PHYSICIAN ORDERS FOR LIFE-SUSTAINING TREATMENT MEDICAL INTERVENTION ORDERS AND IN-HOSPITAL DEATH RATES: COMPARABLE PATTERNS IN TWO STATE REGISTRIES

To the Editor: In their systematic review of the Physician Orders for Life-Sustaining Treatment (POLST) literature, Hickman and colleagues observe limitations that merit further investigation.[1] Among their concerns are the generalizability to other states of Oregon POLST research, the limited data about POLST use outside nursing home populations, and the need for epidemiological studies to better understand how POLST affects clinical outcomes. They note the potential of electronic registries linked to vital statistics to improve understanding of the association between POLST orders and healthcare usage.

The goal of this study was to evaluate patterns observed in Oregon in another POLST program state, West Virginia, with different demographic characteristics and a different approach to electronic POLST registration. Specifically, the relationships between POLST medical intervention orders and in-hospital death were compared using electronic registry data linked to state death records.

METHODS

A cross-section of West Virginia e-Directive Registry[2,3] and Oregon POLST Registry[4,5] data from January 1, 2012, through December 31, 2013, was matched to in-state 2012 and 2013 death records. Only deaths from natural causes were included. Variables from death records included dates of birth and death, decedent county of residence, sex, age at death, and primary cause of death. Decedent counties were coded as rural or urban using the U.S. Department of Agriculture Economic Research Service Rural-Urban Continuum Codes. Variables from both registries included demographic characteristics and POLST orders from the decedent's final form. Death location was grouped into in-hospital, home, and out of hospital (clinic, physician's office, nursing and assisted living facilities, and inpatient hospice).

Data Analysis

Descriptive univariate statistics were used to characterize the sample and chi-square tests to determine significant between-group differences. Analyses were conducted using IBM SPSS statistics v.21 (IBM Corp., Armonk, NY).

Research Ethics

The Oregon Health Authority, Oregon Health & Science University, and West Virginia University institutional review boards reviewed this study and deemed it exempt.

RESULTS

In 2012/13, the matched sample generated 25,670 Oregon and 1,330 West Virginia decedents with POLST forms in their state registries. Table 1 compares registrant demographic characteristics and POLST form orders. Registry decedents in West Virginia were younger than Oregon decedents (median age 79.7 vs 83.6), more likely to live in a rural county at the time of death (44.7% vs 15.5%), and more likely to have cancer as a primary cause of death (35.6% vs 28.4%) (all $P < .001$).

Of decedents with POLST comfort measures orders, 10.8% in West Virginia and 6.8% in Oregon died in the hospital. Of decedents with full-treatment orders, 33.0%

Table 1. Characteristics of 27,000 Decedents with Physician Orders for Life-Sustaining Treatment Forms in the Oregon and West Virginia Registries

Characteristic	West Virginia, n = 1,330	Oregon, n = 25,670	*P*-Value
Age at death, median (interquartile range)	79.7 (18.2)	83.6 (16.8)	<.001
Sex, %			.76
Male	44.4	44.0	
Female	55.6	56.0	
Residence, %			<.001
Urban county	55.3	84.5	
Rural county	44.7	15.5	
Cause of death, %			<.001
Cancer	35.6	28.4	
Heart disease	24.7	26.1	
Alzheimer's disease and other dementias	6.7	10.6	
Parkinson's disease and other nervous system disorders	6.8	10.1	
Respiratory disease	10.9	9.8	
All other natural causes	15.3	14.9	
Location of death, %			.27
Out of hospital[a]	42.1	44.3	
Home	42.8	40.8	
Hospital	15.1	14.9	
Medical intervention orders, %			<.001
Comfort measures only	55.5	57.7	
Limited additional interventions	37.4	32.5	
Full treatment	7.1	9.7	
Medical intervention orders of individuals who died in the hospital, %			<.001
Comfort measures	10.8	6.8	
Limited additional interventions	18.1	21.9	
Full-treatment order	33.0	39.1	

[a]Including physician's office, clinic, nursing and assisted living facilities, and inpatient hospice.

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in West Virginia and 39.1% in Oregon died in the hospital (Table 1). Thus, individuals in both states with full-treatment orders were more than three times as likely to die in the hospital as those with comfort measure orders (both $P < .001$).

DISCUSSION

This study confirms patterns previously observed in Oregon.[5] Despite different demographic characteristics in Oregon and West Virginia, it demonstrates that in both states, the proportions of hospital deaths were strongly associated with POLST medical intervention orders, with individuals with orders for more treatments more likely to die in the hospital.

There are limitations to this retrospective study. Individuals who choose to complete a POLST form may differ from the general population, and those whose forms are submitted to their state registry may not be representative of all individuals with POLST forms in these states. (In Oregon, form submission is mandated, unless an individual opts out, whereas West Virginia has an opt-in system.) Oregon and West Virginia have well-established POLST programs—it is unknown whether this study's results would be obtained in states with newer programs. Nonetheless, the sample captured individuals of all ages, from urban and rural regions, with varying causes of death, and from all care settings, not just nursing homes, throughout Oregon and West Virginia.

CONCLUSIONS

This study contributes to the research on how POLST orders are associated with changes in clinical outcomes and healthcare usage. Using electronic registries linked to state death records, decedents in Oregon and West Virginia with registered POLST comfort measures orders were significantly less likely to die in the hospital than those with full-treatment orders. This study demonstrates that results from Oregon are replicable in another state with different demographic characteristics and different approaches to electronic POLST registration.

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Conflict of Interest: Alvin H. Moss is a member of the National POLST Paradigm Task Force. Dana M. Zive is a member of the National POLST Paradigm Research Subcommittee, a research liaison for the Oregon POLST Task Force, a technology adviser to the National POLST Task Force, and director of the Oregon POLST Registry and has a current unrelated grant from the California Health Care Foundation. Erik K. Fromme is a member of the National POLST Paradigm Research Subcommittee and has a current unrelated grant from the Cambia Health Foundation. Susan W. Tolle is a member of the National POLST Paradigm Task Force and has current grants from the Archstone Foundation, California HealthCare Foundation, Retirement Research Foundation, Collins Foundation, Kinsman Foundation, and Storms Family Foundation. Evan C. Falkenstine is employed by the West Virginia Center for End-of-Life Care, which oversees the West Virginia e-Directive Registry.

Author Contributions: Moss, Fromme, Tolle: study concept and design, interpretation of data, preparation of manuscript. Zive: study concept and design, acquisition of data, analysis and interpretation of data, preparation of manuscript. Falkenstine: study concept and design, acquisition of data, analysis and interpretation of data.

Sponsor's Role: The Earlys had no role in any aspect of the research. The Huang family had no role in any aspect of the conduct of the research.

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