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Intensity of end of life care for dual eligible beneficiaries with cancer and the impact of delivery system affiliation

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Precis (2 sentences): Dual eligible beneficiaries dying from cancer have higher utilization at the end of life compared to non-dual beneficiaries across most end of life quality measures. Some of these differences in utilization are mitigated in part by receipt of care at an affiliated delivery system such as a cancer center or integrated delivery network.

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Abstract

Background: Dual eligible beneficiaries, who qualify for Medicare and Medicaid, are a vulnerable population with much to gain from efforts to improve quality. Integrated delivery networks (IDN) and cancer centers, with their emphasis on care coordination

and communication, may improve quality of care for dual eligible patients with cancer at the end of life.

Methods: We used Surveillance, Epidemiology and End Results registry data linked with Medicare claims to evaluate quality for beneficiaries who died from cancer and were diagnosed from 2009-2014. We evaluated high intensity care using seven end of life quality measures according to dual eligible status with multivariable logistic regression models. We used regression-based techniques to assess the effect of delivery system affiliation (i.e., cancer center or IDN versus no affiliation).

Results: Among 100,549 beneficiaries who died during the study interval, 22% were dually eligible. We identified inferior outcomes for dual eligible beneficiaries compared to non-dual beneficiaries across nearly every quality measure assessed, including >1 hospitalization in last 30 days (12.6% vs 11.3%, $p<0.001$) and greater proportion of deaths occurring in a hospital setting (30.2% vs 26.2%, $p<0.001$). Receipt of care in an affiliated delivery system was associated with reduced deaths in a hospital setting and increased hospice utilization for dual eligible beneficiaries.

Conclusions: Dual eligible status is associated with higher intensity care at the end of life. Delivery system affiliation has a modest impact on quality at the end of life, suggesting targeted efforts may be needed to optimize quality for this group of vulnerable patients.

Introduction

Nearly 900,000 Medicare beneficiaries are diagnosed with cancer annually at a cost of more than \$34 billion.¹ Among beneficiaries 65 and older, 18% qualify for Medicaid in addition to Medicare, due to low income and are considered dually eligible.² Dual eligible beneficiaries are also disproportionately African American, female, and patients who have not attained a high school degree. In addition, higher percentages of breast, lung, and prostate cancers are seen among dual eligible beneficiaries compared to Medicare only beneficiaries.³ Despite making up only 18% of the Medicare population, dual eligible beneficiaries account for 31% of total Medicare spending.²

For dual eligible and non-dual eligible beneficiaries with cancer, a substantial portion of Medicare spending occurs in the last year of life.^{4,5} While much of this spending is

necessary and appropriate, there has been ongoing quality concerns regarding the use of overly aggressive care at the end of life for patients with cancer.^{6,7} Examples of aggressive care include a repeated emergency department visits, hospitalizations, and intensive care unit admissions for patients with limited life expectancy, and underutilization of hospice services. Importantly, avoiding such aggressive care was perceived by family members of Medicare beneficiaries who died from cancer to be consistent with patient preferences and indicative of better end of life care.⁸ With approximately 21% of Medicare spending occurring in the final year of life, often in the form of aggressive care, end of life care may be one area where value could be maximized through pursuit of higher quality care.⁹⁻¹²

Due to greater barriers to accessing care, well-coordinated care is particularly beneficial to the dual eligible population.¹³ Many believe that health systems can play a critical role in building the infrastructure to foster highly efficient, coordinated care, and improved communication among care teams that may be particularly beneficial for dual eligible beneficiaries.¹⁴ At designated cancer centers, such as National Cancer Institute or Commission on Cancer accredited programs, there is often increased attention on education, communication, treatment planning, and decision making for patients and families with cancer. Likewise, Integrated Delivery Networks (IDNs) place a strong emphasis on efficiency and care coordination. Accordingly, healthcare delivery systems that have an affiliation with a cancer center or IDN, may already have resources and systems in place to optimize quality of care for dual eligible beneficiaries with cancer. Recognizing that end of life care may be a particularly high utilization phase of cancer care, we sought to understand differences in aggressive care for dual eligible beneficiaries and if delivery systems with a cancer or integrated focus may be able to mitigate these differences.

Using Surveillance Epidemiology and End Results (SEER) registry data linked with Medicare claims data, we evaluated the association between delivery system structure, and the receipt of high intensity care at the end of life for dual eligible beneficiaries with cancer. We hypothesized that delivery systems with a cancer center or integrated

affiliation would deliver lower intensity care at the end of life for dual eligible beneficiaries with their focus on coordination of care, efficient care delivery, and improved communication.

Methods

Data Sources

We used three data sets to complete our analyses. First, we used SEER-Medicare data from 2009-2014 to identify eligible patients, define dual eligibility as well as clinical and demographic characteristics, and measure our outcomes of interest. Within SEER-Medicare, we used claims from the Medicare Provider Analysis and Review, Carrier, Outpatient, Hospice, and Patient Entitlement and Diagnosis Summary files. Second, we used the American Hospital Association (AHA) Annual Survey to identify participation in the American College of Surgeons Commission on Cancer program and hospital characteristics. Third, we used IQVIA's (formerly IMS Health) *Health Care Organization Services* dataset to identify individual hospitals, clinics, and health systems that comprise integrated delivery systems. This dataset links professionals and organizations to allow us to define participants of health systems and relationships among them using an identifier unique to the dataset. Linkages between SEER-Medicare, AHA Annual Survey, and the IQVIA datasets were performed using the CMS Certification Number (formerly Medicare Identification or Provider Number).

Identification of Study Sample

Using these data, we identified patients between age 66 and 99 years old, who died from breast, colon, lung, liver, esophageal, ovarian, prostate, bladder, kidney or pancreatic cancer between 2009 and 2014. We used the date of death from the Patient Entitlement and Diagnosis Summary File (PEDSF) file to establish the last 12 months of life. We determined dual eligibility for patients using the monthly indicator in the PEDSF file. Consistent with the Centers for Medicare and Medicaid Services' definition, a patient was considered dually eligible if they had at least one month of dual eligible enrollment in last 12 months of life.⁹ We required continuous enrollment in Medicare Parts A and B for the last year of life to ensure complete claims data and the ability to fully capture utilization.

Defining Delivery System Types

We characterized delivery systems according to their affiliation with a cancer center or integrated delivery system. Those with a cancer focus were identified based on accreditation by the American College of Surgeons Commission on Cancer or a National Cancer Institute-Designated Cancer Center.¹⁵ A delivery system was classified as integrated based on prior methodology using *Becker's Hospital Review's* list of the top 100 integrated delivery systems.^{16,17} Based on our prior work demonstrating similar quality outcomes at the end of life among cancer focused systems, integrated delivery systems, as well as systems that had both a cancer focus and were integrated, we combined these delivery system types into a single category (i.e., affiliated delivery systems).¹⁸ Delivery systems lacking a cancer focus or integration were classified as non-affiliated delivery systems. Patients were assigned to a delivery system based on where they received the majority of inpatient hospital care (e.g., the hospital with the plurality of MedPAR claims). For patients with a tie in the number of MedPAR claims, we assigned the patient to the delivery system with the longest length of stay.

End of Life Quality Measures

We utilized seven claims-based end of life quality measures relevant to patients with cancer, all evaluated at the patient level (Table 1). Our measures were chosen based on recommendations from the National Quality Forum and/or the American Society of Clinical Oncology, as well as prior literature establishing these measures as indicators of end of life quality of care.^{8,19-21} Each measure was constructed to identify higher intensity, lower quality care in the last 12 months of life and was calculated at the health system level. Higher percentages indicate a larger proportion of patients receiving higher intensity care. We also created an "all or none" measure for use of high intensity care at the end of life if the patient met any of the individual seven measures.²²

Statistical Analysis

We first compared patient and delivery system characteristics among dual eligible and non-dual eligible beneficiaries using Chi-squared tests. Next, we fit multivariable logistic

regression models to estimate association between dual status and the probability of patients meeting each measure. We adjusted all models for marital status, age, sex, cancer type, hospital bed size, and hospital teaching status based on a priori choice guided by a conceptual model of factors that may influence utilization and quality at the end of life.^{23–25} We specified standard errors to account for clustering at the delivery system level.

Finally, we performed a regression-based decomposition approach, the Blinder-Oaxaca method, to determine the relative contribution of the delivery system on the quality of end of life care for dual eligible versus non dual eligible beneficiaries.^{26–31} Statistical analysis was performed using Stata version 16, College Station, Texas.³² This study was deemed exempt by our Institutional Review Board.

Results

We identified 100,549 Medicare beneficiaries from 2009 through 2014 who died from cancer and met our inclusion criteria. Of these, 21,798 (22%) patients were identified as dually eligible with 85% being dual eligible for at least 11 of the last 12 months of life. The majority (n=79,330, 79%) of patients received care in an affiliated delivery system. However, dual eligible beneficiaries were more likely to receive care in a non-affiliated delivery system (n=6,028, 28%) compared to non-dual eligible beneficiaries (n=15,191 19%, $p < 0.001$).

Table 2 shows patient and delivery system characteristics stratified by dual eligibility in the last year of life. Compared with non-dual beneficiaries, dual eligible beneficiaries dying from cancer were less likely to be married (29% versus 53%, $p < 0.001$). Dual-eligible beneficiaries were also less likely to be white (68% versus 90%), have Hispanic ethnicity (13% versus 3%, $p < 0.001$), and were more often women (55% versus 47%, $p < 0.001$). There were no clinically significant differences in the age distribution or types of cancers among dual versus non-dual beneficiaries. Dual eligible beneficiaries were more likely to be treated in delivery systems that had fewer hospital beds, were non-teaching hospitals, and in census areas with higher levels of poverty.

Table 3 displays results from our multivariable model evaluating the receipt of high intensity care at the end of life for dual eligible versus non dual eligible beneficiaries. Dual eligible patients received higher intensity end of life care across all measures except duration in hospice <3 days, and receiving chemotherapy in the last 14 days of life. Dual eligible beneficiaries were more likely to die in a hospital setting (30.2% of dual eligible patients versus 26.2% non-dual eligible patients, $p<0.001$) and not be enrolled in hospice at the time of death (35.9% dual versus 31.3% non-dual, $p<0.001$).

When we used the Blinder-Oaxaca decomposition model we were able to break down the gap in quality of care between dual and non-dual beneficiaries and examine factors making up the differences noted in Table 3. We found receipt of care in an affiliated delivery system is associated with fewer hospitalizations in the last 30 days of life, a reduced number of deaths in a hospital setting, and improved hospice utilization for dual eligible patients compared to dual eligible patients receiving care in a non-affiliated system (Figure 1). Specifically, for dual eligible beneficiaries, receiving care at an affiliated delivery system reduced the gap in quality by 95% for hospitalizations ($p=0.02$), 90% for death in a hospital setting ($p<0.001$), and 57% for hospice utilization ($p<0.001$) compared to dual eligible beneficiaries receiving care at non-affiliated delivery systems. Figure 1 presents adherence to end of life quality measures for dual eligible beneficiaries stratified according to receipt of care in affiliated versus non-affiliated delivery systems. No significant differences were attributable to receipt of care in an affiliated system with regards to ICU admissions and Emergency Department utilization in the last 30 days of life, receipt of chemotherapy in the last 14 days of life, or short duration of hospice utilization. Finally, for our all or none outcome evaluating receipt of any measure of high intensity care at the end of life, we again noted a positive effect for dual eligible beneficiaries treated in affiliated delivery systems, where the gap in quality of care would have been 51% wider in a non-affiliated delivery system($p=0.003$).

Discussion

We evaluated utilization of end of life care for dual eligible beneficiaries with cancer and the impact of delivery system affiliation with a cancer center or integrated delivery network. Our study has two principal findings. First, dual eligible beneficiaries dying from cancer have higher utilization at the end of life compared to non-dual eligible beneficiaries across most measures. Second, certain differences in utilization at the end of life for dual eligible beneficiaries are mitigated in part by receiving care at an affiliated delivery system such as a cancer center or integrated delivery network. These findings highlight important system-level opportunities to reduce high intensity care at the end of life and improve the quality of end of life care for dual eligible patients with cancer.

Our findings of higher utilization at the end of life for dual eligible beneficiaries echoes prior work showing increased emergency department visits, as well as higher costs when dual eligible patients are hospitalized at the end of life.^{12,33} Several studies examining end of life care for dual eligible patients have found that hospice enrollment is associated with lower hospitalizations and readmissions at the end of life, and may be one potential strategy to decrease aggressive end-of-life care.^{34–37} Despite lower utilization and costs related to higher intensity care with hospice enrollment, disparities in hospice utilization exist, particularly for racial and ethnic minorities, and individuals residing in counties with high social vulnerability.^{38–41} We, similarly, noted lower utilization of hospice among our dual eligible beneficiaries compared to non-dual eligible beneficiaries, a difference that was mildly impacted by receipt of care in an affiliated system.

Our findings highlight a potential role that delivery system affiliation plays in mitigating the negative impact of dual eligibility on receipt of high intensity end of life care. One explanation for this may be that affiliation with a cancer center or within an integrated delivery system provides access to resources, infrastructure, and a focus on communication that can address patient preferences for care at the end of life. Several authors have highlighted the benefits of communication and formal advanced care planning on utilization at the end of life.^{42,43} However, a critical component of these discussions is understanding patient preferences, which are individualized and differ

across racial and ethnic groups and are highly relevant within the dual eligible population. Some studies have shown a preference for more intensive treatment plans among patients from racial or ethnic minority groups.^{44,45} Barriers to advanced care planning, palliative care, and hospice discussions may exist within African American patients to a greater extent than in the White patients and need to be assessed in a culturally appropriate manner.⁴⁶ Examples of possible intervention include tailored patient education, improved access to healthcare, and high quality communication to establish patient rapport.^{47,48} Given their low income status, dual eligible patients likely also face economic barriers to receiving high quality end of life care. Patients must balance competing financial demands to meet basic food, shelter, and safety needs versus paying for out of pocket medical expenses.⁴⁹ Additionally, patients with fewer economic resources may have unstable housing and neighborhood environments, or a lack of available caregivers, which may make home-based care impossible. Finally, the availability of palliative and hospice services (e.g., inpatient hospice beds, hospice providers and nurses) is often limited in low income communities, leaving clinics and hospitals as the only available resource for end of life care.^{50,51} A deeper understanding of the barriers and needs at the end of life for dual eligible and other vulnerable populations and their support systems will be critical to developing policies to eliminate these disparities.

Our study has several limitations. First, we elected to combine integrated delivery systems and cancer centers under the umbrella of affiliated delivery systems due to prior work showing similar benefits for improving quality in end of life care, as well as a significant number of delivery systems that are classified as both cancer centers and integrated systems. However, the mechanisms, resources, and philosophies driving quality differences among dual eligible beneficiaries may be different for integrated systems compared to cancer centers. Second, because of our inclusion criteria, our findings may not be generalizable to dual eligible beneficiaries under the age of 65, which may be important for preferences regarding end of life care. Finally, quality of care at the end of life is highly personal. Patient preferences are the centerpiece of delivering goal concordant care at the end of life. Understanding preferences enables

physicians and other health care providers to more effectively communicate, educate, and inform about prognostication and available options. Ultimately, the pursuit of higher or lower intensity care at the end of life is a decision that should be made by the patient with the support of their family and care team.

These limitations notwithstanding, our study has important implications for patients, physicians, and health systems. Our findings show a continued disparity in utilization of end of life care for dual eligible beneficiaries, however these differences may be mitigated in part by the delivery system where a patient receives the majority of their care. While often times patients, particularly those with constrained resources, have limited options on where to receive care, where patients receive care is a potentially modifiable factor, and they may specifically seek out physicians, and other health care providers who they feel most comfortable discussing end of life scenarios and preferences with. Physicians and other health care providers (e.g., social workers, care navigators), should be aware of this gap in care for dual eligible patients, and other vulnerable populations, so that needs can be identified, and resources can be appropriately directed to patients and families who need them. For health systems, there is an opportunity to improve value in care at the end of life by devoting time and resources to help providers develop improved communication skills, a deeper knowledge of how to elicit patient preferences across the spectrum of patients regardless of vulnerability, and using available resources to deliver goal concordant care.

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Figure Legend

Figure 1. Receipt of high intensity end of life care for dual eligible beneficiaries stratified by and delivery system affiliation. (*indicates significant contribution of delivery system affiliation to quality of care, $p < 0.05$)

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Table 1. End of life quality measures

Measure
>1 hospitalization in last 30 days of life
Admitted to ICU in last 30 days of life
Death in a hospital setting
>1 Emergency Department visit in last 30 days of life
Chemotherapy in last 14 days of life
Percentage of cancer deaths NOT enrolled in hospice
Percentage of patients with <3 days in hospice

Table 2. Patient and health system characteristics stratified according to beneficiary dual eligible status.

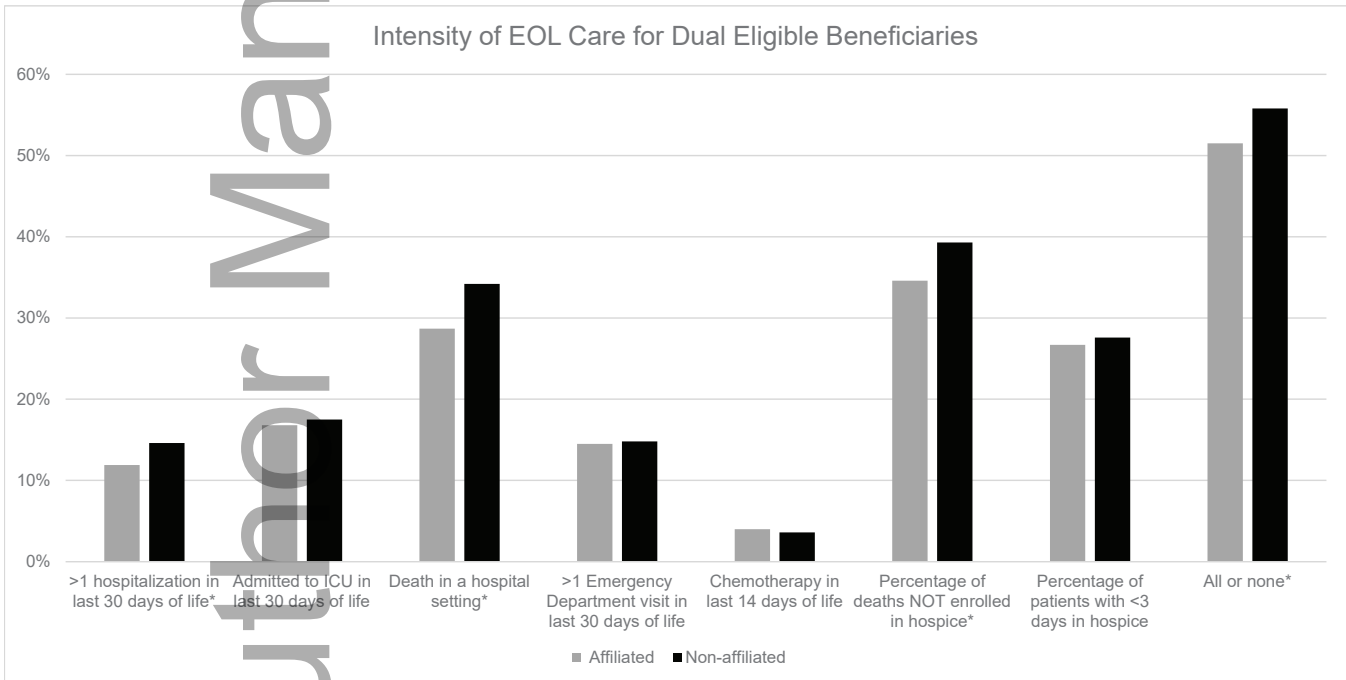
Characteristic	Total		Dual Eligible		Non-Dual Eligible		p-value
	n	%	n	%	n	%	
Marital Status							<0.001
Single	8,504	8	3,435	16	5,069	6	
Married	48,391	48	6,277	29	42,114	53	
Divorced/Separated	9,247	9	3,695	17	5,552	7	
Widowed	30,032	30	7,373	34	22,659	29	
Unknown	4,375	4	1,018	5	3,357	4	
Age (years)							<0.001
66 to 69	16,870	17	4,235	19	12,635	16	
70 to 74	23,107	23	5,293	24	17,814	23	
75 to 79	22,395	22	4,802	22	17,593	22	
80 to 84	19,710	20	3,830	18	15,880	20	
85 or above	18,467	18	3,638	17	14,829	19	
Race							<0.001
White	85,974	86	14,915	68	71,059	90	
Black	9,297	9	4,072	19	5,225	7	
Asian or Pacific Islander	4,770	5	2,627	12	2,143	3	
American Indian/Alaska Native	391	<1	150	1	241	<1	
Unknown	117	<1	34	<1	83	<1	

Ethnicity							<0.001
Hispanic	5,369	5	2,785	13	2,584	3	
Non-Hispanic	95,180	95	19,013	87	76,167	97	
Sex							<0.001
Male	51,279	51	9,795	45	41,484	53	
Female	49,270	49	12,003	55	37,267	47	
Cancer Type							<0.001
Bladder	4,967	5	856	4	4,111	5	
Breast	4,986	5	1,302	6	3,684	5	
Colorectal	13,631	14	3,259	15	10,372	13	
Esophagus	3,054	3	564	3	2,490	3	
Kidney	2,645	3	519	2	2,126	3	
Liver	3,116	3	1,062	5	2,054	3	
Lung	48,359	48	10,583	49	37,776	48	
Ovarian	3,260	3	587	3	2,673	3	
Pancreas	12,440	12	2,276	10	10,164	13	
Prostate	4,091	4	790	4	3,301	4	
Urban/Rural							<0.001
Urban	82,336	82	17,244	79	65,092	83	
Rural	18,213	18	4,554	21	13,659	17	
Hospital Bed Size							<0.001
6-199 beds	27,650	28	6,726	31	20,924	27	
200-399 beds	39,967	40	8,833	41	31,134	40	
400 or more beds	32,932	33	6,239	29	26,693	34	
Teaching Hospital							<0.001
Teaching hospital	49,474	49	9,735	45	39,739	50	
Non-Teaching hospital	51,075	51	12,063	55	39,012	50	
Census Poverty Percentage							<0.001
0%-<5% poverty	21,001	21	2,061	9	18,940	24	
5% to <10% poverty	23,793	24	3,385	16	20,408	26	
10% to <20% poverty	27,216	27	6,263	29	20,953	27	
20% to 100% poverty	20,301	20	7,711	35	12,590	16	
Unknown	8,238	8	2,378	11	5,860	7	
Delivery System							<0.001
Affiliated (Cancer Center	79,330	79	15,770	72	63,560	81	

and/or Integrated)							
Non-affiliated	21,219	21	6,028	28	15,191	19	
Overall Dual Status	100,549	100	21,798	22	78,751	78	

Table 3. Receipt of high intensity end of life care stratified by beneficiary dual eligibility status.

Outcome	Dual eligible	Non-dual eligible	Difference	p-value
>1 hospitalization in last 30 days of life	12.6%	11.3%	1.3%	<0.001
Admitted to ICU in last 30 days of life	16.9%	15.4%	1.5%	<0.001
Death in a hospital setting	30.4%	26.2%	4.2%	<0.001
>1 Emergency Department visit in last 30 days of life	14.7%	12.1%	2.6%	<0.001
Chemotherapy in last 14 days of life	3.7%	6.4%	-2.7%	<0.001
Percentage of deaths NOT enrolled in hospice	36.1%	31.2%	4.9%	<0.001
Percentage of patients with <3 days in hospice	27.0%	27.6%	-0.7%	0.12
All or none	52.8%	47.9%	4.9%	<0.001



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