

Receipt of Chemotherapy Among Medicare Patients With Cancer by Type of Supplemental Insurance

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A B S T R A C T

Purpose

Medicare beneficiaries with cancer bear a greater portion of their health care costs, because cancer treatment costs have increased. Beneficiaries have supplemental insurance to reduce out-of-pocket costs; those without supplemental insurance may face barriers to care. This study examines the association between type of supplemental insurance coverage and receipt of chemotherapy among Medicare patients with cancer who, per National Comprehensive Cancer Network treatment guidelines, should generally receive chemotherapy.

Patients and Methods

This retrospective, observational study included 1,200 Medicare patients diagnosed with incident cancer of the breast (stage IIB to III), colon (stage III), rectum (stage II to III), lung (stage II to IV), or ovary (stage II to IV) from 2000 to 2005. Using the National Cancer Institute Patterns of Care Studies and linked SEER-Medicare data, we determined each Medicare patient's supplemental insurance status (private insurance, dual eligible [ie, Medicare with Medicaid], or no supplemental insurance), consultation with an oncologist, and receipt of chemotherapy. Using adjusted logistic regression, we evaluated the association of type of supplemental insurance with oncologist consultation and receipt of chemotherapy.

Results

Dual-eligible patients were significantly less likely to receive chemotherapy than were Medicare patients with private insurance. Patients with Medicare only who saw an oncologist had comparable rates of chemotherapy compared with Medicare patients with private insurance.

Conclusion

Dual-eligible Medicare beneficiaries received recommended cancer chemotherapy less frequently than other Medicare beneficiaries. With the increasing number of Medicaid patients under the Affordable Care Act, there will be a need for patient navigators and sufficient physician reimbursement so that low-income patients with cancer will have access to oncologists and needed treatment.

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INTRODUCTION

The Medicare program provides insurance coverage to elderly Americans, reducing patient-borne expenses associated with health care. However, rising health care costs and the transition of health care from inpatient to outpatient settings have increased Medicare coinsurance payments and deductibles for beneficiaries.¹ For patients with cancer, medical costs have risen over the past decade, driven in part by ongoing development of expensive chemotherapy drugs.² In a recent report, cumulative 2-year out-of-pocket spending per Medicare beneficiaries with cancer averaged \$4,727 compared with \$3,209

for those without cancer.³ This cost sharing from Medicare beneficiaries supports the financial stability of the Medicare program but places a substantial burden on elderly patients.

To reduce the impact of out-of-pocket costs, most Medicare beneficiaries have supplemental health insurance. Fee-for-service beneficiaries can obtain supplemental insurance from the purchase of a private (ie, Medigap) policy or from employer-sponsored plans for their retirees. Low-income Medicare beneficiaries may not be able to afford supplemental policies. For some low-income beneficiaries, financial assistance from Medicaid can offset these costs. Approximately 20% of Medicare

beneficiaries are dually eligible for Medicare and Medicaid, with Medicaid serving as the supplemental coverage.⁴ Dual-eligible beneficiaries may encounter challenges in accessing care. Prior studies have demonstrated that Medicaid recipients of all ages are less likely to obtain recommended care compared with those who are privately insured.⁵⁻⁷ Medicare patients who do not have Medicaid or supplemental private insurance face significant out-of-pocket expenses. Medicare patients with no supplemental insurance have been reported to receive less cancer treatment.⁸

In this study, we examined the relationship between supplemental insurance coverage and the receipt of chemotherapy among Medicare beneficiaries. The study included patients with selected cancers who, based on their cancer site and stage, should generally receive chemotherapy per National Comprehensive Cancer Network (NCCN) treatment guidelines.⁹⁻¹³ We sought to determine whether the type of supplemental insurance was related to disparities in the receipt of chemotherapy. We hypothesized that Medicare patients with no supplemental insurance or those dually eligible for Medicaid may receive less recommended chemotherapy than those with private supplemental insurance.

PATIENTS AND METHODS

Data Sources

The National Cancer Institute (NCI) SEER cancer registries collect information on all incident cancers occurring in 17 defined geographic regions and are generally representative of the US population. The population-based SEER data, collected primarily from hospital records, include date of diagnosis, tumor site and stage, initial treatment, and selected demographic characteristics for each patient. Chemotherapy is under-reported in SEER data, because most systemic therapies are provided in the outpatient setting. To obtain information on chemotherapy use, NCI annually

conducts Patterns of Care (POC) studies on a subset of SEER patients with selected cancer sites. The specific cancers vary by year. POC studies collect information from the medical records of patients with cancer about treatment, comorbidities, and type of health insurance.¹⁴ Each SEER registry obtains institutional review board approval as required before initiating the study.

NCI also sponsors the SEER-Medicare data, a linkage of patients in the SEER data with their Medicare enrollment and claims files. Of patients in SEER registries age ≥ 65 years, 94% have been linked to the Medicare master enrollment file.¹⁵ Medicare enrollment data include monthly indicators about health maintenance organization enrollment or whether the beneficiary receives state buy-in (SBI) assistance, a proxy for Medicaid enrollment. For beneficiaries with fee-for-service coverage, a Medicare claim includes a variable indicating if Medicare is the secondary payer to a primary insurer for that claim. Medicare physician and outpatient claims include procedure codes that describe the services billed on each claim, each physician's unique provider identification number (UPIN), and the physician's specialty. The NCI POC data and SEER-Medicare data include a unique SEER case number for each patient that was used to match persons in the POC data to the SEER-Medicare data.

Study Population

The POC study population included a subset of patients reported in the SEER data with an incident diagnosis. Cancer sites varied, because the POC studies include different cancer sites each year. Our analysis included patients with stage IIB to III breast, stage III colon, and stage II to III rectal cancers in 2000 and 2005; stage II to IV non-small-cell lung cancer in 2005; and stage II to IV ovarian cancer in 2002. We included the most recent years of data available for the specific sites.

Patients with a prior cancer diagnosis, a simultaneous second cancer diagnosis, or cancer reported only by autopsy or death certificate were ineligible for the POC study. Eligible patients were stratified by registry, sex, and racial/ethnic group and then randomly sampled within strata. Sampling weights varied based on the sex and race/ethnicity of the patient. Sampling fractions were used to calculate weighted percentages, reflecting the SEER populations from which the data were obtained. Women, non-Hispanic

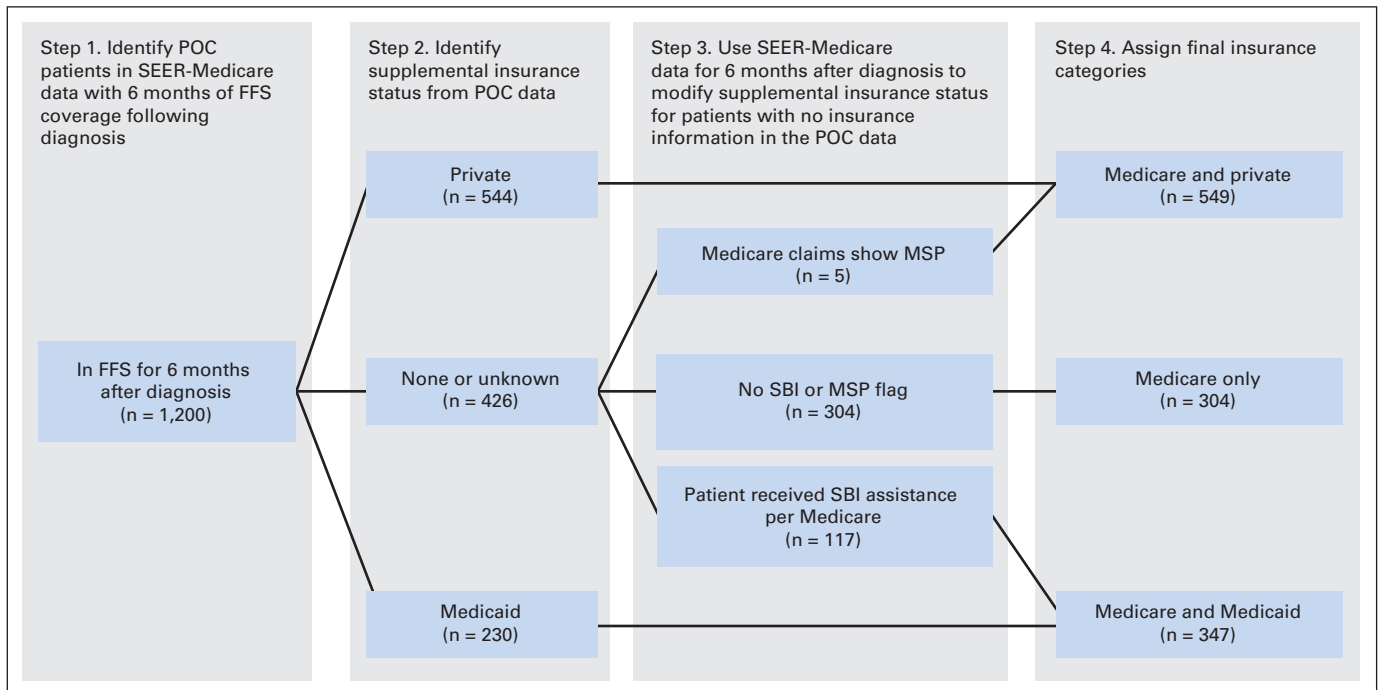


Fig 1. Steps to determine if Medicare beneficiaries had private insurance or Medicaid. FFS, fee for service; MSP, Medicare is secondary payer to private insurance; POC, Patterns of Care; SBI, state buy-in.

blacks, Hispanics, Asians/Pacific Islanders, American Indians, and Native Alaskans were oversampled to obtain more stable estimates. From the POC data, we identified persons age ≥ 65 years who also appeared in the SEER-Medicare data. To ensure complete data from the Medicare files, patients were required to have had continuous Medicare Part A (hospital insurance) and Part B (medical insurance) and fee-for-service coverage in the 6 months after diagnosis. Patients were not required to have undergone surgery for their cancer, because surgery was not indicated for all of the cancers.

Medicare Supplemental Insurance Definitions

Supplemental insurance status was determined from the POC and SEER-Medicare data, as shown in Figure 1. We classified each patient's insurance information into one of three categories: Medicare with private insurance, Medicare only, or Medicare and Medicaid, also known as dual-eligible patients. From the POC data, private insurance was defined as any insurance provided by a private insurance company, government insurance other than Medicare or Medicaid (eg, Tricare, Veterans Affairs, other military), Blue Cross/Blue Shield, or other similar insurance types. Medicaid eligibility was assigned if the patient was identified as having Medicaid. The Medicare-only designation included patients who were reported as having no insurance other than Medicare.

For patients who had no supplement insurance identified in the POC data, we used the SEER-Medicare data to search for additional information

about insurance. Medicare claims include a variable—primary payer amount—noting if there is a primary payer other than Medicare. This occurs when Medicare beneficiaries or their spouses are still working and are covered through an employer's health insurance plan. Patients were considered to have a private insurer in addition to Medicare if the primary payer amount variable on any Medicare claims during the 6 months after the date of diagnosis included any value $> \$0$. We used the SBI variable from the Medicare data. Medicare buy-in benefits, operated by state Medicaid programs, help low-income Medicare beneficiaries pay their Medicare premiums, deductibles, and copayments. If the SBI variable was flagged during the calendar year of diagnosis, the patient was assigned as having Medicaid in addition to having Medicare.

Assessment of Receipt of Chemotherapy and Consultation With Oncologist

Information about whether a patient had received chemotherapy was collected in the POC study from a patient's treating physician. Chemotherapy receipt was limited to initial treatment, generally regarded as treatment planned or administered before progression or disease recurrence.

Our focus was on the receipt of chemotherapy. However, oncologists are key decision makers about chemotherapy administration. Therefore, we evaluated whether consultation with an oncologist varied by supplemental insurance status. Oncologists were identified by matching UPINs for the physicians from the SEER-Medicare claims to American Medical

Table 1. Patient Characteristics by Type of Supplement Insurance Among Medicare Beneficiaries With Cancer in Selected Years

Characteristic	Insurance Type							
	All Patients (N = 1,200)		Medicare With Private Insurance (n = 549)		Medicare Only (n = 304)		Medicare and Medicaid (n = 347)	
	No.	%*	No.	%*	No.	%*	No.	%*
Age group, years								
65-69	283	21.5	138	24.5	62	11.9	83	26.2
70-74	303	25.3	133	25.9	72	24.1	98	25.5
75-79	284	24.8	122	21.7	84	33.4	78	22.0
80-84	195	17.8	100	18.3	44	16.9	51	17.5
≥ 85	135	10.6	56	9.6	42	13.7	37	8.8
Race								
Non-Hispanic white	578	80.3	357	90.2	165	82.1	56	44.1
Non-Hispanic black	269	9.1	94	5.4	71	8.7	104	22.2
Hispanic	161	4.6	49	1.9	37	4.5	75	14.1
Asian/Pacific Islander	181	5.9	45	2.4	29	4.6	107	19.5
American Indian†	11	0.1	< 11	—	< 11	—	< 11	—
Marital status								
Married	577	51.2	303	58.8	146	44.1	128	36.8
Unmarried	623	48.8	246	41.2	158	55.9	219	63.2
Cancer site and stage								
Breast II-B-III	120	19.4	62	23.0	23	12.2	35	18.5
Colon III	234	12.2	108	11.6	59	14.4	67	10.8
Rectal II-III	301	17.7	124	15.7	89	22.1	88	17.3
NSCLC II-IV	288	45.2	125	43.9	60	45.9	103	48.8
Ovarian II-IV	257	5.5	130	5.8	73	5.5	54	4.6
Charlson comorbidity score								
0	772	59.2	360	59.1	205	62.9	360	59.1
1	313	29.3	139	29.1	72	26.2	139	29.1
≥ 2	115	11.6	50	11.8	27	11.0	50	11.8
Prediagnosis physician visit in nursing home								
No	1,156	96.3	542	98.5	294	96.7	324	92.5
Yes	44	3.7	< 11	—	< 11	—	23	7.5

Abbreviation: NSCLC, non-small-cell lung cancer

*Weighted.

†Exact cell sizes < 11 are suppressed to protect patient confidentiality.

Table 2. Patient Comorbidity, Consultation With Oncologist, and Receipt of Chemotherapy by Cancer Type

Variable	Cancer Site and Stage											
	All Patients		Breast IIB to III		Colon III		Rectal II to III		NSCLC II to IV		Ovary II to IV	
	No.	%*	No.	%*	No.	%*	No.	%*	No.	%*	No.	%*
Oncologist consultation												
Yes	946	81.5	102	80.7	186	81.9	232	80.2	235	83.4	191	73.0
No	254	18.5	18	19.3	48	18.1	69	19.8	53	16.7	66	27.0
Received chemotherapy†												
Yes	676	52.5	53	47.9	125	54.5	185	63.6	147	48.7	166	59.1
No	524	47.6	67	52.1	109	45.5	116	36.5	141	51.3	91	40.9
Received chemotherapy‡												
Yes	608	59.8	50	54.6	118	63.6	172	74.8	139	54.9	129	63.8
No	338	40.2	52	45.4	68	36.4	60	25.2	96	45.1	62	36.2
Charlson comorbidity score												
0	772	59.2	83	67.5	146	64.6	200	66.2	145	49.0	198	78.5
1	313	29.3	29	29.8	66	30.0	74	26.7	97	31.3	47	17.3
≥ 2	115	11.6	8	2.7	22	5.5	27	7.1	46	19.7	12	4.2

Abbreviation: NSCLC, non-small-cell lung cancer.
 *Weighted.
 †All patients.
 ‡Among patients with oncologist consultation.

Association (AMA) data on physician specialty. If the patient had a claim from a physician whose primary or secondary specialty was hematology/oncology or medical oncology in the AMA data, the patient was classified as having had an oncology consultation. If the physician’s UPIN was not matched to the AMA data, the physician specialty on each patient’s Medicare claim was used to determine if the patient had seen an oncologist.

Statistical Analysis

Multivariable logistic regression models were used to assess the association between receipt of oncologist consultation and chemotherapy by supplemental insurance type. Two models were used with binary dependent variables (yes v no) for oncologist consultation and receipt of chemotherapy, respectively. Oncologist consultation was hypothesized to modify the effect of insurance type on receipt of chemotherapy, and this was tested with an interaction term in the second model and included in the second model along with the main effects. The results of the logistic regression analyses were presented as standardized percentages (predictive margins), representing the average percent of patients consulting with an oncologist or receiving chemotherapy.¹⁶ Cancer sites were combined to increase sample size. To control for differences in patients in each of the three insurance categories, the standardized percentages and SEs were adjusted for supplemental insurance type, cancer site and stage, race, age, marital status, Charlson comorbidity score, and whether the patient was in a nursing home during the 3 months before the cancer diagnosis, using an established algorithm based on procedure codes for nursing home visits reported in the physician claims.¹⁷ Information about income and educational level for the US Census tract where the patient lived was assessed in earlier models but not included in the final model, because the variables were not significantly associated with oncologist consultation or receipt of chemotherapy. We used SUDAAN statistical software (Research Triangle Institute, Research Triangle Park, NC) to account for the sampling design in all analyses.

RESULTS

Of the 1,200 patients in our study, 45.8% had Medicare with private insurance, 25.3% had Medicare only, and 28.9% had Medicare and Medicaid (Table 1). Supplemental insurance status varied

by age, race, and marital status. The oldest beneficiaries—those age ≥ 85 years—accounted for 13.7% of patients with Medicare only, although they accounted for 10.6% of all patients with cancer. Non-Hispanic black patients composed 22.2% of dual-eligible patients, although they accounted for 9.1% of all patients. Dual-eligible patients had more physician nursing home visits (7.5%) than did Medicare-only patients (3.3%) or those with Medicare and private insurance (1.5%).

All patients in the sample had a cancer site and stage where chemotherapy would generally be indicated per NCCN guidelines. Only 52.5% of all patients received chemotherapy (Table 2). Although > 80% of the sample had a consultation with an oncologist, < 60% of those who saw an oncologist received chemotherapy. Chemotherapy use varied by cancer site; patients with rectal cancer having the greatest use of chemotherapy (63.6%), whereas those with lung cancer had the lowest use of chemotherapy (48.7%).

The standardized percentage of patients who saw an oncologist or received chemotherapy varied by type of supplemental insurance. A lower percentage of dual-eligible Medicare and Medicaid patients saw oncologists than did patients who had Medicare with private insurance (78.4% and 83.6%, respectively; Table 3). However, patients of any insurance type who saw an oncologist received chemotherapy more often compared with those with no oncology consultation, although this difference was not statistically significant (interaction *P* = .55). Dual-eligible patients received chemotherapy significantly less often than did patients who had Medicare with private insurance, regardless of whether they had an oncologist consultation. Only 44.2% of dual-eligible patients who had an oncology consultation received chemotherapy, compared with 60.8% of those with Medicare and private insurance. Patient age was also a significant factor for receipt of chemotherapy, with patients age ≥ 75 years significantly less likely to receive chemotherapy than younger patients. Receipt of chemotherapy varied significantly by cancer site and stage, with patients with

Table 3. Standardized Percentages of Patients Receiving Oncologist Consultation or Chemotherapy

Characteristic	Oncologist Consultation (n = 1,200)		Chemotherapy (n = 1,200)	
	%*	SE	%*	SE
Supplemental insurance category†				
Medicare plus private‡	83.6	2.3	60.8	3.8
Medicare only	79.3	4.3	60.0	5.2
Medicare plus Medicaid	78.4	4.8	44.2	5.8
Supplemental insurance category§				
Medicare plus private‡			32.4	7.8
Medicare only			16.9	8.8
Medicare plus Medicaid			14.7	5.7
Age group, years				
65-69‡	87.9	3.5	70.9	4.4
70-74	85.4	3.4	59.0	5.3
75-79	81.5	4.1	51.1	4.7
80-84	78.1	4.2	38.4	6.1
≥ 85	62.6	6.3	22.0	5.9
Charlson comorbidity score				
0‡	84.5	2.1	56.1	3.3
1	76.9	4.0	45.1	5.0
≥ 2	76.8	7.7	52.8	6.6
Cancer site and stage				
Breast IIB to III‡	77.0	5.9	44.0	6.7
Colon III	85.2	2.8	61.0	3.8
Rectal II to III	80.3	2.8	64.0	3.8
Lung II to IV	84.0	2.8	48.6	4.2
Ovary II to IV	69.9	4.2	59.9	4.6
Race				
Non-Hispanic black‡	79.2	3.6	49.2	4.6
Hispanic	4.6	69.8	59.3	5.2
Non-Hispanic white	82.5	2.3	52.6	3.1
Asian/Pacific Islander	8.5	53.4	50.3	5.7
American Indian/Native Alaskan	11.9	42.2	66.2	29.4
Marital status				
Married‡	78.6	3.1	54.5	3.5
Unmarried	84.1	2.2	50.4	3.8
Prediagnosis physician visit in nursing home				
No‡	82.8	1.9	53.0	2.7
Yes	41.0	14.0	15.9	6.4

NOTE. Bold font indicates statistical significance ($P < .05$).

*Standardized percentages adjusted for all other variables in table.

†Among those with oncologist consultation.

‡Reference group in logistic regression model.

§Among those without oncologist consultation.

stage II to IV lung cancer or stage IIB to III breast cancer significantly less likely to receive chemotherapy than those with colon, rectal, or ovarian cancer. Patients with a prediagnosis nursing home claim were significantly less likely (15.9%) to receive chemotherapy than were patients with no nursing home claims (53.0%).

DISCUSSION

This analysis assessed the association between supplemental health insurance and receipt of chemotherapy among Medicare patients with

cancer for whom chemotherapy is generally recommended per guidelines. We found that dual-eligible patients had significantly lower receipt of chemotherapy than did Medicare patients with cancer who had private supplemental coverage, whether or not they had an oncology consultation and accounting for differences between the two groups, including cancer site, stage, age, race, comorbidities, and whether the patient was in a nursing home before diagnosis. The reasons for these lower rates of treatment are not entirely apparent, because both groups had Medicare and additional insurance to cover copayments and deductibles.

There may be health care system and patient factors that influenced treatment decisions. We examined consultation with an oncologist as one factor related to treatment. Oncology consultations among dual-eligible patients were 8% lower than those for Medicare patients with private supplemental insurance. This difference may reflect challenges encountered by dual-eligible patients in finding an oncologist to care for them. Reduced government payments to physicians have resulted in an increasing number of physicians declining to treat Medicare and Medicaid patients. A 2012 survey of physicians reported that 25% were not accepting new Medicare patients, and 36% were not accepting new Medicaid patients.¹⁸ For dual-eligible patients, states have been required to cover their Medicare copayments. However, states have been allowed to limit their obligation to the Medicaid rate of the state. As a result, many physicians are not reimbursed for patient cost sharing, affecting physicians' financial ability to accept dual-eligible patients. Physicians' willingness to accept dual-eligible patients is a particular concern, given the projected shortage of oncologists.¹⁹ With patient demand exceeding supply, oncologists may limit the types of insurance they are willing to accept.

The expansion of Medicaid under the Affordable Care Act (ACA) will increase the number of Medicare patients with cancer who are eligible for Medicaid. Under the ACA, state Medicaid programs will be required to pay medical oncologists any cost sharing for Medicare patients receiving evaluation and management physician services.²⁰ Physicians have reported willingness to take more Medicaid patients if reimbursement were increased, although they have been found to perceive Medicaid patients as being needier and more likely to be noncompliant.²¹ Future evaluation is needed to determine whether coverage by Medicaid of cost sharing for dual-eligible patients will alter physicians' acceptance of such patients.

There are other possible explanations for the lower rate in chemotherapy use found between dual-eligible patients and patients who had Medicare with private insurance. Dual-eligible patients may not be good candidates for chemotherapy; they have been reported to have more chronic conditions and cognitive or mental impairment when compared with other Medicare beneficiaries.⁴ In our study, comorbidity scores were comparable across insurance groups. Nursing home visits were higher among dual-eligible patients, although in the adjusted models, this did not explain the lower use of chemotherapy among the dual-eligible population. The type of hospital where patients were treated may have influenced the lower rate of chemotherapy among dual-eligible patients. Patients treated in larger teaching hospitals have been found to receive more adjuvant therapy, regardless of type of insurance.²² However, Medicaid patients with cancer have been reported to be more likely to receive care in low-volume hospitals,²³ where there may be less use of chemotherapy. Lower rates of chemotherapy use in the dual-eligible patients may reflect

Medicaid patients having different perspectives about chemotherapy than patients with Medicare with private insurance. Our data do not have detailed information about patient or provider treatment preferences.

We hypothesized that patients with Medicare only would be less likely to see an oncologist and receive chemotherapy because of concerns about out-of-pocket payments. We found lower consultation with an oncologist for patients with Medicare only compared with patients with Medicare with private insurance. However, receipt of chemotherapy was similar for patients with Medicare only and those with Medicare with private insurance. The growing use of oral chemotherapeutic agents will greatly increase the copayment burden for patients with Medicare only.²⁴ There needs to be ongoing assessment of the use of chemotherapy among patients with Medicare only.

Among patients in our study, approximately half were not receiving chemotherapy, despite NCCN guidelines generally recommending chemotherapy for these patients and > 80% having a consultation with an oncologist. The rate of nontreatment in our study was higher than the 9% to 12% nontreatment rate reported from a study using data from the National Cancer Data Base and Iowa Cancer Registry.²⁵ The earlier study included patients of all ages. In contrast, our analysis was limited to elderly persons. Our findings, especially that persons age \geq 75 years and those in nursing homes were significantly less likely to receive treatment, suggest that patients and physicians are considering life expectancy when deciding about whether to refer a patient to an oncologist or to recommend chemotherapy.

This study of the Medicare population is novel in that it examined how type of supplemental insurance is associated with cancer treatment. Although the question addresses a gap in the literature, there are limitations to our analysis. The findings from the SEER population may not be generalized to the entire US population. Our study group included a higher percentage of dual-eligible patients and patients with Medicare only than reported in the general Medicare population.²⁶ We relied on information reported in the medical records, augmented with information from Medicare, to determine type

of supplemental coverage. If this information was missing or inaccurately reported, this would influence our findings. For example, the sensitivity of the Medicare SBI variable is suboptimal.²⁷ We also relied on identification of oncologists based on physician number from Medicare data. Patients may have received chemotherapy from other medical specialists, such as gynecologists or surgeons. This may explain why patients with ovarian cancer had a lower percentage of oncology consultations but a similar rate of chemotherapy use.

In conclusion, this study demonstrates that for elderly patients with cancer, being eligible for Medicare does not guarantee receipt of cancer treatment. The most vulnerable of the Medicare population—low-income dual-eligible patient—are receiving less cancer treatment than are other Medicare beneficiaries. Programs to provide patient navigators for dual-eligible patients with cancer may help them access the system. In addition, ensuring adequate physician reimbursement so that there are a sufficient number of physicians willing to treat Medicaid patients is an important consideration, especially because the number of Medicaid patients will increase under the ACA.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Disclosures provided by the authors are available with this article at www.jco.org.

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Receipt of Chemotherapy Among Medicare Patients With Cancer by Type of Supplemental Insurance

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