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Trends in end-of-life cancer care in the Medicare program

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ABSTRACT

Objectives: To examine contemporary trends in end-of-life cancer care and geographic variation of end-of-life care aggressiveness among Medicare beneficiaries.
Materials and Methods: Using the Surveillance, Epidemiology, and End Results—Medicare data, we identified 132,051 beneficiaries who died as a result of cancer in 2006–2011. Aggressiveness of end-of-life care was measured by chemotherapy received within 14 days of death, >1 emergency department (ED) visit within 30 days of death, >1 hospitalization within 30 days of death, ≥1 intensive care unit (ICU) admission within 30 days of death, in-hospital death, or hospice enrollment ≤3 days before death. Using hierarchical generalized linear models, we assessed potentially aggressive end-of-life care adjusting for patient demographics, tumor characteristics, and hospital referral region (HRR)-level market factors.
Results: The proportion of beneficiaries receiving at least one potentially aggressive end-of-life intervention increased from 48.6% in 2006 to 50.5% in 2011 ($P < .001$). From 2006 to 2011, increases were apparent in repeated hospitalization (14.1% vs. 14.8%; $P = .01$), repeated ED visits (34.3% vs. 36.6%; $P < .001$), ICU admissions (16.2% vs. 21.3%; $P < .001$), and late hospice enrollment (11.2% vs. 12.9%; $P < .001$), whereas in-hospital death declined (23.5% vs. 20.9%; $P < .001$). End-of-life chemotherapy use (4.4% vs. 4.5%) did not change significantly over time ($P = .12$). The use of potentially aggressive end-of-life care varied substantially across HRRs, ranging from 40.3% to 58.3%. Few HRRs had a decrease in aggressive end-of-life care during the study period.
Conclusions: Despite growing focus on providing appropriate end-of-life care, there has not been an improvement in aggressive end-of-life cancer care in the Medicare program.

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1. Introduction

Overly aggressive care at the end of life is not consistent with patient preferences,[1–3] incurs substantial costs, and is not associated with better outcomes.[4–6] Since 1999, the Institute of Medicine (IOM) has released several reports calling for improvement of end-of-life cancer care.[7,8] Efforts have identified concerning end-of-life care patterns, such as very late chemotherapy use, very short hospice enrollment, and repeated hospitalization during patients' last month of life.[9] Such aggressive care patterns have been used by oncologists to indicate poor end-of-life care quality.[10,11] While palliative care has been embraced by the medical community, the recent IOM report *Dying in America* highlights continued deficiencies in promoting palliative care.[12] To improve end-of-life care, several organizations, including the American Society of Clinical Oncology, have been working to improve care delivery, clinician–patient communication, and advance care planning.[13,14]

Available literature examining end-of-life cancer care among older individuals with cancer in the United States is outdated,[15,16] limited in scope,[17] or lacks important clinical detail.[18–20] For instance, one study of Medicare beneficiaries with ovarian cancer found that intensity of hospital-based end-of-life care increased between 1997 and 2007.[17] The other analyses of Medicare beneficiaries lacked clinical detail regarding cancer characteristics, either focusing on patients with cancer who had been hospitalized during the last 6 months of life[18] or comparing general end-of-life care patterns across decedents who died from cancer or other causes.[20] These analyses highlight the need for more comprehensive, updated information regarding end-of-life cancer care in the United States in order to assess progress after over a decade of efforts to improve care, and identify opportunities for improvement.[15]

To address this knowledge gap, we examined the trends in the aggressiveness of end-of-life cancer care over time in a population-based cohort of Medicare beneficiaries who had died after a cancer diagnosis. We also evaluated the trends of geographic variation of end-of-life care aggressiveness and identified the geographic regions that experienced a greater improvement in end-of-life cancer care than others. We assessed the associations of end-of-life care aggressiveness with patient characteristics and the availability of related healthcare resources. Findings from this study can not only provide a more comprehensive picture of temporal trends in the quality of end-of-life cancer care in the United States but also further our knowledge of whether certain regions or regional market factors might be more conducive to improving end-of-life care.

2. Methods

2.1. Data and Study Design

We used the Surveillance, Epidemiology, and End Results (SEER)—Medicare database, a unique data source linking Medicare enrollment and claims records to tumor registries. The SEER registries currently cover approximately 28% of the U.S. population.[21] We used SEER data to identify baseline patient and tumor characteristics and Medicare claims to identify indicators of interaction with the healthcare system. The study was reviewed by the Institutional Review Board of Yale University who determined that this study did not directly involve human subjects.

2.2. Patients

We identified beneficiaries who had breast, prostate, lung, colorectal, pancreas, liver, kidney, melanoma, or hematologic cancer diagnosed in 2004–2011. To make the sample of each year comparable, we limited our cohort to decedents each year who died within 3 years of diagnosis as a result of cancer. This criterion of the same range of time between cancer diagnosis and death each year, consistent with prior research,[9] allowed us to avoid the potential influence of time between cancer diagnosis and death on trend results. Consequently, only the annual results from 2006 to 2011 were compared. We limited our sample to beneficiaries who were aged 66.5–94.9 years at death and enrolled in Medicare Parts A and B during the last 18 months of life. Patients were excluded if their diagnosis occurred only according to death certificate or autopsy, if they could not be assigned to a hospital referral region (HRR), or if they lived less than 3 months after cancer diagnosis. The step-wise ascertainment of our study cohort is listed in Appendix Table A1 (online only).

2.3. Measurement

2.3.1. Outcomes

We used previously developed claims-based indicators of potentially aggressive health care within the last 30 days of life,[10] including (1) chemotherapy received within 14 days of death, (2) >1 emergency department (ED) visit within 30 days of death, (3) >1 hospitalization within 30 days of death, (4) ≥1 intensive care unit (ICU) admission within 30 days of death, (5) in-hospital death, and (6) hospice enrollment ≤3 days before death. We created a composite measure of aggressive end-of-life care, which was defined as the occurrence of at least one of the indicators above.

2.3.2. Covariates

We included candidate variables which are available in our database and have been used in research examining end-of-life care and/or healthcare market factors. Patient demographics included age, race, Hispanic ethnicity, gender, year of death, marital status, SEER registry, and metro status of residence.[22] Socioeconomic status measures included median household income and percentage of adults with high school education or less, both derived from census data. We evaluated Elixhauser comorbidity conditions between 7 months and 18 months prior to death, adapting an approach that requires the diagnosis code to appear on an inpatient claim or two or more physician or outpatient claims greater than 30 days apart for the condition to be considered present.[23] We incorporated a measure of disability status, a claim-based indicator for services commonly needed by patients with poor functional performance status.[24] We also ascertained the number of outpatient clinic visits within 1 to 3 months before death. Tumor characteristics included tumor site, advanced stage, multiple-cancer