

Supplemental Online Content

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This supplemental material has been provided by the authors to give readers additional information about their work.

eAppendix. Additional Technical Details on Analysis Approach, Including Model Fit

a. Develop a propensity score to predict enrollment in MA at the end of life, including survey weight
 As described in the manuscript, we included covariates capturing demographics, socioeconomic status, and health that have been previously demonstrated to vary between the MA and TM decedent populations. This initially included the following variables: age at death (categorized as 65-74, 75-84, and 85+), female, white race, income quartile at survey prior to death, enrolled in Medicaid at the time of death, residing in a metropolitan vs. non-metropolitan region at survey prior to death, difficulty getting out of bed at time of death, receiving help for an activity of daily living (bathing, toileting, transferring, eating, dressing) at survey prior to death, probable dementia at survey prior to death, prior diagnosis of lung disease, prior diagnosis of stroke, prior diagnosis of cancer, if the last month of life survey was conducted with a spouse, child, or other individual, and survey weight (as recommended by DuGoff, et al).

b. Refine propensity score to achieve balance across MA and TM groups
 We first assessed the balance of the propensity score over the MA vs. TM groups. In the specification of the model with 5 blocks across the propensity score, the mean propensity score was not different for the treated (individuals in MA) vs. controls (individuals in TM) in each block, with a p-value threshold of 0.05.

We then assessed the balance of covariates within the propensity score over each block of the propensity score. We found there was an imbalance in covariates across blocks for three variables: cancer, lung disease, and stroke. Given that there was a statistical difference in rates of lung disease between the MA and TM populations, a propensity score was tested that included only this comorbidity, but it still did not achieve balance across all blocks of the propensity score. We therefore revised the propensity score to exclude these variables, given there was not a strong theoretical argument to keep them in the model and their low frequency (see Table 1) likely led to the imbalance. The revised propensity score achieved balance across all quintiles except for Block 2, which was split. With this specification, there was balance across all propensity score blocks:

Group	Obs- Group 0	Obs- Group 1	Mean- group 0	Mean- group 1	p-value for differences in mean score between groups
1	140	33	0.165	0.170	0.35
2	279	86	0.252	0.259	0.05
3	242	107	0.327	0.329	0.21
4	198	132	0.001	0.001	0.33
5	238	196	0.450	0.450	0.94

Additionally, there was balance for all covariates in the 5 propensity score blocks, with a threshold of $p < 0.05$.

c. Derive a new weight from the inverse probability of treatment weight and survey weight
 We first used a double robust estimator for each outcome variable, including the covariates in the propensity score as above. This was then normalized to range from 0 to 1 and multiplied by the survey weight. This resulted in a new weight variable, specific to each of the study outcome variables.

d. Conduct separate logistic regressions for each outcome variable
 For each outcome variable, we estimated a logistic regression model that included all the above covariates and enrollment in MA at the time of death. This model was conducted using the Stata survey commands, including the sampling unit and stratum. The weight was the new weight described in part c above. For two models (that predicting unmet spiritual needs and predicting unmet dyspnea needs), there were missing standard errors because of a stratum with a single sampling unit. For these models, the stratum with a single sampling unit was combined with an adjacent sampling unit to allow the model to run.

e. References for this modeling approach:

Garrido MM, Kelley AS, Paris J, et al. Methods for constructing and assessing propensity scores. *Health Serv Res.* 2014;49(5):1701-1720. doi:10.1111/1475-6773.12182

Dugoff EH, Schuler M, Stuart EA. Generalizing observational study results: applying propensity score methods to complex surveys. *Health Serv Res.* 2014;49(1):284-303. doi:10.1111/1475-6773.12090

Statalist: The Stata Forum. "Propensity score analysis for complex survey data using PSCORE, PSMATCH2 etc." accessed 5/28/2020. <https://www.statalist.org/forums/forum/general-stata-discussion/general/172008-propensity-score-analysis-for-complex-survey-data-using-pscore-psmatch2-etc>

eTable 1. Predicted Rates of Each Measure of Quality of End-of-life Care, From Propensity Score Weighted Model

Supplementary Materials Table 1. Predicted rates of each measure of quality of end-of-life care, from propensity score weighted model.		
	Traditional Medicare	Medicare Advantage
Quality of care not rated excellent	53.1% (50.0%-56.3%)	59.0% (54.4%-63.5%)
Unmet needs pain	23.9% (19.8%-28.1%)	27.4% (22.1%-32.7%)
Unmet needs dyspnea	22.8% (17.8%-27.8%)	25.1% (20.1%-30.2%)
Unmet needs anxiety/sadness	47.3% (42.4%-52.2%)	53.0% (44.9%-61.1%)
Unmet needs spiritual support	57.2% (53.0%-61.4%)	57.5% (52.3%-62.8%)
Not always treated with respect	18.5% (15.6%-21.5%)	19.3% (15.4%-23.2%)
Care not consistent with goals	12.0% (9.2%-14.7%)	13.9% (10.5%-17.4%)
Inadequate Communication	8.7% (6.8%-10.6%)	10.7% (7.5%-13.9%)
Family not kept informed	20.9% (18.1%-23.8%)	27.5% (21.9%-33.2%)

eTable 2. Results of Sensitivity Analysis Defining Medicare Advantage Enrollment at 1 Year Prior to Death

Supplementary Materials Table 2. Association of MA enrollment one year prior to death with quality of care at the end of life		
Quality Measure	OR (95% CI)	p-value
Quality of care not rated excellent	1.21 (0.96-1.53)	0.10
Unmet needs pain	1.16 (0.78-1.72)	0.46
Unmet needs dyspnea	1.03 (0.65-1.63)	0.90
Unmet needs anxiety/sadness	1.30 (0.85-1.99)	0.22
Unmet needs spiritual support	1.02 (0.75-1.38)	0.92
Not always treated with respect	0.98 (0.69-1.38)	0.90
Care not consistent with goals	1.15 (0.77-1.73)	0.49
Inadequate Communication	1.28 (0.81-2.05)	0.29
Family not kept informed	1.44 (1.06-1.95)	0.02
Covariates include age at death, female, white race, income quartile, Medicaid enrollment, metropolitan residence, difficulty getting out of bed in last month, ADL impairment at last NHATS survey, probable dementia at last NHATS survey, whether the survey was completed by a child, spouse, or other. All models adjusted by survey design and weights.		

eTable 3. Comparing Survey Weighted Regression Model and Combined Survey/propensity Weighted Regression Models

Supplementary Materials Table 3. Predicted rates of each measure of quality of end-of-life care, comparing survey weighted regression model and combined survey/propensity weighted regression models									
	Survey weighted			Survey weighted regression			Propensity and survey weighted regression		
	Traditional Medicare	Medicare Advantage	p-value	Traditional Medicare	Medicare Advantage	p-value	Traditional Medicare	Medicare Advantage	p-value
Quality of care not rated excellent	53.5% (50.9-56.1)	59.7% (55.4-64.0)	0.02	53.1% (50.0-56.2)	58.4% (54.0-62.7)	0.05	53.1% (50.0-56.3)	59.0% (54.4-63.5)	0.04
Unmet needs pain	23.1% (19.4-26.8)	26.1% (20.3-31.9)	0.77	23.9% (19.9-27.9)	26.8% (21.3-32.3)	0.45	23.9% (19.8-28.1)	27.4% (22.1-32.7)	0.36
Unmet needs dyspnea	20.7% (16.2-25.3)	23.3% (18.8-27.7)	0.43	22.5% (17.7-27.4)	22.9% (18.3-27.6)	0.91	22.8% (17.8-27.8)	25.1% (20.1-30.2)	0.52
Unmet needs anxiety/sadness	45.9% (41.9-49.8)	54.7% (47.1-62.3)	0.05	47.4% (42.6-52.2)	54.8% (46.3-63.2)	0.15	47.3% (42.4-52.2)	53.0% (44.9-61.1)	0.25
Unmet needs spiritual support	56.6% (52.9-60.3)	57.5 (52.4-62.7)	0.78	57.7% (53.6-61.8)	58.4% (52.9-64.0)	0.84	57.2% (53.0-61.4)	57.5% (52.3-62.8)	0.93
Not always treated with respect	17.6% (14.6-20.6)	21.2% (17.4-25.1)	0.14	18.4% (15.5-21.4)	18.5% (14.7-22.4)	0.96	18.5% (15.6-21.5)	19.3% (15.4-23.2)	0.77
Care not consistent with goals	11.5% (9.1-14.0)	13.1% (10.1-16.0)	0.42	12.0% (9.2-14.8)	13.6% (10.1-17.1)	0.48	12.0% (9.2-14.7)	13.9% (10.5-17.4)	0.37
Inadequate Communication	8.1% (6.5-9.6)	11.6% (8.3-15.0)	0.07	9.1% (7.1-11.1)	11.7% (8.2-15.2)	0.23	8.7% (6.8-10.6)	10.7% (7.5-13.9)	0.31
Family not kept informed	20.6% (18.2-23.0)	26.2% (21.4-31.0)	0.03	21.2% (18.4-24.0)	27.3% (21.9-32.7)	0.04	20.9% (18.1-23.8)	27.5% (21.9-33.2)	0.02

eTable 4. Full Specifications of the Stratified Analyses Conducted by Hospice Status and Location of Death

Supplementary Materials Table 4. Full specifications of the stratified analyses by hospice status and location of death.			
	Dy/dx	95% CI	p-value
Marginal increase in predicted proportion of those reporting care not excellent, hospice vs. not, additionally adjusting for MA enrollment	-0.128	-0.202- -0.053	0.001
Marginal increase in predicted proportion of those reporting care not excellent, MA vs. not, additionally adjusting for hospice enrollment	0.683	0.171-0.120	0.01
Marginal increase in predicted proportion of those reporting care not excellent, MA vs not, within those in NH	0.207	0.081-0.323	0.001
Marginal increase in predicted proportion of those reporting care not excellent, MA vs not, within those in hospital	0.019	-0.0684-0.107	0.663
Marginal increase in predicted proportion of those reporting care not excellent, MA vs not, within those at home	0.074	-0.001-0.148	0.05
Covariates include age at death, female, white race, income quartile, Medicaid enrollment, metropolitan residence, difficulty getting out of bed in last month, ADL impairment at last NHATS survey, probable dementia at last NHATS survey, whether the survey was completed by a child, spouse, or other. All models adjusted by survey design and weights.			

In stratified analysis for those in both MA and TM, predicted probability of reporting that care is not excellent is higher for those not in hospice compared to those in hospice (Figure 2). However, the predicted probability of reporting that care is not excellent is higher for the family/friends of decedents in MA vs. TM, regardless of hospice enrollment. Stratified by care settings (died at home vs. not, hospital care at end of life vs. not, and nursing home care at end of life vs. not), the gap between MA and TM is greatest for those who received care in the nursing home at the end of life: a predicted probability of 57.2% of family/friends of decedents in TM reported that care was not excellent, compared to 77.9% of family/friends of decedents in MA.