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POLST Registration and Associated Outcomes Among Veterans With Advanced-Stage Lung Cancer

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Abstract

Introduction: The Oregon Physicians Orders for Life-Sustaining Treatment (POLST) Program allows patients with advanced illness to document end-of-life (EOL) care preferences. We examined the characteristics and associated EOL care among Veterans with and without a registered POLST.

Methods: Retrospective, cohort study of advanced-stage (IIIB and IV) patients with lung cancer who were diagnosed between 2008 and 2013 as recorded in the VA Central Cancer Registry. We examined a subgroup of 346 Oregon residents. We obtained clinical and sociodemographic variables from the VA Corporate Data Warehouse and EOL preferences from the Oregon POLST Registry. We compared hospice enrollment and place of death between those with and without a registered POLST.

Results: Twenty-two ($n = 77$) percent of our cohort had registered POLST forms. Compared to those without a registered POLST, Veterans with a POLST had a higher income (\$51 456 vs \$48 882) and longer time between diagnosis and death (223 days vs 119 days). Those with a registered POLST were more likely to be enrolled in hospice (adjusted odds ratio [aOR] = 2.37, 95% confidence interval [CI]: 1.01–5.54) and less likely to die in a VA facility (aOR = 0.27, 95% CI: 0.12–0.59).

Conclusion: There was low submission to the POLST Registry among Veterans who received care in Veterans' Health Administration. Veterans who had a registered POLST were more likely to be enrolled in hospice and less likely to die in a VA care setting. The POLST may improve metrics of high-quality EOL care; however, opportunities for improvement in submission and implementation within the VA exist.

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Authors' Note

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Declaration of Conflicting Interests

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Keywords

advance care planning; lung cancer; physician orders for life-sustaining treatment; hospice enrollment; location of death; palliative care; EOL care

Introduction

End-of-life (EOL) planning is considered a hallmark of high-quality care.^{1,2} Advance directives provide a mechanism for patient-physician communication about EOL preferences and are used broadly in EOL care. The Physicians Orders for Life- Sustaining Treatment (POLST) Program is an innovative EOL care planning tool that aims to improve EOL care by allowing patients with advanced illness to document their care preferences in the form of actionable medical orders, which are maintained in a registry. Oregon maintains the oldest statewide POLST registry, which was established in 2009 when the Oregon POLST Registry Act was enacted. Since that time, most of the United States have implemented POLST programs or have passed legislation and are in the process of developing POLST programs.⁴

The Oregon POLST allows patient information and preferences (in the form of signed actionable medical orders) to be stored and retrieved using an electronic state registry that is readily accessible by clinicians in any health-care setting. The medical orders contained on the POLST forms include preferences for cardiopulmonary resuscitation (CPR) and 3 levels of medical intervention: full treatment, limited additional interventions, and comfort measures only (CMO).⁴ The indication for CMO specifies that transfer to a hospital is only desired if comfort cannot be achieved in one's current location. Prior research has demonstrated that POLST forms are typically used to specify a preference for reduced medical interventions (eg, do not resuscitate [DNR] or CMO).⁵⁻⁷ In addition, research has demonstrated that POLST preferences related to avoidance of hospitalization and other POLST preferences are honored in Oregon⁶ and other states with POLST Registries.^{7,8}

The National POLST Paradigm Task Force has recommended that a POLST be completed among patients who may die within a year,⁴ though among patients with cancer, a POLST is often completed closer to death.⁶ Delays in EOL planning, including POLST completion, may lead to late hospice referral or unwanted medical intervention near the EOL, including unwanted hospitalizations.² Intensive care unit (ICU) admission is not preferred by many patients.⁹ Yet, retrospective data among a cohort of Medicare beneficiaries noted an increase and then plateau in admissions to the ICU within the last 30 days of life (20%–29%) between 2000 and 2015.¹⁰ Little is known about the role of the timing of POLST completion and EOL planning among Veterans.

The purpose of this study was to (1) describe the characteristics and EOL care preferences among Veterans with advanced-stage lung cancer who had a registered POLST; (2) compare sociodemographic and clinical characteristics between Veterans with and without a registered POLST; and (3) examine whether having a registered POLST was associated with characteristics of high-quality EOL care (hospice enrollment and place of death). We hypothesized that having a registered POLST would be associated with increased hospice use and an increased likelihood of dying in a nonacute care setting.

Methods

Data Source and Sample Selection

We identified a national cohort of American Joint Committee on Cancer advanced stage (IIIB and IV) patients with lung cancer who were diagnosed between January 2008 and December 2013 using the VA Central Cancer Registry (VACCR). The VACCR is a comprehensive cancer registry of cancer diagnoses and treatments received from any of the 132 VA medical centers that diagnose and/or treat cancer. The VACCR is compiled by trained registrars that adhere to the Commission on Cancer standards.¹¹ Variables obtained from the VACCR included cancer histology and stage, as well as cancer treatments received. We gathered additional clinical and sociodemographic variables from the VA Corporate Data Warehouse (CDW). The VA CDW is a collection of multiple relational clinical databases containing comprehensive and aggregated VA patient electronic medical record data, including demographic characteristics, medical diagnoses, and treatment utilization. From these data, we calculated the Functional Comorbidity Index (FCI) that is a weighted count of 18 diagnoses derived from administrative data that provides a validated measure of physical function.^{12,13} We also calculated the Charlson Comorbidity Index (CCI), which is a weighted measure of the burden of chronic disease that predicts longterm prognosis and outcomes.¹⁴ Finally, EOL preferences and timing of POLST completion among those with a registered POLST were obtained from the Oregon POLST Registry.¹⁵ A detailed description of the study cohort is available.¹⁶

We examined a subset of individuals (n = 346) who resided in Oregon at the time of diagnosis and were able to submit completed POLST forms to the Oregon POLST Registry. Patients were excluded if they were diagnosed with a nonprimary lung cancer or an unknown cancer histology. Study procedures were approved by the relevant institutional review board (#10985).

We obtained information about hospice enrollment using hospice fee-based data. These billing claims include Medicare claims data through the Medicare hospice file data set¹⁰ and VA Purchased Care claim files via visit of Health Care Finance Administration codes.¹⁷ Information about palliative care consult and site of death among those who died in a VA facility was collected from the CDW.

Data Analysis

Descriptive data were summarized for sociodemographic and clinical variables as well as POLST preferences and timing of POLST completion. Bivariate analyses were conducted to compare sociodemographic and clinical characteristics among Veterans with and without a registered POLST. Logistic regression models were conducted to examine the association between those with and without a registered POLST and (1) enrollment in hospice and (2) site of death in an acute care setting, compared to a non-VA setting. Both models were adjusted for relevant clinical variables (stage of cancer, CCI,¹² and FCI¹⁰) thought to impact outcomes. Several sets of sensitivity analyses were conducted on both of the aforementioned models: (1) Models that included rurality of residence and age as covariates (model results were similar to the final models, and therefore, these covariates were excluded from the final

models); (2) A model that excluded individuals ($n = 13$) who did not indicate care limitation preferences on their POLST forms, but rather chose Full Treatment, indicating their preference for ICU care and the potential for death in an acute care setting, to examine whether location of death was consistent with POLST patient preferences. Results of these 2 sets of sensitivity analyses were similar to the 2 final models which examined the association between those with and without a registered POLST and (1) enrollment in hospice and (2) site of death in an acute care setting, compared to a non-VA setting. We ran a third sensitivity model among only those who died in a VA facility ($n = 89$), which examined POLST status among those who died in a VA acute setting (defined as an in-patient hospital location, nursing home care unit, or skilled nursing facility) to those in a VA hospice facility. This model was unadjusted due to the small number of participants in the POLST group who died in an acute care setting ($n = 4$). An $\alpha = .05$ and 2-tailed significance tests were used for all inferential analyses. SPSS version 21 and STATA version 13 were used in analyses.

Results

Sociodemographic and clinical characteristics are presented in Table 1. Veterans were on average 68 years old (standard deviation: 9) and predominantly male (98%). The majority of our sample (99%) identified as white and lived in urban locations (59%); less than half were married (39%). Most were diagnosed with non-small cell lung cancer (54%) followed by small cell lung cancer (21%). The majority (89%) were diagnosed with stage IV disease (Table 1).

At the time of the data censoring (January 23, 2017), all individuals in this cohort were deceased. The majority (74%) of our sample died in a non-VA setting. Among those who died in a VA setting, 44% died in an ICU or inpatient medical unit, 38% died in a VA hospice, and 17% died in a VA Skilled Nursing Home or Nursing Home Care Unit. Approximately 71 % of our sample received a palliative care consult between the time of cancer diagnosis and death; 82% were enrolled in hospice prior to death.

Among the entire cohort, 22% had a registered POLST. Median time between cancer diagnosis and POLST completion was 17.5 weeks (intraquartile range [IQR] = 35 weeks) and median time between POLST completion and death was 7.0 weeks (IQR = 18; Table 2). Overall, 83% of our cohort indicated care limitations on their registered POLST; 79% indicated “Do not attempt or resuscitate” for CPR preference, 56% indicated “CMO” for medical intervention preference; and 72% indicated “No artificial nutrition by tube” for nutrition preference. A small number ($n = 8$) of those with a registered POLST submitted a second POLST a median of 2.5 weeks (IQR = 10) prior to death. Of those who submitted a second POLST, their preferences were most often changed to reduced medical interventions (Figure 1). Specifically, 87% of the 8 patients who registered a second POLST indicated a change of preference from full code to DNR and 63% selected “CMO” for medical intervention from limited or full intervention. Among those with a registered POLST who were enrolled in hospice, the majority (93%) of POLST forms were signed by a physician prior to hospice enrollment. These POLST forms were signed a median time of 102 days (IQR = 241) before hospice enrollment.

Veterans with a registered POLST had a higher income (\$51 456 vs \$48 882) and a longer median time between diagnosis and death (223 days vs 119 days) compared to those without a registered POLST. There were no other significant differences for age, sex, marital status, home residence location (urban vs rural), service connection status, functional comorbidity, medical comorbidity, cancer stage, cancer histology, and length of hospice enrollment between Veterans with and without a POLST.

Results of the regression analyses examining the association between POLST registration and hospice enrollment or death inside a VA facility are presented (Table 3). Regarding hospice enrollment, POLST registration was associated with increased hospice enrollment (adjusted odds ratio [aOR] = 2.37, 95% confidence interval [CI] = 1.01–5.54) compared to patients without POLST. Higher income was also associated with increased hospice enrollment (aOR = 1.90, 95% CI = 1.27–2.82) compared to lower income. The POLST registration was also associated with decreased likelihood of death in a VA facility (aOR = 0.27, 95% CI = 0.12–0.59) compared to patients without POLST.

Discussion

In a state with a well-established POLST program, there was low submission of POLST to the statewide Registry among Veterans with advanced-stage lung cancer who receive care in VA. Importantly, those with a registered POLST were more likely to be enrolled in hospice and less likely to die in a VA care setting, both of which are EOL care quality metrics. Unfortunately, when POLST registration did occur, it was usually close to death, diminishing the impact of documented EOL preferences on subsequent clinical care (eg, ICU admission). The POLST registration is associated with high-quality EOL care; however, low or late utilization limits its effectiveness.

Within the VA, low submission rates to the POLST registry (22%) in a cohort of individuals with advanced cancer suggest that there may be potential system or institutional barriers. This rate is lower than the rates of POLST registration among non-Veterans with cancer, which is estimated at 34%.⁶ Yet compared to other forms advance directives, POLST forms are advantageous to Veterans because they allow medical professionals in non-VA facilities to quickly obtain Veterans' EOL preferences, in the form of actionable, signed orders, when Veterans seek care outside of the VA. This is especially important among Veterans given that Veterans' electronic medical records are only immediately available to clinicians working within VA and the increasing prevalence of Veterans who are older than 65 and dual users of VA and Medicare,¹⁸ meaning they likely receive care in non-VA settings.

In the past year, in an effort to remedy the low utilization rates, the Veterans' Health Administration issued a revised handbook to standardize how clinicians elicit, document, and honor patients' EOL goals and preferences.¹⁹ These efforts may increase the use of POLST (including submission to the state registry) in the VA to help streamline registration and reduce barriers. Future research is needed to examine how standardized processes affect use of POLST in Veterans with advanced illnesses to inform nationwide standards for POLST implementation. Among our sample, we found those who registered a POLST had a longer time between diagnosis and death than those who did not register a POLST (223 days

vs 119 days). The longer length of time likely allowed for more treatment encounters and potential opportunities for someone to complete and register a POLST form. This finding suggests that more health-care contact may increase POLST utilization and that time of diagnosis may be an appropriate time for a clinician to present and complete the POLST form.

Although hospice enrollment was generally high for our cohort (82%), we found that enrollment in hospice was higher among those with a registered POLST, which is consistent with prior research.⁸ Among those with a registered POLST who were enrolled in hospice, 93% registered their POLST prior to enrolling in hospice. This is an important timing distinction among our sample, given that a 2009 study found that POLST use among Oregon Hospices is ubiquitous.²⁰ The POLST discussion likely offers the opportunity for an EOL care conversation that could assist with earlier discussion, and the prioritization of EOL preferences that may include the downstream provision of hospice. Hospice use is an important quality metric of cancer care.^{21,22} The use of hospice and earlier enrollment among Veterans with advanced-stage lung cancer appears to be increasing.¹⁶ More timely referral and enrollment in hospice offers patients and their families many benefits including a multidisciplinary approach to EOL care that avoids aggressive medical care²³ and emphasizes dignity, respect, and control.²⁴ Among decedents and their families who received hospice services at home, there are additional benefits associated with the provision of care in one's own home.²⁴

Location of death is a quality metric of EOL care, with death at home being associated with the preferred location for the majority of those with advanced illness.¹⁰ Those with a registered POLST were significantly less likely to die in a VA care setting. These individuals likely died at their primary residence, although data specifying the exact location of death among these patients were not available. One possible reason for the observed relationship between POLST registration and location of death could be a prioritization of high-quality EOL care (eg, death in a nonacute care setting) and communication of these preferences among individuals completing a POLST. This relationship between POLST registration and location of death in Veterans is consistent with previous literature suggesting that individuals with POLST preference of care limitations are less likely to die in a hospital setting.^{6,25}

In terms of POLST preferences and timing, our data were consistent with non-Veteran Oregon POLST data that suggest a preference toward DNR and CMO.⁵ Additionally, among a small number of Veterans who completed a second POLST, the trend in preference was toward less medical intervention in POLST forms that were registered closer to the time of death, which is also consistent with non-Veteran studies.²⁶ We found that the median time between POLST completion and death was 7 weeks, which is similar to a non-Veteran population of patients with cancer.²⁶ The close proximity between POLST completion and death identifies an opportunity to improve the timeliness of discussions about EOL care preferences in those with advanced cancer. The POLST may be associated with high-quality EOL care that is also more consistent with patients' preferences; however, its effectiveness is limited when utilization occurs near death. Examination of barriers to earlier POLST completion among Veterans with advanced lung cancer and how this influences its effectiveness is warranted.

There are several limitations to our study. Observational studies are subject to unmeasured, residual confounding. Among those who died in non-VA settings, we could not confirm if these deaths occurred in other acute care settings in non-VA hospitals, though given the high percentage of hospice enrollment among that group, we presume those who were enrolled in hospice did not die in acute care settings. We studied those with a registered POLST and not a completed POLST, as POLST completion is difficult to capture without registration. The presence of other advance care planning documents such as advance directives was not studied. Finally, our sample was limited to Veterans who were diagnosed or received their cancer care within VA.

Conclusions

Among Veterans with advanced-stage lung cancer, POLST form registration is underutilized which may limit its effectiveness in ensuring receipt of care that is consistent with patients' preferences. The POLST completion was associated with both hospice enrollment and death outside of a VA facility, known metrics of high-quality EOL care. Most Veterans with a registered POLST have preferences for care limitations at the EOL, but completion of POLST occurs late in the disease trajectory suggesting opportunities for improvement. Elucidation of health-care system-related and individual barriers to POLST registration among Veterans, and more resources are needed to design interventions to improve utilization.

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Figure 1.

Initial and second Physicians Orders for Life-Sustaining Treatment (POLST) preferences. For code status preferences, the proportion of patients who selected do not resuscitate was higher in both those who registered an initial POLST (79%) and those who submitted a second POLST (87%), compared to individuals who indicated resuscitation/ cardiopulmonary resuscitation (CPR) as their preference on the first (21%) or second POLST (13%). Regarding medical intervention preferences, the most commonly selected preference was “Comfort Measures Only” for both the initial (56%) and second POLST (63%). Regarding nutrition preferences, the most commonly selected preference was “No Artificial Nutrition by Tubes on both the initial and second POLST (72% and 50%, respectively). On initial and second POLST forms patients over-whelmingly selected limitations in code status, medical interventions, and artificial nutrition.

Table 1.

Patient Characteristics.^a

Patient Characteristics	Registered POLST n = 77	No POLST n = 269	P Value
Age, years, mean (SD)	67.5 (9.1)	68 (8.7)	.668
Sex, male	76 (99)	264 (98)	.740
Race			
White	77 (100)	265 (98)	.282
Black	—	4(2)	
Marital status			
Married	36 (47)	99 (37)	.439
Not Married	33 (43)	122 (53)	
Widowed	8(10)	28 (10)	
Income, US dollars			
43 999	20 (26)	107 (40)	.045
44 000–52 999	32 (42)	104 (39)	
53 000	25 (33)	58 (22)	
Home residence location			
Urban	51 (66)	153 (57)	.167
Rural	24 (31)	113 (42)	
Unknown	2 (3)	3 (1)	
Service connection			
No	41 (53)	151 (56)	.653
Yes	36 (47)	118 (44)	
AJCC-NTM cancer stage			
IIIB	7 (9)	30 (11)	.606
IV	70 (91)	239 (89)	
Cancer histology			
Small cell	13(17)	59 (22)	.808
Non-small cell	44 (57)	142 (53)	
Other	3 (4)	11 (4)	

Patient Characteristics	Registered POLST n = 77	No POLST n = 269	P Value
Unknown	17 (22)	57(21)	
Functional Comorbidity Index (FCI)			
None (0)	27 (35)	81 (30)	.196
Mild (1–2)	17 (22)	40 (15)	
Moderate (3–4)	19 (25)	73 (27)	
Severe (5)	14 (18)	75 (28)	
Charlson Comorbidity Index (CCI)			
None (0)	14 (18)	28 (10)	.310
Mild (1–2)	13(17)	54 (20)	
Moderate (3–4)	20 (26)	70 (26)	
Severe (5)	30 (39)	117 (44)	
Time between diagnosis and death, days, median (IQR)	223 (292)	119 (209)	<.001
Location of death			
Outside of VA	69 (90)	188 (70)	<.001
Inside of VA	8(10)	81 (30)	
Location inside VA			
ICU or in-patient medical unit	4 (50)	36 (44)	.088
Hospice	3 (38)	31 (38)	
SNF/NHCU	1 (13)	14(17)	
VA care setting			
Acute	4 (50)	36 (44)	.787
Nonacute	4 (50)	45 (66)	
# Received palliative care consult (PCC)	53 (69)	194 (72)	.574
Time from diagnosis to first PCC (days)	38 (135)	31 (72)	.025
# Enrolled in hospice	70 (91)	214 (80)	.022
Time enrolled in hospice, days, median (IQR)	50 (109)	41 (137)	.769

Abbreviations: AJCC, American Joint Committee on Cancer; ICU, intensive care unit; IQR, interquartile range; NHCU, Nursing Home Care Unit; NTM, tumor, node, and metastases; POLST, Physicians Orders for Life-Sustaining Treatment; SD, standard deviation; SNF, skilled nursing facility.

^aReported as n (%) unless otherwise stated. Time to death is non-normally distributed, median (IQR), presented and Mann-Whitney U test used to compare distributions across groups.

Table 2.
Timing of POLST Completion Among Patients With Advanced Stage Lung Cancer in the VA.

POLST Timing	Median (IQR)
Initial POLST Completion, weeks (n = 77)	
Amount of time from diagnosis to POLST completion	17.5 (35)
Amount of time from completion of initial POLST until death	7.0 (18)
POLST Revision ^a , weeks (n = 8)	
Amount of time between first and second POLST completion	33.5 (142)
Amount of time between second POLST completion and death	2.5 (10)

Abbreviations: IQR, intraquartile range; POLST, Physicians Orders for Life-Sustaining Treatment.

^aDenominator is patients who registered a POLST revision.

Table 3.Logistic Regression Examining Variables Associated With Hospice Enrollment and Location of Death.^a

Regression Models	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Hospice enrollment		
Stage IV	1.08 (0.45–2.58)	1.01 (0.41–2.49)
Income	2.00 (1.34–2.97) ^b	1.90 (1.27–2.82) ^b
Medical comorbidity	0.99 (0.93–1.07)	0.81 (0.61–1.09)
Functional comorbidity	1.06 (0.94–1.19)	1.26 (0.98–1.62)
POLST registration	2.57 (1.12–5.90) ^c	2.37 (1.01–5.54) ^c
Death inside a VA facility		
Stage IV	1.09 (0.49–2.40)	1.12 (0.50–2.52)
Income	1.03 (0.76–1.42)	1.11 (0.80–1.53)
Medical comorbidity	1.04 (0.98–1.10)	1.03 (0.80–1.33)
Functional comorbidity	1.08 (0.98–1.20)	1.11 (0.89–1.38)
POLST registration	0.27 (0.12–0.59) ^b	0.27 (0.12–0.59) ^b

Abbreviations: CI, confidence interval; OR, odds ratio; POLST, Physician Orders for Life-Sustaining Treatment.

^a Adjusted models controlled for tumor stage, income, medical comorbidity, and functional comorbidity. Reference group is those without a registered POLST.^b $P < .01$.^c $P < .05$.