

these funds are all distributed to Duke University Medical Center to support research. In the last 2 years she has had consulting agreements (<\$10,000) with Helsinn Therapeutics, Amgen, Novartis, and Bristol Meyers Squibb. Dr Currow reported no disclosures.

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**In Reply:** Although our Commentary focused exclusively on TLTs toward the very end of life, we agree with Drs Abernethy and Currow that the concept has much broader applicability. In fact, virtually all interventions with uncertain clinical effects on outcomes could be framed in these terms, in which the probability of success, markers of response, and associated time frames would be presented and agreed upon upfront (eg, nearly all palliative chemotherapy regimens, biological treatments for autoimmune disorders, and all major invasive interventions such as mechanical ventilation, renal dialysis, or feeding tubes).

In addition, as suggested by Abernethy and Currow, treatments with effects that are realized only if one is likely to live a long time (tight control of blood glucose, blood pressure, or cholesterol) have much less relevance (and may even be harmful) as prognosis worsens. In that sense, all medical treatments deserve reevaluation at regular time intervals depending on changes in the patient's condition and prognosis.

Time-limited trials may help us be more realistic, systematic, and regular in reassessments about what medicine can and cannot do, thereby contributing simultaneously to quality improvement and cost control.

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## RESEARCH LETTER

### POLST Registry Do-Not-Resuscitate Orders and Other Patient Treatment Preferences

**To the Editor:** The Physician Orders for Life Sustaining Treatment (POLST) form augments traditional methods for advance care planning by translating treatment preferences into medical orders, including for cardiopulmonary resuscitation (CPR), scope of treatment, artificial nutrition by tube,

and in some states, antibiotic use. Health professionals complete forms based on conversations with willing patients, primarily with advanced illness or frailty, or surrogates. These orders then guide treatment in any setting. In 3 states, POLST forms were effective in influencing the care that patients received.<sup>1</sup> POLST programs currently exist or are in development in 34 states.<sup>2</sup> We compared the preferences for other treatments among persons with do-not-resuscitate (DNR) orders and those with attempt CPR orders, using the first year of Oregon POLST Registry data (December 3, 2009, to December 2, 2010).

**Methods.** POLST includes 2 possible orders for resuscitation: do not attempt CPR (DNR) or attempt CPR. Scope-of-treatment orders consist of limited additional interventions and full treatment, which include hospitalization, and comfort measures only. POLST forms identify patients using name, birth date, sex, and address.

In Oregon, POLST forms are entered into a registry, allowing emergency personnel and hospitals 24-hour access to POLST information when the physical form cannot be located during an emergency. Clinicians in Oregon are required by law to submit forms to the registry unless the patient opts out.

Data were analyzed using IBM SPSS Statistics version 19.0.0 and an online 95% confidence interval calculator.<sup>3</sup> The institutional review boards of the Oregon Health & Science University and Oregon State Public Health approved this study and the waiver of informed consent.

**Results.** At the end of the first year, 25 142 people had active POLST forms in the registry: 85.9% (21 599/25 142) were aged 65 years or older, 61.0% (14 255/23 376) were female, and 40.4% (8014/19 859) resided in a rural area (denominators <25 142 reflect missing data). There were 27.9% (7026/25 142) with an order to attempt CPR and 72.1% (18 116/25 142) with a DNR order. For patients with an attempt CPR order, 75.7% (5218/6895) had orders for full treatment, 21.6% (1492/6895) limited additional interventions, and 2.7% (185/6895) comfort measures only (TABLE). Of the 18 002 patients with a DNR order, 8929 (49.6%) had orders for comfort measures only and 9073 (50.4%) had orders for either full treatment or limited additional interventions. Thus, half of patients with DNR orders would want to be transported to the hospital if indicated, and half would not unless comfort needs could not be met in their current location.

Among those with POLST DNR orders, the probabilities for having orders for other life-sustaining treatment ranged from 0.101 to 0.557 except for full treatment and long-term tube feeding (Table). Among those with POLST orders to attempt CPR, the probabilities for having orders for other life-sustaining treatments were higher for 6 of the 9 other orders, ranging from 0.021 to 0.739.

**Comment.** The Oregon POLST Registry allows examination of patient preferences beyond resuscitation status. The number of registry submissions in its first year is note-

**Table.** Probability of Physician Orders for Life-Sustaining Treatment

	Physician Orders for Life-Sustaining Treatment			
	Attempt Cardiopulmonary Resuscitation		Do Not Resuscitate	
	No. of Patients	Probability (95% CI)	No. of Patients	Probability (95% CI)
Scope of treatment order <sup>a</sup>	(n = 6895)		(n = 18 002)	
Full treatment	5218	0.757 (0.747-0.767)	1192	0.066 (0.0627-0.0699)
Limited additional interventions	1492	0.216 (0.207-0.226)	7881	0.438 (0.431-0.445)
Comfort measures only	185	0.027 (0.023-0.031)	8929	0.496 (0.489-0.503)
Antibiotic use order <sup>b</sup>	(n = 6872)		(n = 17 906)	
Use antibiotics	5610	0.816 (0.807-0.825)	6130	0.342 (0.335-0.349)
Decide when infection occurs	1223	0.178 (0.169-0.187)	9972	0.557 (0.550-0.564)
Do not use antibiotics	39	0.0057 (0.0042-0.0077)	1804	0.101 (0.096-0.105)
Artificial feeding tube order <sup>c</sup>	(n = 6776)		(n = 17 680)	
Long-term feeding tube	1456	0.215 (0.206-0.225)	369	0.021 (0.019-0.023)
Time-limited trial	4096	0.605 (0.594-0.617)	4246	0.240 (0.234-0.240)
No feeding tube	1214	0.179 (0.170-0.189)	13 065	0.739 (0.732-0.745)

<sup>a</sup>There were missing data for 0.97% (245/25 142); data were available for 24 897 patients.

<sup>b</sup>There were missing data for 1.45% (364/25 142); data were available for 24 778 patients.

<sup>c</sup>There were missing data for 2.77% (696/25 142); data were available for 24 446 patients.

worthy given Oregon's population of 3.7 million with about 32 000 deaths per year. The main study limitations include having little demographic and no illness information, having data from only a single state, and having no data on patients without POLST forms.

Half of registrants with a DNR order wanted comfort measures only, but half wanted a higher level of treatment. Among persons with a POLST DNR order, a substantial proportion had orders for other life-sustaining treatments. While a DNR order does not mean do not treat, there is substantial evidence that DNR orders do influence care more broadly.<sup>4,5</sup> Registry data illustrate why clinicians should not use DNR status to infer more about a patient's wishes. Focus on documenting code status may distract from more important issues,<sup>6</sup> and resuscitation may not be the best question for patients with advanced illness and frailty. POLST orders for scope of treatment may be more useful because they allow patients to designate treatment preferences before a cardiopulmonary arrest.

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**Author Contributions:** Dr Fromme has full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

**Study concept and design:** Fromme, Schmidt, Tolle.

**Acquisition of data:** Zive, Olszewski.

**Analysis and interpretation of data:** Fromme, Schmidt, Tolle.

**Drafting of the manuscript:** Fromme, Olszewski, Tolle.

**Critical revision of the manuscript for important intellectual content:** Fromme, Zive, Schmidt, Tolle.

**Statistical analysis:** Fromme.

**Obtained funding:** Tolle.

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**Study supervision:** Schmidt.

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