

Association Between Physician Orders for Life-Sustaining Treatment for Scope of Treatment and In-Hospital Death in Oregon

Erik K. Fromme, MD, MCR,* Dana Zive, MPH,[†] Terri A. Schmidt, MD, MS,[‡]
Jennifer N. B. Cook, BA, GCPH,[‡] and Susan W. Tolle, MD[§]

OBJECTIVES: To examine the relationship between Physician Orders for Life-Sustaining Treatment (POLST) for Scope of Treatment and setting of care at time of death.

DESIGN: Cross-sectional.

SETTING: Oregon in 2010 and 2011.

PARTICIPANTS: People who died of natural causes.

MEASUREMENTS: Oregon death records containing cause and location of death were matched with POLST orders for people with a POLST form in the Oregon POLST registry. Logistic regression was used to measure the association between POLST orders and location of death.

RESULTS: Of 58,000 decedents, 17,902 (30.9%) had a POLST form in the registry. Their orders for Scope of Treatment were comfort measure only, 11,836 (66.1%); limited interventions, 4,787 (26.7%); and full treatment, 1,153 (6.4%). Comfort measures only (CMO) orders advise avoiding hospitalization unless comfort cannot be achieved in the current setting; 6.4% of participants with POLST CMO orders died in the hospital, compared with 44.2% of those with orders for full treatment and 34.2% for those with no POLST form in the registry. In the logistic regression, the odds of dying in the hospital of those with an order for limited interventions was 3.97 times as great (95% CI = 3.59–4.39) as of those with a CMO order, and the odds of those with an order for full treatment was 9.66 times as great (95% CI = 8.39–11.13).

CONCLUSIONS: The association with numbers of deaths in the hospital suggests that end-of-life preferences of

people who wish to avoid hospitalization as documented in POLST orders are honored. *J Am Geriatr Soc* 2014.

Key words: advance care planning; Physician Orders for Life-Sustaining Treatment; location of death; cardiopulmonary resuscitation

People have decidedly different views about what constitutes a good or bad death and about the kind of treatment they want near the end of their lives.¹ In the face of advanced illness, some people prefer to receive all feasible life-sustaining treatment in the hopes that their lives can be improved or prolonged, whereas others want the focus of their care to be less “medicalized” and more on comfort.² Although it is probably more important how you die than where you die,³ where you die can strongly affect how you die.⁴ Dying in the hospital involves different treatment options, support, personnel, and challenges than dying in long-term care or at home.⁵

A national study of bereaved family members found perceived differences in symptom control, information, emotional support, physician communication, and satisfaction depending on whether people died in a hospital, at home with hospice, or in a long-term care facility. Family members of people receiving home hospice services were more satisfied with overall quality of care; 70.7% rated care as excellent, compared with fewer than 50% of those dying in a hospital or nursing home.⁴ A more-recent study analyzing trends in Medicare fee-for-service claims, found a decrease in deaths in acute care hospitals but also an increase in intensive care unit use in the last 30 days of life.⁶ To what degree is individual preference driving these trends? How much influence do an individual’s end-of-life preferences have on where he or she dies? In the Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments (SUPPORT), researchers found that, although most people expressed a preference for dying at

From the *Division of Hematology and Medical Oncology, Oregon Health & Science University; [†]Center for Policy and Research in Emergency Medicine, Oregon Health & Science University; [‡]Department of Emergency Medicine, Oregon Health & Science University; and [§]Center for Ethics in Health Care, Division of General Internal Medicine and Geriatrics, Oregon Health & Science University, Portland, Oregon.

Address correspondence to Erik K. Fromme, Division of Hematology and Medical Oncology, Oregon Health & Science University, L586, 3181 SW Sam Jackson Park Road, Portland, OR 97239. E-mail: frommee@ohsu.edu

DOI: 10.1111/jgs.12889

home, they nevertheless died in a hospital and that health system characteristics, not individual preferences, influenced where they died.⁷ Because SUPPORT enrolled hospitalized individuals, this may have increased the likelihood of their dying in the hospital despite preferences to die at home.

A 2004 secondary analysis of the Asset and Health Dynamics Among the Oldest Old (AHEAD) study found that having a living will was associated with a lower probability (0.65) of dying in a hospital, although they did not examine the content of the advance directives to see what the individuals' preferences for care were.⁸ A 2010 analysis of the Health and Retirement Study found lower odds of dying in the hospital for subjects who appointed a durable power of attorney for health care (adjusted odds ratio (AOR) = 0.72, 95% confidence interval (CI) = 0.55–0.93) and a nonsignificant trend for individuals who had living wills (AOR = 0.71, 95% CI = 0.47–1.07).⁹ A 2013 study linking the Health and Retirement Study to Medicare data found that those who engaged in advance care planning (e.g., completing an advance directive, assigning a durable power of attorney for health care, discussing preferences with next of kin or a physician) were less likely to die in the hospital (adjusted risk ratio = 0.87, 95% CI = 0.80–0.94).¹⁰ A 1998 study of Physician Orders for Life-Sustaining Treatment (POLST) in 180 Oregon nursing home residents found that those with a comfort measures only (CMO) order rarely (2/38, 5.3%) died in the hospital.¹¹ Because location of death has a powerful effect on care and treatment at the end of life, and because people have different ideas about where they want to die,¹² a mechanism that could help ensure that people spend their final days in the location that they wanted would be valuable in ensuring individual-centered, quality end-of-life care.

The POLST Paradigm was conceived as a tool to help ensure that treatment preferences of individuals with advanced illness or frailty are honored by documenting their preferences as medical orders. (See www.POLST.org for details.)¹³ Although not specifically documenting where people prefer to die, POLST orders for Scope of Treatment include three possible order sets that could affect where people die. First, the POLST CMO order states: "Patient prefers no transfer to hospital for life-sustaining treatments. Transfer if comfort needs cannot be met in current location....Maximize comfort through symptom management." Thus, most but not all people with a CMO order should die outside the hospital because they have an order not to return there, although people whose symptoms cannot be controlled or who have an acute event such as a hip fracture may need to return to the hospital and might appropriately die there. Second, the POLST limited interventions order states "Transfer to hospital if indicated. Generally avoid the intensive care unit.... Provide basic medical treatments." Third, POLST full treatment order states "Transfer to hospital and/or intensive care unit if indicated." People with a full treatment order are not expressing a preference to die in the hospital—they are indicating a preference to receive life-sustaining treatment to live longer, but being transferred to a hospital for life-sustaining treatment increases the likelihood of dying there.

In December 2009, the state of Oregon created the Oregon POLST Registry, an electronic repository that allows emergency personnel and hospitals immediate 24-hour access to POLST orders.¹⁴ The Oregon POLST Registry receives approximately 3,500 submissions per month and had received forms for more than 123,000 registrants as of November 30, 2013. A previous study found that, of individuals with advanced illness and frailty with POLST forms in the registry, 50.4% with DNR orders also had orders for CMO.¹⁵ The current study was designed to examine the association between the presence and type of POLST orders for Scope of Treatment and the type of setting in which people died (home, hospital, or long-term care facility) across the state of Oregon.

METHODS

The Oregon Health and Science University and the Oregon Public Health Department institutional review boards deemed the study exempt because all data pertained to deceased persons.

The population was people in Oregon who died of natural, nontraumatic causes in 2010 to 2011. The Oregon Center for Health Statistics provided an electronic data file on all people who died in Oregon in 2010 and 2011. Deaths outside of Oregon or listed as suicide, homicide, accident, undetermined, or pending were excluded. Data from the Oregon POLST Registry was used to match decedents in the Center for Health Statistics file with POLST forms signed and submitted to the registry between the same dates. Forms that were signed or submitted before 2010 were excluded because statewide registry implementation and the legislative mandate to submit forms did not begin until December 3, 2009. Only final POLST forms were matched with death certificates for registrants with multiple forms. The death certificate data set was deterministically matched to the Oregon POLST Registry data using last name and date of birth, followed by manual review.

Analysis

Data analyzed from POLST forms included orders for resuscitation (attempt or do not attempt cardiopulmonary resuscitation) and Scope of Treatment (CMO, limited interventions, or full treatment). Data available from the death certificates included primary and secondary causes of death, manner of death, location of death, decedent residence information, date of death, decedent race and ethnicity, decedent date of birth, and decedent educational attainment. Decedents who died in an emergency department (ED) were considered to have died in a hospital. Decedent residence ZIP code was used to determine rural versus urban status using the Oregon Office of Rural Health definition of rural (living ≥ 10 miles away from a population center of $\geq 40,000$ people).

Univariate (*t*-test and chi-square) and multivariate analyses were used to assess the association between demographic variables and having a POLST form in the registry and dying in the hospital. Demographic variables with statistically significant differences in the univariate analysis were included in logistic regression models. In the first model, the dependent variable was having a POLST

form in the registry, and the sample included all decedents. In the second model, the independent variable was the POLST Scope of Treatment order (CMO, limited interventions, or full treatment), and the dependent variable was dying in the hospital versus other location. For this model, only individuals with POLST forms were included in the registry to focus the analysis on people with documented preferences. Analyses were conducted using IBM SPSS Statistics v.21 (IBM Corp., Armonk, NY).

RESULTS

Fifty-eight thousand people died in Oregon of natural, nontraumatic causes in 2010 and 2011, and 17,902 of these (30.9%) had POLST forms in the Registry that had been completed during 2010 or 2011: 11,836 CMO (66.1%), 4,787 limited interventions (26.7%), 1,153 full treatment (6.4%), and 126 no Scope of Treatment order (0.7%). Table 1 compares decedents with POLST forms in the registry with those without who died in Oregon. In univariate analysis, decedents with POLST forms were older (mean age 78.8 vs 75.1, $P < .001$), more likely to be

female (54.4% vs 50.2%, $P < .001$), more likely to live in an urban ZIP code (57.6% vs 53%, $P < .001$), more likely to be non-Hispanic Caucasian (95.5% vs 93.4%, $P < .001$), more likely to have cancer as primary cause of death (34.3% vs 22%, $P < .001$), and more likely to have greater than high school education (40.6% vs 38.0%, $P < .001$). In the first logistic regression model, all of these variables remained independently significant (all $P \leq .001$) but predicted only a small proportion of the odds of having a POLST form in the registry, as indicated by a modest pseudo R square (0.054).

POLST was not equally used across diagnoses. Table 2 shows the top 10 natural causes of death in Oregon and what percentage of individuals with each diagnosis had a POLST form in the registry. Individuals who died of cancer, the leading cause of death in Oregon, were significantly more likely to have a POLST (41.0%) than those who died of heart disease, the second leading cause of death (25.1%) ($P < .001$).

Figure 1 reports unadjusted location of death according to POLST Scope of Treatment order. Likelihood of dying in the hospital varied, with 6.4% of individuals with POLST CMO orders dying in the hospital, compared with 22.4% of those with orders for limited interventions, 44.2% of those with orders for full treatment, and 34.2% of those with no POLST form in the registry. Proportions dying at home were the converse, with 48.9% of those with CMO orders dying at home, compared with 37.4% of those with limited interventions, 28.0% of those with orders for full treatment, and 36.7% of those with no POLST form in the registry.

Although the likelihood of having a POLST form in the registry varied according to cause of death, Table 3 shows that the association between POLST CMO orders and lower proportions of in-hospital death is seen for each of the leading causes of death. For each cause of death, the proportion of individuals with a POLST CMO order who died in the hospital was substantially lower than that of individuals with the same cause of death who had a POLST full treatment order.

In the second logistic regression model, for POLST registrants, having a CMO order was associated with lower

Table 1. Demographic Characteristics of Oregon Decedents with and without Physician Orders for Life-Sustaining Treatment (POLST) Forms in the Registry

Characteristic	POLST Form	No POLST
	in Registry, n = 17,902 (30.9%)	in Registry, n = 40,098 (69.1%)
	n (%)	
Age		
0–18	32 (0.2)	504 (1.3)
19–44	212 (1.2)	1,059 (2.6)
45–64	2,473 (13.8)	7,981 (19.9)
65–74	2,850 (15.9)	6,867 (17.1)
75–84	5,068 (28.3)	9,885 (24.7)
85–94	6,083 (34.0)	11,333 (28.3)
≥95	1,184 (6.6)	2,469 (6.2)
Sex		
Female	9,739 (54.4)	20,121 (50.2)
Male	8,163 (45.6)	19,977 (49.8)
Race		
Caucasian	17,275 (96.5)	38,083 (95.0)
African American	188 (1.1)	508 (1.3)
Asian, Hawaiian, or Pacific Islander	194 (1.1)	634 (1.6)
American Indian or Alaskan Native	105 (0.6)	337 (0.8)
More than one race	62 (0.3)	215 (0.5)
Other or unknown	71 (0.4)	321 (0.8)
Hispanic		
No	17,653 (98.6)	39,234 (97.8)
Yes	247 (1.4)	864 (2.2)
Location		
Urban	10,316 (57.6)	21,252 (53.0)
Rural	7,585 (42.4)	18,838 (47.0)
Education		
≤High school or GED	10,636 (30.0)	24,841 (70.0)
≥Some college	7,266 (32.3)	15,257 (67.7)

Table 2. Top 10 Natural Causes of Death in Oregon with Physician Orders for Life-Sustaining Treatment (POLST) in Registry According to Diagnosis

Rank	Cause of Death	n	With POLST Order, n (%)
1	Malignant neoplasms	14,980	6,146 (41.0)
2	Heart disease	11,799	2,967 (25.1)
3	Alzheimer’s disease or dementia	6,118	2,122 (34.7)
4	Chronic respiratory disease	3,918	1,211 (30.9)
5	Cerebrovascular disease	3,603	996 (27.5)
6	Diabetes mellitus	2,126	526 (24.7)
7	Liver disease	1,024	246 (20.8)
8	Influenza and pneumonia	779	162 (24.0)
9	Nephritis and renal failure	699	221 (31.6)
10	Parkinson’s disease	695	248 (35.7)
	All others	12,259	3057 (24.9)
	All causes	58,000	17,902 (30.9)

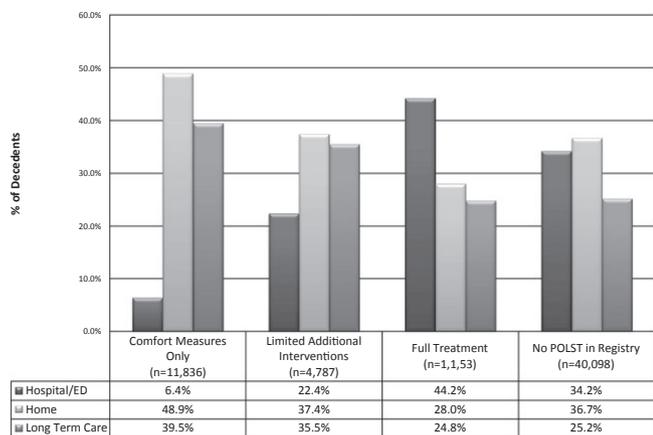


Figure 1. Location of death according to Physician Orders for Life-Sustaining Treatment Scope of Treatment order. 126/17,902 (0.7%) had no POLST Scope of Treatment order, and 4,658 or 58,000 (8.0%) decedents died in locations other than the hospital, emergency department (ED), home, of long-term care (adult foster care, assisted living, nursing home, long-term care facility, residential care).

odds of dying in the hospital when demographic factors (diagnosis, sex, ZIP code, race and ethnicity, education, and age) were controlled. Unadjusted and adjusted odds ratios for all variables are listed in Table 4. The odds of those with an order for limited interventions was 3.97 times as great (95% CI = 3.59–4.39) as the odds of those with a CMO order, and the odds of those with an order for full treatment was 9.66 times as great (95% CI = 8.39–11.13). The pseudo R squared was higher in this model (0.18).

DISCUSSION

Because emergency medical services (EMS) protocol is to provide full treatment, including attempted resuscitation and transport to an ED, people who prefer otherwise need to plan in advance and make their wishes known. In addition to willingness to make a plan, one needs a mechanism to turn that plan into actions that the health system will find and respect. Planning in advance is more effective

Table 4. Multivariable Analysis of Location of Death of Participants with a Completed Physician Orders for Life-Sustaining Treatment Form (Died in the Hospital vs Died Elsewhere, e.g., Home, Long-Term Care, Other)

Characteristic	Unadjusted	Adjusted
	Odds Ratio (95% Confidence Interval)	
Medical indication (reference comfort measures only)		
Limited additional interventions	4.21 (3.81–4.65)	3.97 (3.59–4.39)
Full treatment	11.59 (10.10–13.3)	9.66 (8.39–11.13)
No cancer	2.39 (2.15–2.66)	2.55 (2.27–2.88)
Male	1.17 (1.08–1.28)	1.13 (1.03–1.25)
Rural ZIP code	0.996 (0.91–1.09)	1.02 (0.93–1.12)
Hispanic non-Caucasian	1.50 (1.24–1.80)	1.30 (1.06–1.59)
>High school education	0.99 (0.91–1.09)	1.03 (0.93–1.13)
Age (per 10-year increase)	0.87 (0.85–0.90)	0.83 (0.81–0.87)

C-index for the model was 0.75, pseudo R-squared was 0.18.

if orders directing preferences have been established. The POLST paradigm meets both these needs, providing a support for discussion and planning with a healthcare professional and medical orders.¹⁶

A striking difference was found in proportions of in-hospital death that was consistent with POLST Scope of Treatment orders. In Oregon, approximately one-third of people who died of natural causes without a POLST form in the registry died in the hospital or ED. Only 6% of deceased POLST registrants with an order for CMO died in the hospital or ED, compared with 22.4% of decedents with a limited interventions order, and 44% of decedents with a full treatment order.

Individuals request Scope of Treatment orders for many reasons, not just preferences regarding location of death. Thus, POLST CMO orders may not always mean a preference to avoid dying in the hospital, but the order instructs health professionals to avoid transferring an individual to a hospital unless comfort measures cannot be provided effectively. Similarly, a POLST full treatment order does not

Table 3. Deaths in Hospital According to Cause of Death: Participants with Physician Orders for Life-Sustaining Treatment for Comfort Measures Only and Full Treatment

Rank	Cause of Death	Comfort Measures Only	Full Treatment
		n/N (%)	
1	Malignant neoplasm	213/4,484 (4.8)	76/286 (26.6)
2	Heart disease	129/1,797 (7.2)	107/228 (46.9)
3	Alzheimer's disease or dementia	34/1,576 (2.2)	6/39 (15.4)
4	Chronic respiratory disease	53/703 (7.5)	48/99 (48.5)
5	Cerebrovascular disease	64/602 (10.6)	36/64 (56.3)
6	Diabetes mellitus	20/318 (6.3)	21/64 (32.8)
7	Liver disease	11/162 (6.8)	11/28 (39.3)
8	Influenza and pneumonia	15/71 (21.1)	22/24 (91.7)
9	Nephritis and renal failure	6/139 (4.3)	9/17 (52.9)
10	Parkinson's disease	6/185 (3.2)	1/5 (20.0)
	All others	207/1,799 (11.5)	173/299 (57.9)
	All causes	758/11,836 (6.4)	510/1,153 (44.2)

mean that the individual wishes to die in a hospital; it more likely reflects a wish to go to the hospital to prevent death, but transferring acutely ill individuals with advanced chronic illness to the hospital increases the probability that they will die there. Individuals with a POLST full treatment order were more likely to die in a hospital or ED than those with any other Scope of Treatment order and more often than those without a POLST order in the registry.

A limited interventions order (which also instructs health professionals to transfer the person to the hospital but to avoid intensive care) was associated with fewer deaths in the hospital than not having POLST forms in the registry. Data on intensive care unit use were not available for this study, but the low rate of in-hospital death for these individuals suggests that it may be possible to be hospitalized near the end of life for basic medical treatment while still being discharged to die somewhere other than the hospital.

Although it is not known what percentage of the 6.4% of those with CMO orders who died in the hospital were transferred for comfort (e.g., for a hip fracture), POLST form CMO orders specifically state that, when individuals cannot be kept comfortable in the current setting of care, they should be transferred, despite otherwise wishing to avoid hospitalization. Two prior nursing home studies have shown that the majority of residents with CMO orders who are transferred to the hospital are transferred because their comfort needs could not be managed.^{11,17} In summary, the marked variation in numbers of deaths in the hospital and at home suggests that end-of-life preferences for those with CMO as documented in POLST orders were honored in this statewide sample of decedents.

Based on race, sex, and urban versus rural residence, this sample is representative of Oregon residents. Decedents with a POLST in the registry were slightly more likely than the total sample of deceased Oregon population to be elderly, urban, Caucasian, and more educated. It is likely that decedents with no POLST in the registry are a heterogeneous group with respect to preferences and advance care planning. Some will have died suddenly and without an opportunity to complete a POLST. Some will have spent considerable time and effort in advance care planning and may even have a POLST form that was never submitted to the registry. Others will have avoided advance care planning altogether.

Although there are demographic differences between individuals with registered POLST forms and the decedent population, these differences are small and explain little of the variance between those with and without a POLST form. People with certain illnesses are more likely than others to complete a POLST form. Decedents whose primary cause of death was cancer were far more likely to complete a POLST form (41%) than those with heart disease (25%), which makes sense because individuals with cancer have an end-of-life trajectory that is easier to predict and thus plan for than those with heart disease or many other chronic illnesses. Some people with atherosclerosis who die suddenly of a heart attack or stroke are less likely to be considered candidates for POLST than those with congestive heart failure or other chronic illness. Regardless of diagnosis, if they engage in planning, and a POLST form is completed, there is a similar strong association between their preferences for treatment (transfer to the hospital) and the likelihood of death in a hospital.

Limitations

This was not a controlled study and it is not possible to quantify the effect of having a POLST CMO order on location of death. Limited clinical information was available, and hospitalizations or other transitions that may have occurred before participants died were not known about. Where participants were living, which undoubtedly influenced where they died, could not be controlled for. Who chooses to have a POLST form and what orders they choose are not random. It is possible that individual and family preferences or other advance care planning efforts would have resulted in many individuals dying at home without a POLST CMO order, but evidence from SUPPORT and other studies strongly indicates that individual preferences do not affect where people die⁷ or their receipt of life-sustaining treatments.^{18–24} A previous study found that completing an advance directive reduced the likelihood of dying in the hospital (adjusted relative risk = 0.87, 95% CI = 0.80–0.94). It is worth contrasting this data with the stronger associations between POLST medical Scope of Treatment orders and location of death.¹⁰

Oregon is a racially and ethnically homogeneous state, particularly in the oldest age group. Individual preferences and use of advance directives are known to differ significantly according to race, in aggregate in the direction of greater preference for and receipt of life-sustaining treatments for minority groups.²⁵ Although, in theory, POLST orders are intended to reflect individual preferences, data addressing the concordance between POLST orders and individual preferences are limited.²⁶ Oregon is known to be a progressive state in terms of palliative and end-of-life care, and Oregonians preferences for life-sustaining treatment may differ significantly from those of residents of other states.²⁷

Finally, it is not known what proportion of all Oregon POLST users are active in the registry and how representative the registry is of all Oregonians with a POLST order. Because the registry is relatively new and the first 2 years of data were used, decedents who died in 2010 had less than a year to complete a POLST form. To put the registry numbers in perspective, consider that there are 3.7 million people in Oregon, including 493,759 people aged 65 and older, and approximately 32,000 deaths each year, including approximately 24,000 deaths in people aged 65 and older.²⁸ In its first 2 years, health professionals submitted forms for 64,996 individuals to the registry, which is remarkable. Despite these limitations, by bringing together individuals of all ages and in all care settings, this data set has a tremendous amount of clinical diversity, as opposed to prior studies that focused on individuals in single settings such as the hospital, nursing home, hospice, or outpatient clinic.

Decedents with registered POLST orders for CMO orders were significantly less likely to die in an acute care hospital, whereas those with orders for full treatment were more likely to die in the hospital than those without POLST forms in the registry. This pattern is seen in each of the top 10 causes of death. The association with numbers of deaths in the hospital suggests that end-of-life preferences to avoid hospitalization as documented in POLST orders are honored.

ACKNOWLEDGMENTS

This work was supported in part by a grant from The Samuel S. Johnson Foundation and the Oregon Health & Science University Center for Ethics funding.

Conflict of Interest: The editor in chief has reviewed the conflict of interest checklist provided by the authors and has determined that the authors have no financial or any other kind of personal conflicts with this paper.

The Oregon POLST Registry is supported through a contract from the Oregon Health Authority. Three authors receive salary support for registry operations but not for research activities. The Center for Policy and Research in Emergency Medicine receives no funds from the Oregon POLST Registry contract.

Dr. Fromme reports grants from The Samuel S. Johnson Foundation, compensation and honoraria for travel to a speak at a national POLST conference from Oregon Health & Science University Center for Ethics in Health Care during the conduct of the study, and grants from the California Coalition for Compassionate Care outside the submitted work. Ms. Zive reports grants from The Samuel S. Johnson Foundation during the conduct of the study, travel support from the POLST Task Force, and contract employment from the state of Oregon on the Oregon POLST Registry outside the submitted work. Dr. Schmidt reports contract employment from the state of Oregon on the Oregon POLST registry outside the submitted work. Ms. Cook reports grants from The Samuel S. Johnson Foundation during the conduct of the study, contract employment from the state of Oregon on the Oregon POLST Registry, speaker fees from Continuing Medical Education of Southern Oregon, and personal fees from Washington County EMS outside the submitted work. Dr. Tolle reports grants from The Samuel S. Johnson Foundation, the California HealthCare Foundation, and the Archstone Foundation and compensation for travel from The Retirement Research Foundation during the conduct of the study. Dr. Tolle receives salary support from the Oregon Health & Science University Center for Ethics in Health Care.

Author Contributions: All authors made significant contributions to the concept and design of the study. Ms. Zive performed primary acquisition and analysis of data. All authors participated in data analysis and interpretation of results. Dr. Fromme and Ms. Zive compiled the initial paper draft, and all authors were involved in reviewing, revising, and editing the full manuscript. All authors have approved the manuscript for submission.

Sponsor's Role: The Samuel S. Johnson Foundation had no role in the preparation, review, or approval of the manuscript or the decision to submit the manuscript for publication. The Oregon Health & Science University Center for Ethics in Health Care administers the POLST Program. The Center for Ethics is supported by private philanthropy and does not accept gifts from healthcare industry sources.

REFERENCES

- Vig EK, Davenport NA, Pearlman RA. Good deaths, bad deaths, and preferences for the end of life: A qualitative study of geriatric outpatients. *J Am Geriatr Soc* 2002;50:1541–1548.
- McCue J. The naturalness of dying. *JAMA* 1995;273:1039–1043.
- McNeil C. A good death. *J Palliat Care* 1998;14:5–6.
- Teno JM, Clarridge BR, Casey V et al. Family perspectives on end-of-life care at the last place of care. *JAMA* 2004;291:88–93.
- Wilson DM, Cohen J, Deliens L et al. The preferred place of last days: Results of a representative population-based public survey. *J Palliat Med* 2013;16:502–508.
- Teno JM, Gozalo PL, Bynum JP et al. Change in end-of-life care for Medicare beneficiaries: Site of death, place of care, and health care transitions in 2000, 2005, and 2009. *JAMA* 2009;309:470–477.
- Pritchard RS, Fisher ES, Teno JM et al. Influence of patient preferences and local health system characteristics on the place of death. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Risks and Outcomes of Treatment. *J Am Geriatr Soc* 1998;46:1242–1250.
- Degenholtz HB, Rhee Y, Arnold RM. Brief communication: The relationship between having a living will and dying in place. *Ann Intern Med* 2004;141:113–117.
- Silveira MJ, Kim SYH, Langa KM. Advance directives and outcomes of surrogate decision making before death. *N Engl J Med* 2010;362:1211–1218.
- Bischoff K, Sudore R, Miao Y et al. Advance care planning and the quality of end-of-life care in older adults. *J Am Geriatr Soc* 2013;61:209–214.
- Tolle SW, Tilden VP, Nelson CA et al. A prospective study of the efficacy of the physician order form for life-sustaining treatment. *J Am Geriatr Soc* 1998;46:1097–1102.
- Stajduhar KI, Allan DE, Cohen SR et al. Preferences for location of death of seriously ill hospitalized patients: Perspectives from Canadian patients and their family caregivers. *Palliat Med* 2008;22:85–88.
- Dunn PM, Schmidt TA, Carley MM et al. A method to communicate patient preferences about medically indicated life-sustaining treatment in the out-of-hospital setting. *J Am Geriatr Soc* 1996;44:785–791.
- Oregon POLST Registry Act. House Bill 2009. Oregon Administrative Rules ch. 595, Sec. 1184, 2009.
- Fromme EK, Zive D, Schmidt TA et al. POLST Registry do-not-resuscitate orders and other patient treatment preferences. *JAMA* 2012;307:34–35.
- The National POLST Paradigm Taskforce. National POLST Paradigm Webpage [on-line]. Available at www.polst.org Accessed on August 8, 2013.
- Hickman SE, Nelson C, Moss A et al. Consistency between treatments provided to nursing facility residents and orders on the Physician Orders for Life-Sustaining Treatment form. *J Am Geriatr Soc* 2011;59:2091–2099.
- Goodman MD, Tarnoff M, Slotman GJ. Effect of advance directives on the management of elderly critically ill patients. *Crit Care Med* 1998;26:701–704.
- Kish Wallace S, Martin CG, Shaw AD et al. Influence of an advance directive on the initiation of life support technology in critically ill cancer patients. *Crit Care Med* 2001;29:2294–2298.
- Schneiderman LJ, Kronick R, Kaplan RM et al. Effects of offering advance directives on medical treatments and costs. *Ann Intern Med* 1992;117:599–606.
- Danis M, Mutran E, Garrett JM et al. A prospective study of the impact of patient preferences on life-sustaining treatment and hospital cost. *Crit Care Med* 1996;24:1811–1817.
- Teno J, Lynn J, Connors AF Jr et al. The illusion of end-of-life resource savings with advance directives. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment. *J Am Geriatr Soc* 1997;45:513–518.
- Teno J, Lynn J, Wenger N et al. Advance directives for seriously ill hospitalized patients: Effectiveness with the Patient Self-Determination Act and the SUPPORT intervention. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment. *J Am Geriatr Soc* 1997;45:500–507.
- Haidet P, Hamel MB, Davis RB et al. Outcomes, preferences for resuscitation, and physician-patient communication among patients with metastatic colorectal cancer. SUPPORT Investigators. Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments. *Am J Med* 1998;105:222–229.
- Smith AK, Davis RB, Krakauer EL. Differences in the quality of the patient-physician relationship among terminally ill African-American and white patients: Impact on advance care planning and treatment preferences. *J Gen Intern Med* 2007;22:1579–1582.
- Meyers JL, Moore C, McGrory A et al. Physician Orders for Life-Sustaining Treatment form: Honoring end-of-life directives for nursing home residents. *J Gerontol Nurs* 2004;30:37–46.
- Tolle SW, Tilden VP. Changing end-of-life planning: The Oregon experience. *J Palliat Med* 2002;5:311–317.
- Oregon Health Authority. Death Data in Oregon, 2011 [on-line]. Available at <http://public.health.oregon.gov/BirthDeathCertificates/VitalStatistics/death/Pages/index.aspx> Accessed April 25, 2013.