

Quantifying the Effect of a Cancer Diagnosis on Medicare Payments and Use According to New Public Use Files

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INTRODUCTION

In 2011, the Centers for Medicare and Medicaid Services (CMS) launched a data initiative called Basic Stand Alone Medicare Claims Public Use Files (PUFs). The objective was to increase access to its Medicare claims data through the release of deidentified data files available for public use. These files are available as free downloads and contain nonidentifiable claim-specific information. They are categorized by type of claim: Inpatient, Durable Medical Equipment, Prescription Drug Events, Hospice, Carrier, Home Health Agency, and Skilled Nursing Facility (SNF). Another set summarizes claims by patient characteristics (chronic conditions), institutional provider, and drug profiles. Each file offers summary data for Medicare beneficiaries under the fee-for-service plan. The objective of the current brief was 2-fold: 1) to quantify the impact of a cancer diagnosis on selected measures of Medicare payments and use as available in the 2008 and 2010 Chronic Conditions PUFs; and 2) to discuss the advantages and limitations of these files.

Information regarding chronic conditions is available in other PUFs such as the National Health Interview Survey, the Behavioral Risk Factor Surveillance System, and the Medical Expenditure Panel Survey. However, the first 2 are limited because 1) chronic conditions are identified only if limitations of daily living are reported and 2) these PUFs are subject to accuracy bias due to self-reporting. In addition, they do not collect information regarding expenditures. Conversely, the Medical Expenditure Panel Survey does collect information on expenditures by chronic condition, but also depends on the respondents' self-report and only collects data if the condition is current.

The chronic condition of cancer in these PUFs is defined as an indicator (eg, binary variable) of whether Medicare beneficiaries have been diagnosed with any of the following types of cancer: breast, colorectal, prostate, or lung. Table 1 shows the prevalence of these diagnoses in the United States by sex and age group according to the National Cancer Institute. Breast cancer affects mostly women, with a higher prevalence noted among women aged 70 years to 79 years, whereas prostate cancer is a condition that affects only men, with its prevalence being higher for those men aged ≥ 80 years. The lowest prevalence of these 4 cancers is that for the lung, with men having a slightly higher prevalence than women. Lastly, a similar pattern is observed for cancers of the colon and rectum, with low prevalence observed compared with cancers of the prostate or breast, and with a slightly higher prevalence among men. Although these figures are not available for the Medicare program population by site (because the program provides health insurance coverage to virtually all elderly Americans) they may reflect prevalence by cancer site in this population.

Medicare coverage for patients with cancer includes hospitalization and inpatient expenses incurred under Medicare Part A. Medicare Part B covers physician visits and outpatient hospital services. According to the American Cancer Society, Medicare pays for certain preventive health care services and some of the tests used to help in the early detection of disease (Part B) (more can be found at cancer.org/treatment/findingandpayingfortreatment/managinginsuranceissues/medicare/medicarepartd/medicare-part-d-things-people-with-cancer-need-to-think-about). Part B also covers drugs that are infused (given intravenously) or injected (given as a shot) in a physician's office or treatment center. Many chemotherapy drugs and the anti-nausea drugs used along with chemotherapy are administered intravenously in a physician's office or clinic, and therefore are covered under Medicare Part B. Lastly, depending on certain variables (eg, whether a drug was administered orally or intravenously) some drugs are covered under Medicare Part D.

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TABLE 1. Estimated US Cancer Prevalence Counts by Crude Age for All Races on January 1, 2010

Site		Aged 60-69 Years	Aged 70-79 Years	Aged ≥80 Years
Breast	Women	3.61%	4.47%	4.44%
	Men	0.02%	0.04%	0.06%
Colon and rectum	Women	0.59%	1.20%	1.90%
	Men	0.85%	1.68%	2.25%
Prostate	Women	—	—	—
	Men	4.89%	10.90%	11.61%
Lung	Women	0.31%	0.60%	0.52%
	Men	0.33%	0.65%	0.65%

Source: National Cancer Institute Surveillance, Epidemiology, and End Results (SEER) Cancer Statistics Review 1975-2010. Bethesda, MD: National Cancer Institute; 2013.

Data

The PUF for chronic conditions is formatted in such a way that each row is a combination of the following characteristics of Medicare beneficiaries: sex, age (in 5-year intervals), 11 indicators for chronic conditions, and an indicator for whether the beneficiary is eligible for Medicaid. The number of records represents the number of unique combinations of these characteristics observed in the Medicare population in the reference year. An example of a record is: female, aged 70-74 years, has cancer, has diabetes, and is not eligible for Medicare. Data represent 100% of the Medicare beneficiaries.

These PUFs provide information for Medicare beneficiaries who are enrolled in fee-for-service plans. Beneficiaries with 12 months of enrollment in fee-for-service Part A or Part B are separated from beneficiaries with < 12 months of enrollment. Payment indicators for Medicare Part A include Total Part A, Inpatient admissions, SNF, and other Part A services. Usage indicators for Part A include Inpatient admissions and SNF covered days. Payment indicators for Part B include Total Part B, Carrier, Outpatient, and other Part B services. Usage indicators for Part B include Carrier visits and Outpatient visits. Part D variables include drug costs and the number of prescriptions. Each payment and usage variable is presented as “per beneficiary” in the same profile. The file, however, includes the number of beneficiaries for each profile and therefore absolute numbers are easily obtained.

To compute the effect of a cancer diagnosis on Medicare payments and use, I restricted the analyses to beneficiaries enrolled in Medicare Parts A and B for the entire year who were not eligible for Medicaid (these are not 2 disjointed populations; most traditional Medicare [Part A] beneficiaries also have Part B coverage [approximately 90%]). The reason for only considering full-year enrollment is to avoid bias introduced by deaths, expenditures within the last year of life, and individuals who are just aging into the program. The reason for not including dual

eligible beneficiaries is to avoid bias due to state-specific program coverage variation as well as to partially control for socioeconomic status.

RESULTS

I began by estimating the prevalence for the 4 types of cancers included in these files. Table 2 provides the data for 2010. Results indicated that the overall prevalence was 7.2% and 8.3%, respectively, for men in Medicare Parts A and B and 4.5% and 4.9%, respectively, for women in Medicare Parts A and B. The prevalence in men increased over time, reaching 12% between age 80 years and 84 years. The prevalence for women was considerably lower, reaching its peak at ages 75 years to 79 years at 5.5% on average. Overall, the cancer prevalence in 2010 for Part A beneficiaries was 6.14% and was 6.92% for Part B beneficiaries. These numbers are consistent with a similar estimation by Schneider et al for 2005, in which prevalence was reported to be 6.3%.¹ It is interesting to note that the finding that cancer prevalence is higher in Medicare Part B beneficiaries compared with Part A beneficiaries reflects the fact that Part B is optional, and therefore patients with cancer will be more likely to enroll because of their health status.

To quantify the effect of a cancer diagnosis on Medicare payments and usage, it is necessary to isolate beneficiaries for whom cancer is their only diagnosis (these data sets are also useful to analyze the effect of multiple chronic conditions, but this is out of the scope of this brief). According to the chronic condition PUF, in 2010, a total of 364,414 beneficiaries had cancer as their only diagnosis, whereas 1,177,238 had cancer as well as another diagnosis. The distribution of cancer beneficiaries in 2010 by age and sex and whether other chronic conditions were present is shown in Table 3.

The metric used in this brief to estimate the effect of cancer on Medicare payments and usage variables is defined as the ratio of values between beneficiaries with

TABLE 2. Cancer Prevalence in the Medicare Population, 2010

Age Group, Years	Sex	Prevalence	
		Part A Full Year Not Dual	Part B Full Year Not Dual
<65	Man	1.27%	1.58%
	Woman	2.16%	2.63%
65-69	Man	4.62%	5.64%
	Woman	3.99%	4.63%
70-74	Man	7.70%	8.63%
	Woman	5.11%	5.49%
75-79	Man	10.23%	10.99%
	Woman	5.50%	5.74%
80-84	Man	11.73%	12.34%
	Woman	5.33%	5.51%
≥85	Man	11.29%	12.24%
	Woman	3.85%	4.10%
All	Man	7.24%	8.31%
	Woman	4.47%	4.89%
Overall		6.14%	6.92%

Source: Centers for Medicare and Medicaid Services 2010 Chronic Conditions Public Use File.

such conditions and those without any such condition. For example, in 2010, the average Part A payment per beneficiary for women in the group of patients who were aged ≥ 85 years and for whom cancer was their only chronic condition was \$2122, whereas the same value for beneficiaries without any chronic condition was \$458. The ratio between these 2 values is the factor by which Medicare payments increase due to the diagnosis (ie, 4.6 [eg, 2122 divided by 458]). Table 4 shows these ratios by sex and age categories for 2008 and 2010. Note that each ratio uses values per beneficiary and not per user.

The results indicate that having any of these 4 cancers as the only chronic condition increased the average Medicare payment for Medicare Part A beneficiaries by a factor of 5.2 for men in 2008 and by a factor of 5.1 in 2010. For women, the same factor was higher (5.8 in 2008 and 5.5 in 2010). By age, the highest factor was noted for those beneficiaries aged 65 years to 69 years for both sexes and years. Among the different components of Part A payments, the highest factors were observed for inpatient treatment for both patient sex and years. For example, in 2010, the effect was 5.4 for men and 5.9 for women. This figure is lower than that estimated by Schneider et al for 2005, which was 7.4.¹ However, their estimate included patients with multiple chronic conditions. Similarly, for Schneider et al, the effect on payments for a SNF was 7.2 for 2005, whereas in this brief it was 3.3 for men and 3.6 for women for 2010.

TABLE 3. Medicare Beneficiaries Enrolled Full Year in Part A and Not Eligible for Medicaid 2010 Who Were Diagnosed With Cancer

Age Group, Years	Sex	Cancer is Only Chronic Condition	Cancer and Other Chronic Condition
<65	Man	5,915	15,977
	Woman	7,578	20,765
65-69	Man	55,657	95,874
	Woman	42,389	90,084
70-74	Man	62,557	150,461
	Woman	38,494	114,240
75-79	Man	47,223	158,211
	Woman	25,425	104,533
80-84	Man	31,200	140,878
	Woman	17,111	89,458
≥85	Man	19,505	120,622
	Woman	11,360	76,135
All	Man	222,057	682,023
	Woman	142,357	495,215

Source: Centers for Medicare and Medicaid Services 2010 Chronic Conditions Public Use File.

With regard to usage variables, having any of these cancers as the only chronic condition increased inpatient admissions by 4.8 across sex and years. Lastly, SNF days increased by a factor of 3.3 for men and 3.7 for women in 2010.

With regard to Medicare Part B among men, the average Medicare payment increased by a factor of 4.9 in 2008 and a factor of 4.7 in 2010. This factor was 5.5 in 2008 and decreased to 5.3 in 2010 for women. Among the different components of Part B payments, Outpatient and Carrier were found to be the highest, with 6.2 for women and 5.1 for men in 2010. The age category with the highest factors was for those aged < 65 years. Lastly, cancer is associated with approximately 2.5 to 2.6 more physician visits for men and 2.3 to 2.4 more visits for women. Similarly, outpatient visits increased by a factor of 2.9 for both sexes.

DISCUSSION

In this brief, I calculated the effect of a cancer diagnosis on Medicare payments and use, comparing beneficiaries with cancer as their only diagnosis with beneficiaries without any chronic conditions, using a novel database that is available as a PUF. Overall Medicare Part A and Part B payments increased by a factor of approximately 5 (eg, \$230 vs \$1165 per beneficiary in 2010); inpatient admissions increased by a factor of 4.8 (eg, 2.6 vs 12.4 per 100 beneficiaries in 2010); Part B carrier payments increased by a factor of 5 (eg, \$756 vs \$3596 per beneficiary in 2010); outpatient payments increased by a factor of 6 for women (eg, \$381 vs \$2375 per beneficiary in 2010); and

TABLE 4. Effect of Cancer on Selected Medicare Payment and Use Variables for Full-Year Enrollees With Non-Dual Eligibility, 2008 and 2010

		Part A Payment Per Beneficiary						Part A Use Per Beneficiary					
		Total		Inpatient		SNF		Other		Inpatient Admissions		SNF Days	
		2008	2010	2008	2010	2008	2010	2008	2010	2008	2010	2008	2010
All men		5.2	5.1	5.5	5.4	3.9	3.3	3.5	3.1	4.8	4.8	3.7	3.3
Men aged:	<65 y	8.6	7.7	8.7	7.9	4.4	4.4	8.7	7.0	7.5	7.3	4.2	3.4
	65-69 y	9.1	8.5	9.3	8.9	3.7	2.3	6.6	5.4	8.0	7.9	3.4	2.6
	70-74 y	5.4	5.4	5.6	5.6	2.8	2.7	3.4	3.6	4.8	4.8	2.5	2.6
	75-79 y	3.9	3.7	4.1	4.0	2.5	2.3	2.4	2.1	3.4	3.5	2.5	2.4
	80-84 y	3.2	3.2	3.4	3.6	2.7	2.3	2.2	1.8	2.9	3.0	2.7	2.2
	≥85 y	3.3	3.2	4.0	4.1	3.3	2.9	2.1	1.8	3.5	3.5	3.2	2.9
All women		5.8	5.5	6.2	5.9	3.8	3.6	4.5	4.3	4.8	4.8	3.8	3.7
Women aged:	<65 y	6.5	6.7	6.3	6.5	6.8	6.3	8.8	8.2	5.2	5.3	6.3	6.2
	65-69 y	7.3	7.1	7.3	7.0	5.3	4.6	7.7	8.9	5.6	5.8	5.7	5.0
	70-74 y	6.0	5.5	6.0	5.5	4.1	3.6	6.7	6.1	4.7	4.7	4.2	3.2
	75-79 y	5.3	5.0	5.5	5.1	3.2	3.5	5.0	5.0	4.5	4.3	3.5	3.6
	80-84 y	4.7	4.4	5.0	4.8	3.1	3.2	4.5	3.9	4.0	3.9	3.1	3.4
	≥85 y	5.0	4.6	6.9	6.3	3.8	3.4	3.0	3.2	5.0	4.8	3.9	3.5
		Part B Payment per Beneficiary						Part B Use Per Beneficiary					
		Total		Carrier		Outpatient		Other		Carrier Visits		Outpatient Visits	
		2008	2010	2008	2010	2008	2010	2008	2010	2008	2010	2008	2010
All men		4.9	4.7	5.0	4.8	5.4	5.1	1.8	2.1	2.5	2.6	2.9	2.9
Men aged:	<65 y	8.9	8.1	10.1	9.0	10.6	9.4	2.3	2.6	3.9	4.0	4.1	4.2
	65-69 y	6.1	6.0	6.1	5.9	6.8	6.6	2.7	3.4	2.6	2.8	3.3	3.4
	70-74 y	4.7	4.4	4.6	4.4	5.5	4.9	2.1	2.5	2.3	2.2	2.8	2.7
	75-79 y	4.1	3.8	4.1	3.7	4.7	4.2	1.9	2.3	2.2	2.2	2.6	2.5
	80-84 y	3.4	3.2	3.5	3.2	3.7	3.5	1.6	1.9	2.2	2.1	2.3	2.3
	≥85 y	3.1	2.9	3.2	3.0	3.2	3.0	1.6	1.6	2.3	2.3	2.4	2.4
All women		5.5	5.3	5.4	5.0	6.3	6.2	3.6	4.1	2.3	2.4	2.8	2.9
Women aged:	<65 y	9.4	8.5	10.7	9.1	9.9	9.2	2.8	3.3	3.0	3.0	3.6	3.7
	65-69 y	6.7	6.7	6.5	6.2	7.5	7.9	5.3	6.1	2.5	2.6	3.1	3.2
	70-74 y	5.6	5.2	5.3	4.8	6.4	6.1	5.0	5.6	2.3	2.3	2.8	2.7
	75-79 y	4.7	4.5	4.5	4.2	5.3	5.2	4.2	4.5	2.1	2.2	2.5	2.6
	80-84 y	4.1	3.8	3.9	3.6	4.7	4.5	3.1	3.7	2.1	2.1	2.4	2.4
	≥85 y	3.7	3.5	3.7	3.4	4.4	4.3	2.2	2.5	2.2	2.2	2.6	2.6

Abbreviation: SNF, Skilled Nursing Facility.

carrier and outpatient visits increased by a factor of approximately 3. These results differ from and complement previous efforts. For example, Schneider et al¹ and the American Cancer Society Cancer Action Network's Cancer and Medicare: A Chartbook² published similar comparisons (eg, Medicare beneficiaries with and without cancer) for 2005 and 2006, respectively. However, in both efforts, patients with cancer may or may not have had other chronic conditions, making it difficult to isolate the effect of cancer from that of other diagnoses. Erdem et al³ published total Medicare Part A factors and compared those with other chronic conditions, but did not examine usage variables or payments by specific benefits such as SNF days or outpatient visits.

A second objective of the current article was to demonstrate the potential of the new PUFs from the CMS. Analyses used 24 profiles per file (eg, rows in each file) out of the >20,000 that were available. Although these files are not rich enough to perform statistical inference, there are more than enough facts and comparisons that can be performed to motivate further research. This is important because access to Medicare claims data is costly both in terms of money and time. In addition, as suggested by one reviewer, these files may complement other cancer surveillance tools currently available to the public, such as the National Cancer Institute's Surveillance, Epidemiology, and End Results program.

These files have several advantages, in addition to the obvious one of being free. First, they offer a multidimensional view (by all combinations of age categories, sex, Medicaid eligibility, and chronic conditions) of payment and usage variables for Medicare beneficiaries by program, which was previously unavailable to analysts. Second, they represent 100% of the Medicare beneficiaries, thereby overcoming sampling shortcomings. Third, they provide analytical variables separated by program and enrollment type, figures that to my knowledge have not been made available to the public in a PUF before. Fourth, chronic conditions included in these PUFs are taken directly from CMS Chronic Condition Data Warehouse condition categories, which in turn are identified using peer-reviewed clinical algorithms that search for valid *International Classification of Diseases, Ninth Revision/Current Procedural Terminology, 4th Edition/Healthcare Common Procedure Coding System* codes in claims files for chronic disease-specific reference time periods. The algorithm used⁴⁻¹⁷ is available elsewhere (ccwdata.org/cs/groups/public/documents/document/ccw_conditioncategories2011.pdf).

With regard to data limitations, it is worth noting the following. First, specific subpopulations such as individuals with disabilities or end-stage renal disease are not disaggregated. Second, and along the same lines, the dual eligibility indicator does not allow for disaggregation (for a review of different types of Medicaid coverage of Medicare beneficiaries, see cms.gov/MLNProducts/downloads/Medicare_Beneficiaries_Dual_Eligibles_At_a_Glance.pdf). Third, due to the deidentification techniques applied to the original data, some profiles have missing values, although to a very small degree. With regard to the latter, according to documentation (available at cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/BSAPUFS/Downloads/2010_ChronicConditions_GenDoc.pdf), although cancer is one of the conditions affected by the method applied, at the same time the number of beneficiaries suppressed is a very small percentage of the Medicare population. For this reason, although the factor estimated herein may not be exactly precise, the measurement error caused by suppression must not be of serious concern.

The descriptive nature of the current brief does not allow for direct policy implications. Nonetheless, it provides evidence to support current policy initiatives. For example, to the extent that early detection may have a positive effect on managing the course of the disease, it may also have a positive effect on Medicare payment and use.

Eliminating copays for cancer screenings and extending “Welcome to Medicare” visit availability are policies consistent with such an objective.

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