Next, we use the linked CPS ASEC and MEDB data to estimate the extent of misreporting among individuals in the CPS ASEC, as shown in Table 2. Of the 42.5 million weighted cases in the linked CPS ASEC and MEDB file, 1.8 million (4.2 percent) did not report Medicare coverage in the CPS ASEC; these are considered false negatives. Of the 1.6 million weighted linkable records not found in the MEDB file, about 817,000 (51.8 percent) are false positives-they reported having Medicare in the CPS ASEC but did not have a matching record in the MEDB file. While the false positive rate is higher than the false negative rate, false positives are calculated based on a much smaller universe as most linkable records aged 65 and older in the CPS ASEC are found in the MEDB file.

We evaluate the characteristics associated with misreporting using descriptive and logistic regression analyses. First, we show descriptive characteristics of false negatives and false positives in Tables 3 and 4. We find that false negative rates are highest for those aged 65 and decrease as age increases. Individuals aged 65 in the CPS ASEC may not yet be enrolled or be aware they are enrolled in Medicare at the time of the survey and thus be more likely to report not having Medicare coverage. We also find higher rates of false negatives for those in the labor force compared to those not in the labor force and for non-citizens and recent entrants compared to native U.S. citizens. Persons with disabilities have lower rates of false negatives compared to those without a disability, and those living in households where other individuals were reported as having Medicare are less likely to report false negatives. When Medicare coverage was imputed rather than reported, individuals have higher rates of false negative reporting.

We find higher false positive reporting among persons not in the labor force compared to those in the labor force as well as for persons with disabilities and those living in households where another individual was reported as having Medicare coverage. As with false negatives, false positive reporting is higher in cases where the CPS ASEC report of Medicare coverage requires imputation relative to those

Table 2. False Negative and False Positive Misreporting of Medicare Coverage in the 2014 CPS ASEC
Universe: Ages 65 and older

Calculation of False Negative and Positive Errors	Number	Percent
False Negatives		
Total CPS ASEC - MEDB matched records	42,474,221	100.0
Matched records that correctly report Medicare coverage	40,679,956	95.8
Report false negative	1,794,265	4.2
False Positives		
Linkable records not in MEDB	1,577,342	100.0
Linkable records that correctly report no Medicare coverage	760,416	48.2
Report false positive	816,926	51.8

Source: 2014 Current Population Survey Annual Social Economic Supplement (CPS ASEC) and 2014 Medicare Enrollment Database (MEDB) linked data

Table 3. False Negative Misreporting of Medicare Coverage in the 2014 CPS ASEC by Characteristics
Universe: Ages 65 and older

Characteristics in CPS ASEC	Total CPS ASEC-MEDB Matched	Matched Records that Correctly Report Medicare Coverage		Report False Negative	
	Number	Number	Percent	Number	Percent
Total, Ages 65 and older	42,474,221	40,679,956	95.8	1,794,265	4.2
65	3,010,423	2,429,217	80.7	581,205	19.3
66	3,279,903	3,011,520	91.8	268,384	8.2
67	3,072,522	2,887,505	94.0	185,017	6.0
68	2,480,173	2,357,719	95.1	122,454	4.9
69	2,320,034	2,214,038	95.4	105,996	4.6
70+	28,311,166	27,779,957	98.1	531,209	1.9
Sex					
Male	18,785,765	17,860,169	95.1	925,596	4.9
Female	23,688,456	22,819,787	96.3	868,670	3.7
Race and Hispanic origin					
Non-Hispanic White alone	33,445,921	32,184,815	96.2	1,261,106	3.8
Non-Hispanic Black alone	3,562,405	3,368,949	94.6	193,456	5.4
Non-Hispanic Asian alone	1,624,896	1,496,405	92.1	128,491	7.9
Non-Hispanic other	557,548	519,342	93.1	38,207	6.9
Hispanic	3,283,450	3,110,444	94.7	173,006	5.3
Educational attainment					
No high school	7,052,463	6,871,210	97.4	181,253	2.6
High school degree	14,681,156	14,167,793	96.5	513,364	3.5
Some college	9,718,941	9,324,958	95.9	393,983	4.1
Bachelors degree	6,256,155	5,914,681	94.5	341,474	5.5
Graduate or professional degree	4,765,506	4,401,314	92.4	364,192	7.6
Citizenship status and year of entry					
Native	37,334,590	35,874,096	96.1	1,460,494	3.9
Naturalized entered 10+ years ago	3,989,702	3,764,445	94.4	225,257	5.6
Naturalized entered less than 10 years ago	97,334	92,725	95.3	4,609	4.7
Non-citizen entered 10+ years ago	965,053	876,004	90.8	89,049	9.2
Non-citizen entered less than 10 years ago	87,543	72,687	83.0	14,856	17.0
Marital status					
Now married	24,942,443	23,781,849	95.3	1,160,594	4.7
Widowed, separated, or divorced	15,866,247	15,370,345	96.9	495,902	3.1
Never married	1,665,531	1,527,761	91.7	137,770	8.3

(continued)

Table 3, continued

Characteristics in CPS ASEC	Total CPS ASEC-MEDB Matched	Matched Records that Correctly Report Medicare Coverage		Report False Negative	
	Number	Number	Percent	Number	Percent
Income to poverty ratio of health insurance unit					
Less than 100 %	5,925,149	5,565,920	93.9	359,229	6.1
100% to 149 %	5,871,060	5,768,964	98.3	102,096	1.7
150% to 199 %	5,085,366	5,005,311	98.4	80,055	1.6
200 or higher	25,592,647	24,339,762	95.1	1,252,885	4.9
Labor force participation					
Employed	7,015,217	5,942,323	84.7	1,072,894	15.3
Unemployed	298,527	269,623	90.3	28,904	9.7
Not in labor force	35,160,478	34,468,010	98.0	692,468	2.0
Disability					
Has a disability	12,923,178	12,708,458	98.3	214,719	1.7
Does not have a disability	29,551,044	27,971,498	94.7	1,579,546	5.3
SSI receipt					
Yes	1,234,081	1,219,888	98.8	14,193	1.2
No	41,240,140	39,460,068	95.7	1,780,072	4.3
Other household members have Medicare					
Yes	20,860,962	20,402,368	97.8	458,593	2.2
No	21,613,259	20,277,587	93.8	1,335,672	6.2
Imputation status of Medicare response					
Explicitly reported	33,948,437	32,686,231	96.3	1,262,206	3.7
Imputed	8,525,784	7,993,725	93.8	532,059	6.7

Source: 2014 Current Population Survey Annual Social Economic Supplement (CPS ASEC) and 2014 Medicare Enrollment Database (MEDB) linked data

Table 4. False Positive Misreporting of Medicare Coverage in the 2014 CPS ASEC by Characteristics
Universe: Ages 65 and older

Characteristics in CPS ASEC	Linkable records not in MEDB	Linkable Records that Correctly Report No Medicare Coverage		Report False Positive	
	Number	Number	Percent	Number	Percent
Total, Ages 65 and older	1,577,342	760,416	48.2	816,926	51.8
65	329,918	212,537	64.4	117,381	35.6
66	271,285	123,568	45.5	147,717	54.5
67	106,818	67,078	62.8	39,740	37.2
68	91,860	45,314	49.3	46,546	50.7
69	101,467	67,897	66.9	33,570	33.1
70+	675,993	244,022	36.1	431,971	63.9
Sex					
Male	776,535	418,658	53.9	357,877	46.1
Female	800,806	341,758	42.7	459,048	57.3
Race and Hispanic origin					
Non-Hispanic White alone	868,836	394,624	45.4	474,212	54.6
Non-Hispanic Black alone	177,563	78,103	44.0	99,460	56.0
Non-Hispanic Asian alone	237,928	116,484	49.0	121,444	51.0
Non-Hispanic other	15,357	8,099	52.7	7,257	47.3
Hispanic	277,658	163,106	58.7	114,552	41.3
Educational attainment					
No high school	333,763	96,338	28.9	237,425	71.1
High school degree	423,252	199,188	47.1	224,064	52.9
Some college	389,433	204,700	52.6	184,734	47.4
Bachelors degree	274,242	160,085	58.4	114,157	41.6
Graduate or professional degree	156,650	100,105	63.9	56,545	36.1
Citizenship status and year of entry					
Native	934,716	429,912	46.0	504,804	54.0
Naturalized entered 10+ years ago	248,210	130,492	52.6	117,718	47.4
Naturalized entered less than 10 years ago	27,357	11,052	40.4	16,305	59.6
Non-citizen entered 10+ years ago	193,358	116,991	60.5	76,367	39.5
Non-citizen entered less than 10 years ago	173,700	71,970	41.4	101,730	58.6
Marital status					
Now married	855,972	437,224	51.1	418,747	48.9
Widowed, separated, or divorced	592,116	255,741	43.2	336,376	56.8
Never married	129,253	67,451	52.2	61,802	47.8

(continued)

Table 4, continued

Characteristics in CPS ASEC	Linkable records not in MEDB	Linkable Records that Correctly Report No Medicare Coverage		Report False Positive	
	Number	Number	Percent	Number	Percent
Income to poverty ratio of health insurance unit					
Less than 100 %	502,694	190,489	37.9	312,204	62.1
100% to 149 %	111,703	27,065	24.2	84,638	75.8
150% to 199 %	116,400	27,470	23.6	88,930	76.4
200% or higher	846,544	515,391	60.9	331,153	39.1
Labor force participation					
Employed	595,054	410,008	68.9	185,046	31.1
Unemployed	33,366	25,166	75.4	8,200	24.6
Not in labor force	948,921	325,242	34.3	623,679	65.7
Disability					
Has a disability	345,987	75,092	21.7	270,895	78.3
Does not have a disability	1,231,354	685,324	55.7	546,030	44.3
SSI receipt					
Yes	76,937	-	0.0	76,937	100.0
No	1,500,404	760,416	50.7	739,988	49.3
Other household members have Medicare					
Yes	401,675	98,212	24.5	303,463	75.5
No	1,175,666	662,204	56.3	513,462	43.7
Imputation status of Medicare response					
Explicitly reported	931,191	641,593	68.9	289,598	31.1
Imputed	646,151	118,823	18.4	527,328	81.6

Source: 2014 Current Population Survey Annual Social Economic Supplement (CPS ASEC) and 2014 Medicare Enrollment Database (MEDB) linked data

whose response is as reported. In fact, of all the false positive responses, most (527,328 or 65 percent) were imputed values rather than reported responses.

Next we turn to our two logistic regressions evaluating the characteristics associated with, first, false negative responses and, second, false positive responses. Odds ratio results for both models are shown in Table 5. We find that minorities are generally more likely to report false negatives relative to non-Hispanic single-race Whites. Non-citizens are more likely to report false negatives compared to natives. This is particularly true for recent non-citizen entrants who are over five times more likely to report false negatives compared to natives. This may be a result of confusion regarding the different types of insurance or a misunderstanding of the survey question. Recent immigrants may have more difficulty answering the question and may be less familiar with the various types of insurance, resulting in higher rates of false negative reporting errors. The non-citizen CPS ASEC variable is not significant for false positive reporting.

Individuals who are not in the labor force, have a disability, or live in a household with others who have Medicare have lower odds of reporting false negatives (odds ratios ranging from 0.13 to 0.49) and higher odds of reporting false positives (odds ratios ranging from 3.89 to 6.29) relative to their counterparts. It is not surprising that we see lower odds of false negative reporting for these groups. Retired individuals are more likely to depend on Medicare compared to those still in the labor force, may have access to employer-based coverage and may therefore be more likely to accurately report having Medicare. Persons with disabilities may be more likely to seek medical care and thus more aware of their coverage. Additionally, Medicare eligibility criteria allow some disabled individuals to be eligible for Medicare prior to turning 65, and longer-term coverage may also be associated with more awareness and accuracy in reporting. Living in a household with others reported as having Medicare coverage also suggests awareness of the Medicare program and a higher likelihood of reporting Medicare coverage. It is interesting that we also see higher rates of false positives for these groups-indicating higher rates of reporting Medicare coverage even when not enrolled. Future research could explore whether persons in

Table 5. Weighted Logistic Regression Results: False Negative and False Positive Misreporting of Medicare Coverage in the 2014 CPS ASEC

Universe: Ages 65 and older

Variables	Model 1: False Negative Response		Model 2: False Positive Response	
	Odds Ratios		Odds Ratios	
Sex (male omitted)				
Female	1.15		0.76	
Race and Hispanic origin (non-Hispanic White omitted)				
Non-Hispanic Black alone	1.69	**	0.86	
Non-Hispanic Asian alone	1.47		0.63	
Non-Hispanic other	2.22	***	0.93	
Hispanic	1.49	*	0.30	*
Educational attainment (high school degree omitted)				
No high school	0.67	*	3.43	**
Some college	1.01		1.88	
Bachelors degree	1.09		2.23	
Graduate or professional degree	1.30		1.92	
Citizenship/Year of Entry (native omitted)				
Naturalized entered 10+ years ago	1.23		1.12	
Naturalized entered less than 10 years ago	1.05		0.53	
Non-citizen entered 10+ years ago	2.56	***	0.56	
Non-citizen entered less than 10 years ago	5.48	**	0.45	
Marital status (now married omitted)				
Widowed, separated, or divorced	0.41	***	1.70	
Never married	0.94		1.15	
Income to poverty ratio of the health insurance unit (200%+ omitted)				
Less than 100 %	2.97	***	3.09	*
100% to 149 %	0.82		4.34	*
150% to 199 %	0.63	*	6.97	***
Labor Force Participation (employed omitted)				
Unemployed	0.60		0.10	
Not in labor force	0.13	***	3.89	**
Disability Status (no disability omitted)				
Has a disability	0.49	***	4.16	**
Medicare Status of Other Household Members (no others with Medicare omitted)				
Others in household have Medicare	0.25	***	6.29	***
Private insurance (no private insurance omitted)				
Has private insurance	1.96	***	0.34	**
Imputation of Medicare response (not imputed)				
Imputed	1.36	*	25.96	***
-2 log likelihood	14,866,837		2,184,634	
N (weighted)	21,126		623	

*p<.05, **p<.01, ***p<.001

Source: 2014 Current Population Survey Annual Social Economic Supplement (CPS ASEC) and 2014 Medicare Enrollment Database (MEDB) linked data

these groups have had more experience with other public health insurance, are more informed about Medicare, and are thus more likely to report it even when not enrolled.

Individuals who are a part of a family[3] with an income to poverty ratio of less than 100 percent have higher odds of false negative reporting compared to those with an income to poverty ratio of more than 200 percent. For those whose health insurance unit income to poverty ratio is less than 200 percent, we find higher odds of reporting false positives relative to those with an income to poverty ratio of more than 200 percent. This is particularly true for those with an income to poverty ratio between 150 to 199 percent, who are close to seven times more likely to report a false positive compared to the reference group of 200 percent or higher. One possible explanation for this result may be health insurance coverage for the different income to poverty groups. People in the 150-199 income to poverty group may be less likely than those in the lowest income group to have Medicaid coverage and less likely than those in the highest income group to have private insurance. Thus they may be more likely to report having Medicare both when they have it (leading to lower odds of reporting false negatives) and when they do not (leading to higher odds of reporting false positives).

Having private insurance is associated with higher odds of reporting false negatives and lower odds of reporting false positives. As discussed earlier, people with dual coverage may not accurately report each insurance type. People who have both private insurance and Medicare may rely on their private insurance as their primary source of coverage, and thus may be choosing to select only this insurance in their CPS ASEC response. Meanwhile, those without private insurance may be more likely to depend on their Medicare coverage and thus report it.

Individuals whose Medicare coverage response was imputed in the CPS ASEC are more likely to have both types of reporting errors compared to those whose response was reported. This is particularly true for false positive reporting-imputed responses are 26 times more likely to be false positives compared

[3] Family is defined narrowly here. The Census Bureau defines family broadly and includes any related family. The family unit that we use takes into account eligibility for private or public insurance coverage. It is possible for there to be multiple health insurance units within one household or even within a Census-defined family (SHADAC 2012).

to responses that are reported. Further analysis (not shown) indicates that across all characteristics evaluated, false positive rates are higher when Medicare coverage is imputed compared to reported responses. This finding suggests current imputation procedures are often assigning Medicare coverage to individuals in the CPS who do not have Medicare coverage according to MEDB enrollment records.

Finally, we address our third research question regarding the impact of misreporting on Medicare and uninsured rates among older individuals. Table 6 shows the process of calculating adjusted rates using our measures of false negative and false positive errors. Taking into account these errors, the Medicare rate for the population aged 65 and older increases from 93.4 percent to 95.6 percent once we take into account misreporting, an increase of 2.2 percentage points. The uninsured rate for the population aged 65 and older decreases slightly from 1.4 percent to 1.3 percent when we adjust for misreporting of Medicare coverage.

Conclusion

We examined Medicare reporting of the older population in the CPS ASEC. By comparing CPS ASEC estimates of the Medicare enrolled population to administrative enrollment records, we find that the CPS ASEC undercounts the Medicare enrolled older population by about 4.5 percent. While notable, this undercount is much smaller than previous research on the Medicaid undercount,, suggesting that Medicare coverage is more accurately reported and covered in surveys relative to Medicaid. Using linked data, we find both false negative and false positive reporting of Medicare coverage in the CPS ASEC, and these errors are not randomly distributed. Similar to Medicaid reporting research, having multiple types of insurance is associated with misreporting Medicare coverage, as those with private insurance are less likely to report having Medicare. We also find that Medicare coverage of others in the household is associated with accuracy in reporting, which is also consistent with research on Medicaid reporting (Noon et al. 2016, Pascale et al. 2009). Usage of services also seems to be a factor – individuals with disabilities, whom we expect seek more care, are also more likely to report false negatives. We also find that non-citizens and recent entrants, groups that are less likely to have Medicare coverage (Gray et al. 2006), are

Table 6. Adjusted Insured, Medicare Coverage, Uninsured Rates
Universe: Ages 65 and older

	CPS Population	
	Number	**Pct**
Total, age 65 or higher	44,360,179	100.0
Report Insured in CPS	43,719,548	98.6
Report Medicare in CPS	41,424,095	93.4
Report Uninsured in CPS	640,631	1.4
Total, False Negative with Other Coverage	1,435,254	
Total, False Negative without Other Coverage	359,011	
Total, False Positive with Other Coverage	509,833	
Total, False Positive without Other Coverage	307,092	
Adjusted Medicare Rate *(Report Medicare + False Negative with or without Other Coverage - False Positive with or without Other Coverage)*	42,401,435	95.6
Adjusted Uninsured in CPS *(Report Uninsured - False Negative without Other Coverage + False Positive without Other Coverage)*	588,712	1.3

Source: 2014 Current Population Survey Annual Social Economic Supplement (CPS ASEC) and 2014 Medicare Enrollment Database (MEDB) linked data

more likely to report false negatives. Finally, imputation status of the Medicare coverage survey response is strongly associated with measurement error. Taking into account these misreporting errors, we estimate the adjusted Medicare coverage rate for the population aged 65 and older to be 95.6 percent, 2.2 percentage points higher than the CPS ASEC estimate of 93.4 percent, and we find a modest decline in the uninsured rate among the population aged 65 and older.

As researchers and policy makers often rely on survey data to understand health insurance coverage, our findings provide important information on the accuracy of survey-based estimates of Medicare coverage. While these results show that overall most people accurately report their Medicare coverage, false negative and positive reporting do affect estimates of Medicare coverage. Researchers studying Medicare coverage of older individuals should be aware of these errors in reporting and factors associated with false positive and negative errors.

These findings may also be of use to Medicare program administrators and efforts targeted at beneficiary education and outreach.[4] Resources devoted toward the administration of Medicare, and outreach efforts to educate participants, both depend on the knowledge of who is and is not enrolled in the program. If there are segments of the population that have a lower awareness of their Medicare enrollment status and incorrectly report not being enrolled, or incorrectly report being enrolled, then this could lessen the effectiveness of outreach efforts.

Our results also suggest further avenues of research for the U.S. Census Bureau. In particular, our finding that misreporting is significantly higher for those whose Medicare coverage was imputed in the CPS ASEC highlights the need for evaluation of current imputation procedures and the potential use of administrative records to determine Medicare coverage for those with a missing response. Knowledge of the extent of the Medicare undercount and factors associated with misreporting Medicare enrollment status may therefore contribute towards improvements in the measurement of Medicare coverage in surveys such as the Current Population Survey.

[4] The 2015 Medicare budget included $412 million for beneficiary education and outreach activities (Department of Health and Human Services, 2015). http://www.hhs.gov/about/budget/fy2015/budget-in-brief/cms/program-management/index.html

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