Published in final edited form as:
JAMA Intern Med. 2013 December 9; 173(22): . doi:10.1001/jamainternmed.2013.10573.

Health Insurance Status and the Care of Nursing Home Residents with Advanced Dementia

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Abstract

Importance—Nursing home residents with advanced dementia commonly experience burdensome and costly hospitalizations that may not extend survival or improve the quality of life. Fragmentation in health care has contributed to poor coordination of care for acutely ill nursing home residents.

Objective—To compare patterns of care and quality outcomes for nursing home residents with advanced dementia covered by managed care to those covered by traditional fee-for-service Medicare.

Design—The Choices, Attitudes, and Strategies for Care of Advanced Dementia at the End-of-Life (CASCADE) study was a prospective cohort study that followed 323 nursing home residents over eighteen months to better understand the course of advanced dementia at or near the end of life. CASCADE and Medicare data were linked to determine the health insurance status of study participants.

Setting—Twenty-two nursing homes in the Boston area.

Participants—Nursing home residents with advanced dementia and their health care proxies.

Exposure—The health insurance status of the resident, either managed care or traditional fee-for-service.

Main Outcomes—The outcomes included survival, symptoms related to comfort, treatment of pain and dyspnea, presence of pressure ulcers, presence of a DNH order, treatment for pneumonia, hospital transfer (hospitalization or emergency room visit) for an acute illness, hospice referral, primary care visits, and family satisfaction with care.

Results—Residents enrolled in managed care (n=133) were more likely to have do-not-hospitalize orders compared to those in traditional Medicare fee-for service (n=158) (64% vs. 51%, p-value < 0.05), were less likely to be transferred to the hospital for acute illness (4% vs. 16%, p-value < 0.05), had more primary care visits per 90 days (4.8±2.6 vs. 4.2±5.0, p-value < 0.05**)**, and had more nurse practitioner visits (3.0±2.1 vs. 0.8±2.6, p-value < 0.05). Survival, comfort, and other treatment outcomes did not differ across groups.

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Conclusions and Relevance—Medicare managed care programs may offer a promising approach to ensure that nursing homes are able to provide appropriate, less burdensome and affordable care, especially at the end-of-life.

INTRODUCTION

Dementia is a leading cause of death in the United States,[1] yet patients dying with this disease may not receive optimal end-of-life care. With the advent of health care reform in the U.S., increasing opportunities now exist to improve the quality and cost-effectiveness of care provided to nursing home residents with advanced dementia.[2]

Recent research has led to a growing appreciation of advanced dementia as a terminal illness and the clinical complications that characterize the end-stage of the disease, most notably eating problems and infections.[3] Over 90% of proxies for nursing home residents with advanced dementia state that their preferred goal of care is comfort, which should guide how these complications are treated.[3] Nonetheless, many of these residents commonly experience burdensome and costly interventions, such as hospital transfers, tube-feeding and intravenous antibiotics, that do not promote comfort and in many instances, do not have any demonstrable clinical benefits in this profoundly debilitated population.[3-6]

Nursing home reimbursement policies are among the factors that incentivize more aggressive care,[7] including burdensome interventions for residents with advanced dementia. Most nursing home residents with advanced dementia are long-stay residents dually eligible for Medicare and Medicaid. Medicaid reimburses nursing homes for daily room and board and nursing care. Medicare has historically paid for acute, sub-acute, and physician services on a fee-for-service (FFS) basis. Given that nursing homes do not receive higher reimbursement to manage acutely ill long-term care residents on site, the nursing home has an incentive to transfer them to the hospital, temporarily cost-shifting their care from Medicaid to Medicare. Even if the resident's preference is for palliation, this too requires a more focused approach. Nursing homes are not directly reimbursed for providing specialized palliative care services. Finally, although the Medicare hospice benefit is available for nursing home residents,[8] it is under-utilized among those with dementia,[9] and access is hindered by complex fiscal arrangements that once again involve cost-shifting to Medicare.[10]

The Affordable Care Act presents a timely opportunity to evaluate alternative financial structures to pay for higher quality and more cost-effective care for dual-eligible nursing home residents, particularly those with advanced dementia. Such approaches include capitated or global payment programs similar to the Program of All-Inclusive Care for the Elderly (PACE) or the Medicare Advantage Special Needs Plans, which strive to integrate Medicare and Medicaid financing for dual-eligible nursing home residents.[11] However, evidence demonstrating that such approaches improve the quality of end-of-life care for nursing home residents is limited. In an observational study from 2003, Kane et al found that Evercare, a nurse practitioner based capitated managed care program, reduced acute care use among nursing home residents, but did not focus specifically on those with end-stage disease or examine other end-of-life outcomes.[12]

In this report, we merged the rich clinical dataset from the Choices Attitudes and Strategies for Care of Advanced Dementia at the End of Life (CASCADE) study, a prospective cohort study that followed 323 advanced dementia nursing home residents for 18 months, with Medicare claims files. This approach enabled us to compare a broad range of outcomes reflecting the quality of care provided to residents covered by traditional fee-for-service Medicare to those covered by managed care.

METHODS

Data Sources

Two data sources were used: the dataset generated from CASCADE and Medicare claims files. CASCADE was an NIH-funded prospective cohort study conducted between February 1, 2003 and March 1, 2009 that described the experience of nursing home residents with advanced dementia and their families, the details of which are provided elsewhere.[3,13] Data were collected to characterize the residents' survival, clinical complications, symptoms, and treatments, as well as the proxies' perspectives on the quality of care. The CASCADE dataset was linked to Medicare claims files from February 1, 2003 until December 31, 2010 using the following identifiers: name, social security number, gender, and date of birth. The institutional review board of Hebrew SeniorLife and Harvard Medical School approved the conduct of this study to analyze CASCADE data merged with Medicare claims files.

Sample

Subjects included nursing home residents with advanced dementia who participated in the CASCADE study. A total of 323 residents with advanced dementia were recruited from 22 Boston-area nursing homes. Eligibility criteria included: 1) age > 60; 2) dementia (any type); 3) Global Deterioration Scale (GDS) score of 7,[14] and 4) available English-speaking health care proxy. At GDS stage 7, residents have profound memory deficits, virtually no verbal communication, incontinence, and cannot walk. Residents had to have English-speaking health care proxies who provided informed consent for their participation and for the residents' participation.

Resident Variables

Unless otherwise indicated, resident variables were obtained from the CASCADE dataset from assessments conducted at baseline, quarterly for up to 18 months, and within 14 days of death using chart reviews, direct resident examination, and nurse interviews. Baseline resident characteristics obtained from the chart included demographics (gender, race [white vs. other], and age); whether or not the resident lived in a special care dementia unit; whether or not nursing home length of stay at baseline was less than 3 years; co-morbidities (congestive heart failure, active cancer, chronic obstructive lung disease [COPD]); and presence of a percutaneous endoscopic gastrostomy (PEG) tube. Cognitive status was measured by direct resident examination at the baseline and quarterly assessments using the Test for Severe Impairment (TSI) score (range, 0-24, higher scores indicate better cognition; categorized as either equal to 0 or > 0).

Other resident variables were collected from the chart at baseline and quarterly assessments, including presence of a do-not-hospitalize order (DNH), treatment for pain and dyspnea, occurrence of acute illness, and health services utilization. At each assessment, the frequency of pain and dyspnea that occurred since the prior assessment was ascertained. Pain and dyspnea were quantified based on documentation in the chart as follows: 0) never, 1) rarely (< 5 days/month), 2) sometimes (5-10 days/month), 3) often (11-20 days/month) and 4) almost daily (>20 days/month). For residents who experienced any pain (e.g., > never), it was determined whether they received oral or parenteral opioids on a regularly scheduled basis. For residents who experienced any dyspnea (e.g., > never), it was determined if they were treated with any of the following: oxygen, morphine, scopolamine or hyoscyamine. Acute illnesses occurring since the prior assessment included infectious episodes (suspected pneumonia and febrile episodes), and other sentinel events (e.g., stroke, bone fracture, myocardial infarction, seizure). A febrile episode was defined as an oral (≥100°F), rectal (≥ 101°F), or axillary (≥ 99°F) temperature at least once within a 7-day period (> 1 recorded fever during a 7-day period was considered a single episode). If residents had experienced pneumonia, the type of treatment they received was determined and classified as follows: no antibiotics, oral antibiotics only, intramuscular antibiotics, and intravenous antibiotics or hospitalization. All heath care utilization data, including dates of service, were determined from primary data collected in CASCADE and included all documented hospitalizations, emergency room (ER) visits, hospice referrals, and the number of primary care visits at the nursing home by nurse practitioners (NP) and physicians in the prior 90 days.

Nurse interviews included measures of functional status and resident discomfort. Functional status was quantified at each assessment using the Bedford Alzheimer Nursing Severity Scale (BANSS) [range 7-28, higher scores signify greater disability].[15] The Symptom Management at End-Of-Life in Dementia Scale (SM-EOLD) was used to quantify resident comfort over the prior 90 days at the baseline and quarterly nurse interview. The SM-EOLD is a validated scale that ranges from 0-45, with higher scores representing greater comfort; the Comfort Assessment in Dying with Dementia Scale (CAD-EOLD) is a similar scale which quantifies discomfort in the last week of life (ranges from 14-42, with higher scores indicating greater comfort).[16,17] Nurses also stated whether or not the resident had pressure ulcers at stage 2 or higher in the intervening period between interviews.[18]

Survival was measured in days from the date of enrollment in CASCADE until the date of death. For those residents who died during the CASCADE study, death dates were determined from official death certificates which were obtained for all decedents. The vital status as of December 31, 2010 for residents who survived the full 18-month CASCADE follow-up period was determined by the Medicare Beneficiary Eligibility and Enrollment Files, and for those who died, their death dates was taken from that source.

The Medicare Beneficiary Eligibility and Enrollment Files were used to classify each resident’s insurance coverage during the entire CASCADE follow-up period as either managed care or traditional fee-for-service Medicare (non-managed care). Insurance status for each resident was consistent throughout the CASCADE study (i.e., did not fluctuate between managed care and fee-for-service status).

Proxy Variables

All proxy variables were obtained from interviews conducted during the CASCADE study. Characteristics obtained at baseline included age, gender and relationship to the resident (child vs. other). At each proxy interview, satisfaction with care was measured using the Satisfaction with Care at the End-of-Life in Dementia Scale (SWC-EOLD), a validated scale that ranges from 10 to 40, with higher scores indicating greater satisfaction.[16,17]

Analysis

All resident and proxy characteristics were described using means for continuous variables and proportions for categorical variables. The main independent variable was whether or not the residents’ health insurance status was managed care or fee-for-service during the period of observation.

We were interested in examining the association between managed care status and palliative care outcomes. Therefore, outcomes were selected that have been endorsed as measures of the quality of end-of-life care for older persons,[19] and specifically for those with advanced dementia.[20] These outcomes included: survival, symptoms (SM-EOLD, CAD-EOLD) and treatment of pain and dyspnea, presence of a DNH order, presence of stage 2 or higher pressure ulcers, treatment for pneumonia, hospital transfer (hospitalization or ER visit) for an acute illness, hospice referral, physician and NP visits, and family satisfaction with care (SWC-EOLD).

The units of analysis varied depending on the outcome. Measures collected at each assessment (i.e., assessment level) framed the analysis for the following outcomes: SM-EOLD, pain and dyspnea treatment, pressure ulcer, DNH, primary care visits, and SWC-EOLD. CAD-EOLD was recorded only once for those who died during the 18-month observation period. Analyses examining the management of pneumonia and acute illnesses were conducted at the episode level. For hospice referral, the resident was the unit of analysis.

Unadjusted and adjusted associations between managed care status and each outcome were calculated using logistic and linear regression for dichotomous and continuous outcomes, respectively. Multinomial regression was used to analyze the categorical pneumonia treatment outcome. Poisson regression methods were used to analyze the number of primary care visits per 90 days of follow-up. For survival, Kaplan-Meier methods were used to plot unadjusted survival curves, and multivariable analyses were conducted using Cox proportional hazard models. Odds ratios (ORs) were generated from the logistic and multinomial models, parameter estimates from the linear regression models, and hazard ratios (HR) from the Cox model. Ninety-five percent confidence intervals (CIs) were provided for all measures of association. All multivariable models were adjusted for the baseline resident and proxy characteristics presented in Table 1. In addition, the Cox proportional hazard model was adjusted for a time-dependent variable representing acute illness. Generalized estimation equation (GEE) methods were used to account for within-resident clustering for outcomes that were analyzed at the assessment and event levels. All statistical analyses were conducted using R (version 2.15.2. R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Sample Characteristics

Of the 323 residents recruited into the CASCADE study, 291 are included in these analyses. Reasons for lack of inclusion for the remaining 32 residents included: incorrect or no available social security number (N=14), definite match could not be made with Medicare (N=8), and managed care status could not be determined from Medicare Enrollment Files (N=10). No statistically significant differences were observed in the baseline characteristics shown in Table 1 for residents who were and were not included in the analyses.

Among the 291 residents included in this study, 133 (46%) were enrolled in a managed care plan and 158 (54%) were covered by the traditional Medicare fee-for-service plan for the entire CASCADE follow-up period. The mean age of the entire sample of 291 residents was 85.5 years; 86% were female; 90% were white; and 44% lived in a special care unit for advanced dementia (Table 1). Baseline characteristics between the managed care and fee-for-service residents were very similar except that the managed care residents were more likely to be female (91% vs. 81%, $p = 0.02$) and less likely to have CHF (11% vs. 22%, $p = 0.01$).

Outcomes

During the CASCADE study, 158 (54%) of the 291 residents died, and an additional 118 (41%) died prior to the end of the Medicare data observation period, for a total of 276 (95%) decedents; 126 (95%) in the managed care group and 150 (95%) in the fee-for-service group. Survival did not differ between the two groups in the unadjusted analyses (log-rank test p-value 0.88) and the adjusted Cox proportional hazards model (adjusted hazard ratio 0.93 with 95% CI [0.77, 1.50]).

Table 2 presents the analyses comparing the remaining outcomes between the managed care and fee-for-service groups. In the adjusted analysis, residents with advanced dementia enrolled in managed care were significantly more likely to have DNH orders compared to those in the traditional Medicare fee-for service program (64% vs. 51%; adjusted OR 1.8, 95% CI [1.2, 2.9]). Managed care residents were also less likely to be transferred to the hospital for any acute illness (4% vs. 16%, adjusted OR 0.2 [0.1, 0.5]). This pattern was most apparent for episodes of pneumonia and other acute events. Managed care residents had significantly more primary care visits per 90 days than fee-for-service residents (4.8±2.6 vs. 4.2±5.0**;** adjusted rate ratio [ARR] 1.4 [1.2, 1.6]), and in particular managed care residents had relatively more NP visits (3.0±2.1 vs. 0.8±2.6)**;** ARR 4.2 [3.2, 5.4]).

A larger proportion of managed care (23%) compared to fee-for-service residents (18%) were referred to hospice, although this difference was not statistically significant. Additionally, family satisfaction with care (SWC-EOLD) was slightly higher for the managed care group (difference 0.9 [0.0 , 1.8], though the difference was also not statistically significant.

DISCUSSION

This study linked unique prospective clinical data with Medicare claims in order to describe and compare patterns of care between nursing home residents with advanced dementia enrolled in a Medicare managed care insurance plan and those with fee-for-service Medicare. Residents enrolled in Medicare managed care received more primary care visits, principally from NPs, were more likely to have a DNH order, and had fewer hospital transfers for acute illness compared to those traditional Medicare coverage. Our findings also suggest that managed care residents may have been more likely to enter hospice and that family members may have been more satisfied with the level of care. For all other outcomes, including survival, residents fared as well under managed care as those under traditional Medicare.

In the era of health care reform, tremendous focus has been placed on reducing unnecessary and costly care, and in particular reducing avoidable hospitalizations of nursing home residents.[21] Residents with advanced dementia who are profoundly disabled, near the end-of-life, and most often have comfort as a primary goal of care, are obvious targets for such initiatives. Hospital transfers can be traumatic for these residents and their families[22,23] and most often do not improve their clinical outcomes (e.g. survival) or comfort[4,5,24], albeit with possible exceptions, such as hip fracture. The challenge is to understand the mechanisms that will encourage nursing homes to provide goal-directed care for acutely ill nursing home residents on-site, either by providing high quality palliative care or potentially curative conservative treatments (i.e., antibiotics).

Researchers have argued that fragmentation at both the payment and delivery levels has contributed to poor coordination of care for acutely ill nursing home residents.[7] At the payment level, nursing homes and other providers have historically been reimbursed on a fee-for-service separately for each service. As such, Medicaid has not incentivized nursing homes to prevent unnecessary hospital transfers. Since Medicare managed care plans are at risk for hospitalization costs, they have an incentive to invest in the infrastructure and resources necessary to prevent unnecessary hospital transfers.[25] Indeed, one review estimated that managed care might reduce hospitalizations by 30% to 80%,[25] which is consistent with our findings.

At the delivery level, our findings support the notion that a possible mechanism for the managed care plans to reduce hospital transfers is by increasing the intensity of primary care services provided in the nursing home, mainly by employing on-site NPs.[25] Studies have shown that greater NP presence in nursing homes is associated with reduced hospitalizations, independent of insurance status.[26,27] Specifically in advanced dementia, having a NP on-site has been associated with higher DNH rates[28] and lower use of feeding tubes.[6] Higher DNH rates suggest that NPs may be more engaged in advance care planning; the most consistent modifiable factor associated with better palliative care outcomes for NH residents with advanced dementia.[3,4,29,30] The presence of a DNH order among these patients has been associated with fewer hospital transfers, greater family satisfaction[29], and more cost-effective care.[31] Thus, the presence of advance directives, especially DNH orders, is generally considered a marker of higher quality advanced dementia care. Although the prevalence of DNH orders in the CASCADE cohort was considerably higher compared to national averages[28], the fact that it was 64% and 51% in the HMO and non-HMO groups, respectively, suggests an opportunity exists to improve advance care planning in these residents regardless of insurance status.

Findings from evaluations of the two prominent Medicare risk models, PACE and Evercare, stressed the importance of NPs in helping to reduce hospital transfers under managed care.[12,32] We should acknowledge that some of the increase in NP visits was offset by fewer physician visits in our data, but managed care patients ultimately received more primary care visits. It is also important to underscore the finding in our study that survival and other end-of-life outcomes were similar in residents who were and were not covered by managed care programs. In fact, a trend was found towards higher satisfaction with care in the managed care group.

One important development under the Affordable Care Act that is directed at improving care coordination for dually eligible beneficiaries is the Integrated Care Demonstration.[2] This 26-state Demonstration blends payment and delivery reforms to improve care coordination for dually eligible beneficiaries, including those nursing home residents with advanced dementia.[33] Currently, 21 of the states have proposed some capitated managed care model under this demonstration to combine Medicare and Medicaid financing and offer enhanced primary care for beneficiaries. It will be important to monitor whether the favorable managed care results observed in this study generalize to the advanced dementia nursing home residents that participate in these demonstrations.

This study has several limitations. CASCADE was an observational study, thus we are unable to make causal inferences regarding the observed associations between patient insurance status and outcomes. The possibility of unmeasured confounding remains despite the fact that the managed care and traditional Medicare groups were balanced on measured factors and the robustness of the adjusted analyses. Moreover, the CASCADE study was not designed to examine facility factors associated with patient-level outcomes and the relatively few residents per facility do not provide adequate power to do so. Thus, unmeasured nursing home characteristics are another possible source of confounding. Inaccuracies may also have occurred in the ascertainment of CASCADE data from the residents' charts (i.e., pain, dyspnea, utilization); however, such errors are likely to be non-differential between the two groups. We also are unable to identify the exact managed care plan in which individuals were enrolled. Given the heterogeneity of managed care programs, we cannot contend that all such programs will be associated with the same findings as those observed in this study. Specifically, we do not know whether individuals were in a standard Medicare Advantage plan or a plan that also included coverage of Medicaid services and hospice. However, it is notable that the managed care residents in our sample did not have any Medicare hospice claims even though hospice care was indicated in the CASCADE data, suggesting that hospice care was part of the capitated services provided by their managed care plan. In Massachusetts, the Evercare Senior Care Options (SCO) plan covers all Medicare (including hospice) and Medicaid services. Finally, because our entire sample is drawn from the Boston area, generalizability to other areas is uncertain. This study provides novel data suggesting that the model of health care delivery in a nursing home has important effects on the type of care received by individual residents. Intensive primary care services may be a promising approach to ensure that nursing homes are able to provide appropriate, less burdensome and affordable care, especially at the end-of-life. Ultimately, it may require a change in the underlying financial structure to make those changes happen.

Acknowledgments

This study was supported in part by grants R21AG039658-01, R01AG024091, and K24AG033640 (Dr. Mitchell) from the National Institute on Aging. The funding sources had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or preparation of the article. None of the authors had any conflicts of interest in preparing this article. Two authors (Goldfeld and Caudry) had full access to all data in the study and take responsibility for the integrity of the data an accuracy of the data analysis.

This research was supported by the following grants from NIH-NIA: R21 AG039658-01, R01 AG024091, and NIH-NIA K24AG033640 (SLM).

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Table 1

Baseline Characteristics of Nursing Home Residents with Advanced Dementia and Their Health Care Proxies, by Health Insurance Status

Characteristic	All residents (n=291)[a]	Fee for Service (n=158)	Managed Care (n=133)
Resident age, mean (SD)	85.5 (7.5)	85.2 (7.5)	85.7 (7.5)
Female resident	249 (86%)	128 (81%)	121 (91%) [b]
White race	261 (90%)	145 (92%)	116 (87%)
Did not live in a special care unit for dementia	164 (56%)	92 (58%)	72 (54%)
Nursing home length of stay < 3 years	132 (45%)	77 (49%)	55 (41%)
Score 0 on Test for Severe Impairment [c]	213 (73%)	110 (70%)	103 (77%)
Score on Bedford Alzheimer Nursing Severity Subscale [d], mean (SD)	21.0 (2.2)	21.0 (2.2)	21.0 (2.3)
Comorbid baseline conditions			
Congestive heart failure	49 (17%)	35 (22%)	14 (11%) [b]
Chronic obstructive lung disease	30 (10%)	18 (11%)	12 (9%)
Active cancer	3 (1%)	2 (1%)	1 (1%)
Percutaneous endoscopic gastrostomy tube	19 (7%)	12 (8%)	7 (5%)
Proxy is child of resident	199 (68%)	111 (70%)	88 (66%)
Female proxy	188 (65%)	99 (63%)	89 (67%)
Proxy age, mean (SD)	60.2 (11.6)	60.6 (11.4)	59.8 (12.0)

[a] All values other than age and Bedford Subscale are expressed as number (percentage).

[b] Managed care group is significantly different, p-value < 0.05.

[c] Scores on the Test for Severe Impairment range from 0 to 24; lower scores indicate greater cognitive impairment. This outcome was dichotomized as 0 or higher than 0.

[d] Scores on the Bedford Alzheimer Nursing Severity Subscale range from 7 to 28; higher scores indicate greater functional disability.

Table 2

Health Quality and Utilization Outcomes of Nursing Home Residents with Advanced Dementia and Their Health Care Proxies, by Health Insurance Status

	Fee for Service		Managed Care		Managed Care estimate[a]	
Outcome	**n**	**Avg (SD) or %**	**n**	**Avg (SD) or %**	**Unadjusted (CI)**	**Adjusted [b] (CI)**
Do-not-hospitalize orders[d]	852	51%	703	64%	1.7 (1.1 , 2.6)[c]	1.8 (1.2 , 2.9)[c]
Hospital transfers for acute illness[e]	331	16%	229	4%	0.2 (0.1 , 0.5)[c]	0.2 (0.1 , 0.5)[c]
Pneumonia	126	18%	79	6%	0.2 (0.0 , 0.6)[c]	0.1 (0.0 , 0.4)[c]
Febrile event	182	8%	133	2%	0.2 (0.1 , 1.1)[c]	0.3 (0.1 , 1.3)[c]
Other acute event	23	61%	17	12%	0.1 (0.0 , 0.4)[c]	0.0 (0.0 , 0.2)[c]
Primary care visits in the nursing home/90 days[f]	158	4.2 (5.0)	133	4.8 (2.6)	1.3 (1.1 , 1.5)[c]	1.4 (1.2 , 1.6)[c]
Physician visits	158	3.4 (4.7)	133	1.8 (1.5)	0.6 (0.5 , 0.7)[c]	0.7 (0.5, 0.8)[c]
Nurse practitioner visits	158	0.8 (2.6)	133	3.0(2.1)	3.8 (2.9 , 4.9)[c]	4.2 (3.2 , 5.4)[c]
Hospice treatment[f]	158	18%	133	23%	1.4 (0.8 , 2.4)	1.4 (0.8 , 2.7)
Family satisfaction with care (SWC-EOLD)[d,g]	638	31.6 (4.6)	538	32.3 (4.5)	0.9 (0.0 , 1.8)	0.9 (0.0 , 1.8)
Comfort in prior 90 days (SM-EOLD)[d,h]	762	37.5 (7.6)	634	37.8 (7.5)	0.2 (−1.2 , 1.7)	−0.5 (−1.9 , 0.9)
Comfort during last week of life (CAD-EOLD)[e,i]	81	34.9 (4.6)	66	34.0 (4.2)	−0.9 (−2.3 , 0.5)	−0.9 (−2.3 , 0.4)
Pain treatment[e]	147	10%	114	17%	1.8 (0.8 , 4.2)	1.7 (0.7 , 4.1)
Dyspnea treatment[e]	124	61%	94	55%	0.9 (0.5 , 1.6)	0.8 (0.4 , 1.6)
Treatment for pneumonia[e]	127	100%	79	100%		
No antimicrobial agent	10	8%	8	10%	-	-
Oral antimicrobial agent	71	56%	44	56%	0.8 (0.3 , 2.1)	1.5 (0.4 , 4.9)
IM antimicrobial agent	16	13%	17	22%	1.3 (0.2 , 2.4)	2.9 (0.7 , 11.7)
IV antimicrobial agent or hospitalization	30	24%	10	13%	0.4 (0.1 , 1.3)	0.6 (0.1 , 2.2)

Abbreviations: CI, confidence interval; IM, Intramuscular; IV, Intravenous

[a] The effect estimate is an odds ratio for all outcomes except for EOLD measures and MD & NP visits. EOLD effects are differences, effects of MD & NP visits are shown as rate ratios.

[b] The association of managed care status with each outcome after adjusting for all baseline characteristics described in Table 1.

[c] p-value < 0.05

[d] Analysis conducted at the 90-day assessment level.

[e] Analysis conducted at the episode level.

[f] Analysis conducted at the resident level.

[g] SWC-EOLD ranges from 10 to 40, with higher scores indicating greater family satisfaction with care.

[h] SM-EOLD ranges from 0 to 45; higher scores indicate greater comfort.

[i] CAD-EOLD ranges from 14-42; higher scores indicate greater comfort in the last week of life.