

Hospice Agency Characteristics Associated with Benzodiazepine and Antipsychotic Prescribing

Running Title: Prescribing in Hospice

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Disclosures: No related papers have been published or submitted from this study. This work was supported by the National Institute on Aging K23AG066864.

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Manuscript Word Count = 1998

Abstract = 278

Tables = 0

Figures = 3

References = 28

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: [10.1111/jgs.18344](https://doi.org/10.1111/jgs.18344)

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Key Points:

- Across hospice agencies in the U.S., prescribing rates of both benzodiazepines and antipsychotics vary widely suggesting non-standardized practice patterns.
- Among the highest benzodiazepine- and antipsychotic-prescribing hospice agencies, there was a smaller proportion of patients from minoritized populations, while for-profit and larger hospice agencies were over-represented. A greater proportion of rural beneficiaries were in the highest benzodiazepine-prescribing quintile while this relationship was not present for antipsychotics. Wide variation in both benzodiazepine and antipsychotic prescribing rates were observed across Census regions.

Why does this paper matter? Defining the appropriate level of benzodiazepine and antipsychotic prescribing to hospice-enrolled individuals is difficult because there is limited high-quality evidence to help guide their use. In this information vacuum, the extent of prescribing varies widely across hospice agencies, and the characteristics of the hospice agency in which patients are enrolled (e.g., for-profit status) are strongly associated with prescribing. Further work is needed to better understand the drivers and outcomes of this wide variation in care.

ABSTRACT

Background: Benzodiazepine and antipsychotic medications are routinely prescribed for symptom management in hospice but have significant risks for older adults. We explored the extent to which patient and hospice agency characteristics are associated with variation in their prescribing.

Methods: Cross-sectional analysis of hospice-enrolled Medicare beneficiaries ≥ 65 years old in 2017 (N=1,393,622 in 4,219 hospice agencies). Main outcome was the hospice agency-level rate of enrollees with benzodiazepine and antipsychotic prescription fills, divided into quintiles. Rate ratios were used to compare agencies with the highest and lowest prescribing across patient and agency characteristics.

Results: In 2017, hospice agency prescribing rates varied widely: for benzodiazepines, from a median of 11.9% (IQR 5.9,22.2) in the lowest-prescribing quintile to 80.0% (IQR 76.9,84.2) in the highest-prescribing quintile; for antipsychotics, from 5.5% (IQR 2.9,7.7) in the lowest to 63.9% (IQR 56.1,72.0) in the highest. Among the highest benzodiazepine- and antipsychotic-prescribing hospice agencies, there was a smaller proportion of patients from minoritized populations (benzodiazepine: non-Hispanic Black rate ratio [RR] [Q5/Q1] 0.7, 95% CI 0.6-0.7, Hispanic RR 0.4, 95% CI 0.3-0.5; antipsychotic: non-Hispanic Black RR 0.7, 95% CI 0.6-0.8, Hispanic RR 0.4, 95% CI 0.3-0.5). A greater proportion of rural beneficiaries were in the highest benzodiazepine-prescribing quintile (RR 1.3, 95% CI 1.2-1.4) while this relationship was not present for antipsychotics. Larger hospice agencies were over-represented in the highest prescribing quintile for both benzodiazepines (RR 2.6, 95% CI 2.5-2.7) and antipsychotics (RR 2.7, 95% CI 2.6-2.8), as were for-profit agencies (benzodiazepine: RR 2.4, 95% CI 2.3-2.4; antipsychotic: RR 2.3, 95% CI 2.2-2.4). Prescribing rates varied widely across Census regions.

Conclusions: Prescribing in hospice settings varies marked across factors other than the clinical characteristics of enrolled patients.

Key Words: Hospice, benzodiazepine, antipsychotic, symptom management

INTRODUCTION

Benzodiazepine and antipsychotic medications are routinely prescribed in hospice for both behavioral and physical symptom management.¹ Following opioids, benzodiazepines and antipsychotics are the most widely prescribed medication classes to Medicare hospice beneficiaries, with prescriptions filled by 60.6% and 38.3% of beneficiaries, respectively.^{2,3} While their presence in the hospice toolkit reflects their perceived value in this setting,⁴ outside of hospice care, these medications would otherwise be generally considered potentially inappropriate for older adults given their associated adverse events including falls, sedation, and mortality risk.^{5,6} Knowledge characterizing prescription medication use among hospice beneficiaries has been limited because, prior to 2014, there was no requirement that hospice agencies report medications billed to the Medicare benefit.⁷

Following Medicare hospice payment reform in 2014, hospice agencies were required to list medications billed to Medicare,⁸ allowing for the first claims-based analysis of prescribing in hospice.² While prior work has noted central nervous system-active medication use in hospice is common,^{2,3} it is unclear the extent to which patient- or agency-level factors are associated with prescribing. As in other parts of the health care system (e.g., nursing homes),⁹ the characteristics of the treating facility may be an important determinant of how medications are prescribed.¹⁰ This may be particularly true in hospice, where there is relatively limited evidence to guide care.^{11,12} Recent work demonstrating wide state-based variation in hospice benzodiazepine and antipsychotic prescribing suggests clinical practice is highly variable.¹³

No studies have examined variation in prescribing across hospice agencies, which may be critical information to help guide future initiatives to promote more standardized and appropriate prescribing. Using a sample of all age-eligible Medicare beneficiaries enrolled in hospice in 2017, we aimed to determine potential variation in benzodiazepine and antipsychotic prescribing across hospice agencies as well as the hospice agency characteristics associated with prescribing. The objectives of this study were to: 1) determine the rates of and variation in

benzodiazepine and antipsychotic prescribing across hospice agencies; and 2) determine how prescribing varied across particular hospice patient- and agency-level factors.

METHODS

Study Cohort

We identified Medicare beneficiaries enrolled in hospice for at least one day in 2017 using the 100% Medicare Hospice files, and restricted to those ≥ 65 years old at hospice enrollment. Beneficiaries were followed until disenrollment from hospice, death, or end of study period (12/31/2017), whichever occurred first. If a beneficiary had multiple enrollments in 2017, we selected the earliest. Using the Hospice files, we identified the enrolling hospice agency for each beneficiary; we excluded agencies with fewer than 10 beneficiaries (N=35 agencies). The final study sample included 1,393,622 beneficiaries receiving hospice services from 4,219 hospice agencies.

Hospice Agency Prescribing

Among those in the study cohort, we first determined if they had at least one benzodiazepine fill during their hospice stay in 2017. Prescription fills were identified in the Medicare Hospice file, which reflects medications billed to the Medicare hospice benefit and captures the vast majority of benzodiazepine and antipsychotic prescribing to hospice enrollees.¹⁴ Using beneficiary-level data, we then computed the hospice agency-level prescribing prevalence. The denominator was the number of beneficiaries in the study cohort at each hospice agency, while the numerator was the number of beneficiaries with at least one benzodiazepine prescription fill during hospice enrollment. Similar steps were taken to determine the hospice agency-level antipsychotic prescribing rates.

Hospice Agency-Level Characteristics

We used the Hospice files to identify beneficiary age, sex, race/ethnicity, rurality (using beneficiary zip code and Rural-Urban Commuting Area Codes^{15,16}), and length of enrollment. Hospice primary qualifying diagnoses included cancer, circulatory/heart disease, dementia, respiratory disease, stroke, and other diagnoses, categorized based on Clinical Classifications Software (CCS) diagnosis categories.^{17,18} Patient-level data were summarized to create characteristics at the level of the hospice agency (e.g., mean age, percentage of non-Hispanic Black beneficiaries, percentage of beneficiaries residing in rural locations).

We categorized hospice agencies by size using the number of annual admissions from Medicare Hospice Public Use Files^{17,18} and by ownership status using the Medicare Provider of Service file.¹⁹ Lastly, we used agency zip code to assign agencies to Census region.

Statistical Analysis

For descriptive purposes, we split agency-level prescribing of benzodiazepines and antipsychotics into quintiles and characterized agencies by prescribing quintile. To examine variation across hospice-level patient and agency characteristics, we used rate ratios to compare those agencies in the highest prescribing rate (quintile 5 [Q5]) with those with the lowest prescribing rates (quintile 1 [Q1]). All analyses were conducted using SAS 9.4. This study was approved by the Michigan Medicine IRB; informed consent was waived.

RESULTS

In 2017, 1,393,622 beneficiaries received care from 4,219 hospice agencies. 59.4% were female and the mean age was 83.8 years (standard deviation [SD]: 2.0); 84.6% were non-Hispanic white, 8.9% non-Hispanic Black, and 2.8% Hispanic. The most common hospice qualifying diagnosis was cancer (22.9%), followed by heart disease (21.8%) and dementia (21.3%). 75.9% of hospice agencies were non-profit.

Variation in Benzodiazepine and Antipsychotic Prescribing

Across hospice agencies, prescribing rates varied widely. Among the quintile with the lowest amount of prescribing, a median 11.9% (interquartile range [IQR] 5.9,22.2) of hospice beneficiaries filled a benzodiazepine prescription. In contrast, among the highest-prescribing agencies, this was 80.0% (Q5; IQR 76.9,84.2). For antipsychotics, among the lowest-prescribing quintile, a median of 5.5% (IQR 2.9,7.7) filled a prescription for an antipsychotic, in contrast to 63.9% (IQR 56.1,72.0) among the highest quintile (**Figure 1**).

Prescribing Variation Across Hospice Agency Characteristics

High and low benzodiazepine-prescribing hospice agencies had similar beneficiary profiles by age and gender (**Figure 2**). There were differences by hospice racial composition, where high benzodiazepine-prescribing agencies generally had a smaller proportion of patients from minoritized populations (e.g., non-Hispanic Black rate ratio [RR] [Q5/Q1] 0.7, 95% CI 0.6-0.7; Hispanic RR 0.4, 95% CI 0.3-0.5). Beneficiaries in rural areas were over-represented in the highest prescribing quintile (RR 1.3, 95% CI 1.2-1.4). Hospices in the high benzodiazepine-prescribing quintile had a larger proportion of enrollees with cancer (RR 1.2, 95% CI 1.1-1.3) and smaller proportion of dementia (RR 0.8, 95% CI 0.7-0.9); the distribution of other diagnoses was relatively similar across the quintiles. Agencies in the top benzodiazepine-prescribing quintile had a slightly larger proportion of patients with a hospice length of enrollment <1 month (RR 1.2, 95% 1.1-1.3). There was marked variation across benzodiazepine quintiles by hospice characteristics that were not related to their respective patient populations. Agencies in the top benzodiazepine-prescribing quintile were more likely to be for-profit (RR 2.4, 95% CI 2.3-2.5) and large (RR 2.6, 95% CI 2.5-2.7). Across Census regions, those in the top-prescribing quintile were more likely to be from the South Atlantic (RR 2.1, 95% CI 2.0-2.2) while those in New England were less likely to be high vs. low-prescribing (RR 0.7, 95% CI 0.6-0.8).

For antipsychotic prescribing, high and low antipsychotic-prescribing facilities had similar beneficiary profiles by age, gender, length of hospice enrollment, and rurality (**Figure 3**).

Consistent with benzodiazepine prescribing, high antipsychotic-prescribing agencies had a smaller proportion of patients from minoritized populations (non-Hispanic Black RR 0.7, 95% CI 0.6-0.8, Hispanic RR 0.4, 95% CI 0.3-0.5) and larger proportion of enrollees with cancer (RR 1.2, 95% CI 1.1-1.3). Hospice agency characteristics including profit status and size followed a similar pattern as benzodiazepines: hospice agencies in the top antipsychotic-prescribing quintile were more likely to be for-profit (RR 2.3, 95% CI 2.2-2.4) and large (RR 2.7, 95% CI 2.6-2.8). However, variation across quintiles by hospice Census region differed widely from benzodiazepine prescribing. Agencies in the top antipsychotic-prescribing quintile were more likely to be from New England (RR 5.1, 95% CI 5.0-5.2) while those in the West South Central Census region were less likely to be high vs. low-prescribing (RR 0.4, 95% CI 0.3-0.5).

DISCUSSION

In this study of over 4,200 hospice agencies, we found significant variation in prescribing of benzodiazepines and antipsychotics. While the distribution of patient clinical characteristics was largely similar across prescribing quintiles, for-profit and larger hospices were far more likely to be among the highest prescribing facilities, with important differences by region, as well. While the optimal level of use of these medications in hospice is unknown, such wide variation that does not appear to vary with characteristics of the hospice-enrolled beneficiaries suggests that prescribing is being influenced by factors other than clinical needs of the enrolled patients.

Prescribing culture appears to influence medication use in long-term care settings.^{20,21} Our findings suggest that a similar concept could apply to hospice agencies as well. We found that the hospice agency in which a patient is enrolled greatly impacts how commonly prescriptions for these medications are filled, extending limited work demonstrating the role of hospice agencies in benzodiazepine and antipsychotic prescribing.^{10,13} Previous work has

demonstrated that, more so than clinical characteristics, the strongest predictor of whether a patient receives a benzodiazepine or antipsychotic in hospice is being enrolled in a high prescribing hospice agency (e.g., patients enrolled in high benzodiazepine-prescribing agencies are 10 times more likely to receive a benzodiazepine compared to beneficiaries enrolled in low-prescribing facilities).¹⁰ Prescribing culture may be particularly influential in hospice, where standardized order sets or use of comfort kits may be default settings that are broadly applied across an agency, potentially without direct contact between the prescriber and patient. It is possible that such default order sets are more broadly used across larger and for-profit agencies, which may help account for their over-representation among high-prescribing facilities.

Our finding that benzodiazepine and antipsychotic prescribing vary significantly by region warrants further study. While those in the New England Census region were the least likely to be in the top benzodiazepine-prescribing quintile they were also the most likely to be in the top antipsychotic-prescribing quintile. Consistent with previous work evaluating hospice prescribing across states, rates of both benzodiazepine and antipsychotic prescribing were highest in the Pacific region including states such as Oregon and Washington.¹³ Somewhat surprisingly, these findings do not parallel community benzodiazepine²² and nursing home antipsychotic prescribing²³ within this region, where use is quite low. It is unclear why region would have such a pronounced impact on this prescribing, and why hospice prescribing does not track local community and nursing home practice patterns.

For-profit hospice agencies, which now provide care to nearly half of all Medicare hospice beneficiaries, were over-represented among the quintile of top-prescribing agencies for both benzodiazepines and antipsychotics.²⁴ Concerns have been raised about the quality of hospice care provided by for-profit agencies, finding lower staffing per patient,²⁵ higher rates of hospice disenrollment prior to death,²⁶ and more hospital and emergency department use compared to non-profit agencies.²⁷ It is unknown why, clinically, for-profit agencies would need

to prescribe more benzodiazepines and antipsychotics and whether such use is associated with better or worse outcomes for patients. In nursing home studies outside of hospice care, improved staff-to-patient ratios are associated with decreased prescribing of potentially inappropriate antipsychotic medications.²⁸ It is unclear if a similar relationship exists between staffing levels and medication use in hospice.

Our study has several limitations. First, prescription fills may not reflect actual drug exposure. Next, we do not know the indication for medication prescribing (e.g., antipsychotics could be prescribed for agitation, nausea, or psychosis) or the appropriateness of such prescribing. Lastly, this analysis does not evaluate other hospice agency-level characteristics that may be associated with prescribing such as clinician factors (e.g., the percentage of hospice prescribers in an agency with geriatrics training) or availability of inpatient hospice beds.

CONCLUSIONS AND IMPLICATIONS

Significant variation in benzodiazepine and antipsychotic prescribing exists across hospice agencies, with large differences exhibited by non-clinical hospice agency characteristics including profit status, size, and region. As with any medical treatment, the decision to prescribe a medication should be driven by a clinical need. However, we found a wide range of use across hospice agencies, with large and for-profit agencies accounting for a larger proportion of high-prescribing facilities, which suggests significant variation in what is considered clinically appropriate use in this population. Because of variation in prescribing across agency-level characteristics, such agency features may be important elements to help develop and focus interventions to promote appropriate prescribing. Finally, it will be critical to explore the extent to which individual clinicians help contribute to this variation.

ACKNOWLEDGMENTS:

Author Contributions: Dr. Gerlach had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Gerlach, Teno, Bynum, Maust

Acquisition, analysis, or interpretation of data: all authors

Drafting of the manuscript: Gerlach, Strominger, Maust

Critical revision of the manuscript for important intellectual content: all authors

Statistical analysis: Zhang, Strominger

Obtaining funding: Gerlach

Administrative, technical, or material support: Gerlach

Supervision: Gerlach, Maust

Conflict of Interest Disclosures: The authors have none to disclose.

Funding Source: This work was supported by the National Institute on Aging K23AG066864.

Role of the Funder/Sponsor: The funding source had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

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Legends:

Figure 1. Distribution of hospice agency benzodiazepine (A) and antipsychotic (B) prescribing rates by prescribing quintiles (N=4219 hospice agencies)

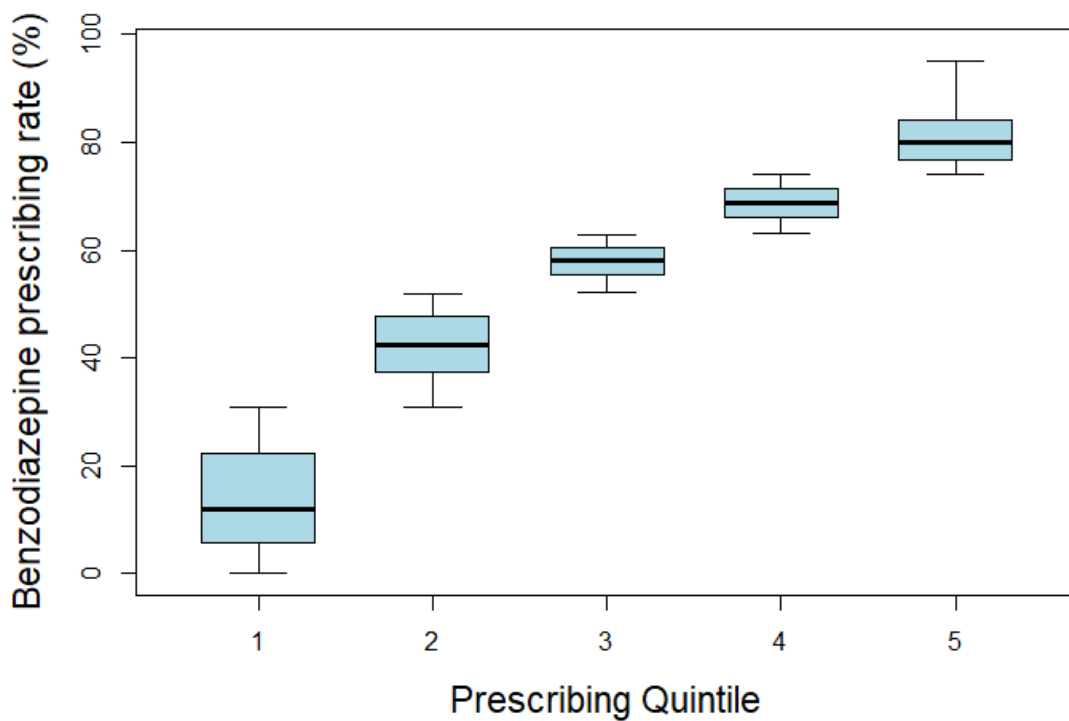
Figure 2. Characteristics according to hospice agency benzodiazepine prescribing rate^a

^a Census region classifications are as follows: Pacific (AK, CA, HI, OR, WA), East South Central (AL, KY, MS, TN), Mountain (AZ, CO, ID, NM, MT, UT, NV, WY), New England (CT, ME, MA, NH, RI, VT), South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, WV), West North Central (IA, KS, MN, MS, NE, ND, SD), West South Central (AR, LA, OK, TX), East North Central (IN, IL, MI, OH, WI), Middle Atlantic (NJ, NY, PA)

Figure 3. Characteristics according to hospice agency antipsychotic prescribing rate^a

^a Census region classifications are as follows: Pacific (AK, CA, HI, OR, WA), East South Central (AL, KY, MS, TN), Mountain (AZ, CO, ID, NM, MT, UT, NV, WY), New England (CT, ME, MA, NH, RI, VT), South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, WV), West North Central (IA, KS, MN, MS, NE, ND, SD), West South Central (AR, LA, OK, TX), East North Central (IN, IL, MI, OH, WI), Middle Atlantic (NJ, NY, PA)

A



B

