

# UCSF

## UC San Francisco Previously Published Works

### Title

Factors associated with concordance between POLST orders and current treatment preferences

### Permalink

<https://escholarship.org/uc/item/3jh1z9bq>

### Journal

Journal of the American Geriatrics Society, 69(7)

### ISSN

0002-8614

### Authors

Hickman, Susan E  
Torke, Alexia M  
Sachs, Greg A  
[et al.](#)

### Publication Date

2021-07-01

### DOI

10.1111/jgs.17095

Peer reviewed



Published in final edited form as:

*J Am Geriatr Soc.* 2021 July ; 69(7): 1865–1876. doi:10.1111/jgs.17095.

## Factors associated with concordance between POLST orders and current treatment preferences

Susan E. Hickman, PhD<sup>1,2,3,4</sup>, Alexia M. Torke, MD<sup>2,3,4</sup>, Greg A. Sachs, MD<sup>2,3,4</sup>, Rebecca L. Sudore, MD<sup>5</sup>, Qing Tang, MS<sup>6,7</sup>, Giorgos Bakoyannis, PhD<sup>6,7</sup>, Nicholette Heim Smith, BSN<sup>1</sup>, Anne L. Myers, MPH<sup>1</sup>, Bernard J. Hammes, PhD<sup>8</sup>

<sup>1</sup>Indiana University School of Nursing, Department of Community & Health Systems, Indianapolis, Indiana

<sup>2</sup>Research in Palliative and End-of-Life Communication & Training (RESPECT) Signature Center, Indiana University Purdue University Indianapolis, Indianapolis, Indiana

<sup>3</sup>Indiana University School of Medicine, Division of General Internal Medicine & Geriatrics, Indianapolis, Indiana

<sup>4</sup>Indiana University Center for Aging Research, Regenstrief Institute, Inc., Indianapolis, Indiana

<sup>5</sup>University of California San Francisco, Division of Geriatrics, School of Medicine, San Francisco, California

<sup>6</sup>Indiana University School of Medicine, Department of Biostatistics, Indianapolis, Indiana

<sup>7</sup>Fairbanks School of Public Health, Indiana University, Indianapolis, Indiana

<sup>8</sup>Respecting Choices, A Division of C-TAC Innovations, La Crosse, Wisconsin

### Abstract

**Background**—POLST is widely used to document the treatment preferences of nursing facility residents as orders, but it is unknown how well previously completed POLST orders reflect current preferences (concordance) and what factors are associated with concordance.

**Objectives**—To describe POLST preference concordance and identify factors associated with concordance.

**Design**—Chart reviews to document current POLST orders and interviews to elicit current treatment preferences.

**Setting**—POLST-using nursing facilities (n = 29) in Indiana.

---

Corresponding Author: Susan E. Hickman, PhD, Director, IU Center for Aging Research, Regenstrief Institute, Inc., 1101 West 10<sup>th</sup> Street, Indianapolis, IN 46202, hickman@iu.edu, @Regenstrief.

#### Author Contributions

Author Contributions were as follows: Study concept and design (SEH, AMT, RS, GAS, BJH); acquisition of subjects and/or data (SEH, ALM, NHS); analysis and interpretation of data (SEH, AMT, RS, GAS, QT, NHS, GB, ALM, BJH), and preparation of manuscript (SEH, AMT, RS, GAS, QT, NHS, GB, ALM, BJH).

#### Conflict of Interest

The authors report no conflicts of interest.

**Participants**—Nursing facility residents (n = 123) and surrogates of residents without decisional capacity (n = 152).

**Measurements**—Concordance was determined by comparing existing POLST orders for resuscitation, medical interventions, and artificial nutrition with current treatment preferences. Comfort-focused POLSTs contained orders for do not resuscitate, comfort measures, and no artificial nutrition.

**Results**—Overall, 55.7% (123/221) of residents and 44.7% (152/340) of surrogates participated (total n = 275). POLST concordance was 44%, but concordance was higher for comfort-focused POLSTs (68%) than for non-comfort-focused POLSTs (27%) (p < .001). In the unadjusted analysis, increasing resident age (OR 1.04, 95% CI 1.01 – 1.07, p < .01), better cognitive functioning (OR 1.07, 95% CI 1.02 – 1.13, p < .01), surrogate as the decision-maker (OR 2.87, OR 1.73 – 4.75, p < .001), and comfort-focused POLSTs (OR 6.01, 95% CI 3.29 – 11.00, p < .01) were associated with concordance. In the adjusted multivariable model, only having an existing comfort-focused POLST was associated with higher odds of POLST concordance (OR 5.28, 95% CI 2.59 – 10.73, p < .01).

**Conclusions**—Less than half of all POLST forms were concordant with current preferences, but POLST was over 5 times as likely to be concordant when orders reflected preferences for comfort-focused care. Findings suggest a clear need to improve the quality of POLST use in nursing facilities and focus its use among residents with stable, comfort-focused preferences.

### Keywords

Nursing home; advance care planning; palliative care

## INTRODUCTION

POLST is an advance care planning (ACP) tool used to document treatment preferences elicited during ACP as standardized medical orders. It was initially developed in order to help prevent the transfer of nursing facility residents with stable preferences for comfort-focused care<sup>1</sup> and is widely used in this setting.<sup>2,3</sup> The POLST form includes treatment orders for resuscitation, medical interventions, and artificially administered nutrition. POLST is a standing, active order from the date it is signed, unless or until the POLST is revoked or the decision-maker requests alternate treatment. Best practices include periodic review to confirm orders reflect current preferences, particularly when the resident's condition changes.<sup>4</sup>

Over the past 15 years, a series of studies have confirmed that POLST orders are associated with treatment outcomes for patients in hospice,<sup>5</sup> community programs,<sup>6,7</sup> emergency settings,<sup>8,9</sup> nursing facilities,<sup>10,11</sup> and hospitals.<sup>12,13</sup> A fundamental assumption underlying POLST is that the orders documented on POLST reflect current patient goals and preferences. Prior research suggests that POLST may not always be concordant with preferences, though the findings of these studies are difficult to generalize due to small sizes and methodological limitations.<sup>9,14–16</sup>

We conducted a study of concordance between documented POLST orders and current treatment preferences to address these limitations. We have previously reported that the likelihood of concordance between preferences for cardiopulmonary resuscitation, medical interventions, and documentation was more than three times higher for residents with POLST in comparison to residents without POLST.<sup>17</sup> The goal of the current study is to describe POLST preference concordance and understand factors associated with concordance between POLST orders and current preferences. We hypothesized that POLST preference concordance would be associated with characteristics of the decision-maker (either the resident or surrogate) and initial conversation.

## METHODS

### Setting

The study was conducted in Indiana nursing facilities between August 2016 and January 2019. The Indiana version of POLST (POST for Physician Order for Scope of Treatment) became available in 2013 and was endorsed by National POLST in 2018. This study was reviewed and approved by the Indiana University Institutional Review Board.

### Facility Identification

Nursing facilities were eligible for inclusion if they had more than 70 skilled beds and reporting using POLST for 50% or more of residents.<sup>18</sup> Nursing facilities were stratified by the proportion of racial and ethnic minority populations as well as location (urban versus rural) using data from the Centers for Medicare and Medicaid Services (CMS). A stratified, random sample of facilities was identified, prioritizing facilities with higher proportions of racial and ethnic minority residents to help ensure a nationally representative sample. Facility administrators were contacted to request permission to collect data on site or for referral to corporate offices for approval.

### Participants

Residents and surrogates of residents without decisional capacity were eligible for inclusion if they met the following criteria: (1) resident was aged 65 or older; (2) resident had a minimum length of stay of 60 days or longer; (3) chart included a fully completed POLST (orders in sections A – D) with signature of potential participant and treating clinician; (4) willing and able to participate in the study; (5) fluent in English; and (6) a score of  $\geq 21$  on the Telephone Interview for Cognitive Status (TICS).<sup>19</sup> Residents were also required to pass an informed consent verification assessment.<sup>20</sup>

### Procedures

The research assistant (RA) reviewed facility medical records to identify potentially eligible residents and abstract resident characteristics from the chart. The POLST was reviewed to determine whether a resident or surrogate decision-maker signed the form. These potential participants were subsequently divided into two lists based on the identity of the decision-maker (resident versus surrogate). The facility contact reviewed the list to screen out anyone who might be inappropriate to approach to recruit (e.g., psychosocial concerns, conflict with facility, currently too sick to participate) and confirm that residents who had signed their

own POLST continued to make their own healthcare decisions. Residents eligible for participation were then randomly selected from the list. Non-white residents were oversampled to achieve a proportion of non-whites comparable to national demographics. The TICS was administered to residents and surrogates. An informed consent verification process was conducted to ensure resident participants had the capacity to consent to research.<sup>20</sup> The RA conducted resident interviews in a private, quiet location within the facility without the presence of staff, family members, or other residents.

Potential surrogate participants were sent an introductory letter describing the study, and informed consent form, as well as a sealed envelope containing a blank POLST form and educational brochures that they were instructed to open during the interview. Surrogates who did not opt out or decline were interviewed by phone. Interviews were audio recorded after obtaining permission from participants and fidelity monitoring was performed to ensure adherence to the Respecting Choices Advanced Steps (RCAS) facilitation model used to elicit values-based, informed preferences.<sup>21</sup>

### Data Collection Tools

The primary outcome was POLST preference concordance, which was determined by comparing existing POLST orders with current treatment preferences.

**Existing POLST Orders.**—Orders for cardiopulmonary resuscitation (Section A), medical interventions (Section B), and artificial nutrition (Section D) were abstracted from the POLST. Antibiotics were excluded as this is an optional element nationally. Forms reflecting a goal of comfort (i.e., section A marked as do not resuscitate, B marked as comfort measures only, and D marked as no artificial nutrition) were categorized as comfort-focused POLSTs. The date of the treating clinician's signature was used to calculate time in months since the form was signed.

**Current Treatment Preferences.**—The RCAS POLST facilitation interview model<sup>22</sup> was used to identify current treatment preferences. RAs were certified in RCAS facilitation and received additional training that included observed role-plays using standardized patients. This interview guides the decision maker through identifying values, educating them about POLST choices and assisting in making choices consistent with values and goals. The interview explores the participant's understanding of the resident's current medical conditions and complications, experiences with hospitalization, hopes, fears, and what makes life worth living. Standardized education was provided about the benefits and burdens of CPR, assistance with breathing, and hospitalization using scripting and brochures to support informed decision-making.<sup>22,23</sup> Questions were encouraged and perceptions of burden, benefit, and acceptable outcomes were explored. Participants were asked to confirm the POLST order that best reflected current treatment preferences for each section.

**POLST Preference Concordance.**—POLST preference concordance was defined as having current treatment preferences for resuscitation, medical interventions, and artificial nutrition match existing POLST orders in sections A, B, and D. Discordance was classified

as reflecting preferences for a higher or lower level of treatment than documented on the existing POLST in one or more sections.

**Facility Characteristics.**—Rural/urban status and percent of minority residents were obtained from Minimum Data Set (MDS) 3.0 data obtained from CMS. Facility staff training in RCAS was assessed by reviewing records from prior statewide trainings to identify facilities with a trained facilitator on site. CMS Five-Star rating for staffing, skilled bed capacity, and profit status were obtained from publicly available sources.

**Participant Characteristics.**—Resident age, race, ethnicity, gender, length of stay, and diagnoses were abstracted from the most recent MDS assessment in the resident's medical record. Surrogate age, race, gender, as well as surrogate and resident education level were obtained during the interview.

**Functional Status.**—Resident functional status was assessed using the Activities of Daily Living (ADL) scale derived from MDS data.<sup>24</sup>

**Cognitive functioning.**—Potential participants were administered the TICS during screening. Additionally, MDS data was used to calculate the Cognitive Functioning Scale (CFS) for all residents.<sup>25</sup>

**Health Literacy.**—Three previously validated self-report questions were used to assess health literacy. The items are rated on a 5-point Likert scale with a higher overall score indicating lower health literacy.<sup>26,27</sup>

**Health Status.**—Participants were asked if the resident's health had changed over the past year. The response options were collapsed into three categories for the purposes of analysis: much better/somewhat better, about the same, and somewhat worse/much worse.<sup>28</sup>

**POLST Knowledge.**—The POLST Knowledge Survey is designed to assess knowledge about POLST as well as key medical information about CPR, medical interventions, and artificial nutrition. Scores range from 0 to 19, with higher scores reflecting greater knowledge.<sup>29</sup>

## Analysis

Data analysis was performed with SAS software<sup>30</sup> and RStudio Version 1.1.414.<sup>31</sup> Descriptive statistics are presented as absolute frequencies and proportions for categorical variables, and medians and interquartile ranges (IQR) for continuous variables. Statistical comparisons of categorical characteristics between residents and surrogates according to preference concordance status were based on the Pearson's chi-square test or the Fisher's exact test. The nonparametric Wilcoxon Rank Sum Test was used for the comparison of the continuous characteristics between those with concordance and those with discordance. To account for potential selection bias for the randomly selected facilities that refused to participate in the study, we used inverse probability weighting techniques.<sup>32</sup> To do this, we fitted a logistic model for the probability of response, defined as the agreement of a randomly selected facility to participate in the study, with the covariates rural/urban status,

profit status, percent of minority, staff training in RCAS, CMS Five-Star rating for staffing, and skilled bed capacity. In this analysis, we imposed the missing at random assumption that there were no other variables associated with the probability of non-response. Then, we performed a weighted logistic regression to identify factors predictive of preference concordance, where the weights were estimated based on the fitted response probability model. To account for the potential association between residents in the same facility and also to incorporate the variability in the estimated weights, we used a nonparametric cluster bootstrap for standard error estimation.<sup>33</sup>

This analysis provided population-averaged estimates of the parameters of interest as well as standard error estimates that correctly reflect all the sources of variability. The variable selection approach was a hybrid approach where some variables (age, TICS score, time since POLST completion, resident/surrogate decision maker) were selected a priori and the remaining variables were selected using empirical evidence from the data. To select the latter set of variables we considered all the possible models and selected the optimal model according to the Akaike's Information Criterion (AIC).<sup>34</sup> This variable selection approach avoids the type I error inflation of the traditional approaches such as forward, backward or stepwise variable selection. The covariates ultimately included in the model for the probability of preference concordance in all three POLST sections (A, B, and D), were residents' age, TICS score for the decision maker, time since POLST completion, identity of decision-maker (resident or surrogate), health literacy, and having a comfort-focused POLST.

## RESULTS

### Setting, POLST Decision-Maker, and Resident Characteristics

A total of 104 POLST-using nursing facilities were approached about participation. Among this initial pool, 19 facilities did not respond to our contact attempts and 31 did not meet facility eligibility requirements. Of the remaining 54 facilities eligible for inclusion, 29 agreed to allow data collection on site (53.7%). These included 22 urban and 7 rural facilities with an average bed size of 118. Among eligible facilities, there were no differences between participating and non-participating facilities in rural/urban status, profit status, percent minority residents, RCAS trained staff, CMS Five-Star rating, and skilled bed capacity.

Overall, 55.7% of eligible resident decision-makers (123/221) and 44.7% of eligible surrogate decision-makers (152/340) agreed to participate for a final sample of 275 POLST decision-makers (See Supplementary Table 1). A majority of participants were female (69.8%) and white (86.2%). Surrogates included the adult children of residents (65.1%, n = 99), other relatives (e.g., nieces or adult grandchildren; 19.7%, n = 30), spouses (7.9%, n = 12) and siblings (7.2%, n = 11). In comparison to surrogates, residents were older (78.7 years vs 62.5 years,  $p < .001$ ), with lower levels of health literacy ( $p < .001$ ) and education ( $p < .001$ ). Residents scores on the TICS were significantly lower than surrogate scores ( $p < .001$ ), with scores suggesting possible cognitive impairment. Residents also scored lower than surrogates on an assessment of POLST knowledge ( $p < .001$ ). (See Table 1).

### **POLST Preference Concordance and Direction of Discordance**

POLST preference concordance was highest for POLST orders about resuscitation (85.8%) in section A and lower for POLST orders about medical interventions (63.3%) in section B and artificial nutrition (66.9%) in section C. Concordance in all three sections was low (44.4%). Forty three percent of POLSTs were comfort-focused and overall concordance was higher for comfort-focused POLSTs (68.4%, 80/117) than for non-comfort focused POLSTs (26.6%, 42/158;  $p < .0001$ ). When preferences for medical interventions in Section B were discordant, residents reported wanting a higher level of medical interventions than were documented on the POLST in comparison to surrogates (81% vs. 50%,  $p = .001$ ) (See Table 2). Just over half of participants with discordance in one or more POLST sections (56.6%, 86/153) wanted the POLST updated. Reasons for not wanting to update the form included: it was easier to keep the form the same/did not feel strongly (46.2%); wanting to consult with family (26.2%); preferring the original orders (20%); not wanting to upset family (15.4%), wanting to talk with the doctor (7.7%), and other (18.5%).

### **Covariates and Predictors Associated with POLST Preference Concordance**

Overall concordance between current preferences and existing orders was higher when the decision-maker was the surrogate versus the resident (68.9% vs 31.1%,  $p < .001$ ). Concordance was also higher when the resident with POLST was older ( $p < .001$ ), more cognitively impaired ( $p < .001$ ), had a diagnosis of dementia ( $p < .001$ ), and a comfort-focused POLST (65.6% vs. 24.2%,  $p < .0001$ ). Other characteristics of the resident, decision-maker (resident or surrogate), and conversation including time since the original POLST was prepared were not significant (see Table 3).

In the unadjusted logistic regression model, POLST preference concordance was best predicted by greater resident age (OR 1.04, 95% CI 1.01 – 1.07,  $p < .01$ ), better performance on TICS (OR 1.07, 95% CI 1.02 – 1.13,  $p < .01$ ), surrogate as the decision-maker (OR 2.87, 95% CI 1.73 – 4.75,  $p < .01$ ), and having an existing comfort-focused POLST (OR 6.01, 95% CI 3.29 – 11.00,  $p < .01$ ). In the adjusted multivariable model identified as the optimal model based on the AIC, having an existing comfort-focused POLST resulted in 5.28 times higher odds of having preference concordance than having a POLST that was not comfort-focused (OR 5.28, 95% CI 2.59 – 10.73,  $p < .01$ ). No other variables remained statistically significant (see Table 4 and Figure 1). There was a substantial effect attenuation in the cognition-related variables (i.e. TICS score, surrogate decision maker) in the multivariable analysis model. To examine the possibility of over-adjustment (as a consequence of a complex mediation structure involving the cognition-related variables), we fitted a series of models by including only one cognition-related variable at a time and excluding the rest. In these additional analyses, we found a trend for higher concordance among the surrogate variable (marginally statistically significant,  $p=.05$ ). Furthermore, we explored the possibility of a differential effect of the predictors of the final model according to the identity of the decision maker (resident or surrogate). No other statistically significant interactions were detected.



## DISCUSSION

It is critical that existing POLST orders are concordant with current patient and surrogate preferences to help ensure goal-concordant care. In this nursing home study, residents with existing comfort-focused POLST orders were over 5 times more likely to have concordance with current preferences than when the existing POLST contained orders for a higher level of interventions. Other resident or surrogate characteristics and time in months since POLST completion were not associated with preference concordance. Although comfort-focused POLSTs were concordant with preferences 68% of the time, overall concordance rates were low (44.4%). POLST preference concordance was also significantly lower for residents who were making their own decisions (31%) in comparison to surrogates making decisions for residents without decisional capacity (69%). When there was discordance, most residents expressed preferences for a higher level of medical intervention than documented. However, when offered the chance to update the POLST form, about half of participants declined and said it was not that important. Findings suggest a critical need to increase the quality of POLST conversations and documentation in the nursing facility setting.

### Comfort-focused POLST

A sizeable minority of POLST forms were comfort-focused and these were significantly more likely to be concordant with current preferences than POLST forms documenting preferences for higher levels of interventions. This finding is consistent with prior research suggesting greater stability when baseline preferences are to forgo or limit treatment<sup>35–37</sup> and may reflect greater certainty about the resident's medical condition and the context of decision-making.<sup>38</sup> Interestingly, the initial intent of POLST was to ensure nursing facility resident preferences for comfort were honored,<sup>1</sup> as a decision to focus on comfort is a departure from default treatments. Knowing and honoring preferences for comfort continues to be a challenge when POLST is not used, as reflected by a recent study of residents with advanced dementia in which preferences for comfort were concordant with documentation in only 7% of cases.<sup>39</sup> It is important to note that even comfort-focused preferences are subject to change.<sup>10,40</sup> Regular review of preferences is clearly important, but this may be particularly true for residents who prefer more intensive interventions as these preferences are less stable. However, length of time since POLST completion was not significantly associated with concordance, suggesting the use of POLST expiration dates is unwarranted and could result in goal-discordant care for patients with stable preferences.<sup>41</sup>

### Residents, Surrogates, and Preference Concordance

Preference concordance rates for residents who make their own decisions ranged from 78% (resuscitation) to 54% (medical interventions, artificial nutrition), with few (31%) having concordance in all three sections of POLST. Interventions including decision support tools, and/or involving family members or staff<sup>42,43</sup> are clearly needed to support residents in the decision-making process. The significant differences in POLST preference concordance for resident and surrogate decision-makers are likely confounded with education, literacy, and cognition, as residents had lower levels of education and health literacy than surrogates. In unadjusted analyses, decision-makers with better cognitive functioning had higher rates of concordance. It is reassuring that preference concordance was highest between POLST CPR

orders and current preferences, as cardiopulmonary arrest requires rapid decision-making. Inconsistencies between POLST orders and treatments may in part reflect an appropriate in-the-moment response to discordance when it is identified<sup>10,13,40</sup> or a correction of conflicting orders.<sup>44</sup>

In contrast to residents who were making decisions for themselves, surrogates were making decisions for residents who were older, sicker, and more impaired. A substantial majority (76%) of the residents for whom they were making decisions had a diagnosis of dementia and surrogates were more likely than residents to report the residents' health status had worsened over the past year. As noted, POLST was initially developed with this resident population in mind,<sup>1</sup> but more widespread use in a facility for all residents (e.g., to document code status), may result in use with inappropriate patients.<sup>4</sup> Resident discordance in orders about medication interventions (Section B) was also more likely to reflect preferences for a higher level of medical interventions than documented in comparison to surrogate, suggesting resident's perception of stable or improved health played a role. It is also possible that preferences for a higher level of interventions in this long-stay nursing facility population reflect lower levels of knowledge about POLST decisions.<sup>29</sup> Interestingly, about half of participants with preference discordance declined the opportunity to update their POLST forms with facility staff. The lack of interest in updating the form could reflect a lack of investment in the decision-making process or study, a concept described by Piers et al. as "pseudo participation."<sup>45</sup> Several of the reasons provided for not wanting to update a discordant POLST, such as wanting to avoid upsetting family, suggest that values other than preferences and goals are more important to some participants.

### Limitations

We compared existing POLST forms with preferences elicited during a research interview. It is possible the existing POLST may have been completed using a shared-decision-making model and the absence of other family or health care providers during the research interview may have led to different POLST decisions. In practice, it is strongly recommended that family members be included in POLST discussions with residents and it is possible including family may have improved POLST preference concordance. Unfortunately, including family members and treating providers in study interviews was infeasible. Second, this study was conducted in a single state, which could limit generalizability. However, Indiana's program is endorsed by the National POLST Paradigm as meeting standards comparable to other endorsed states, including similar eligibility criteria, and there is evidence of nursing home implementation challenges in other states.<sup>46-48</sup> Third, the variables considered in our inverse probability weighting might not be sufficient to achieve the missing at random assumption and this could lead to bias. However, we believe that even if there are other (unaccounted) variables associated with the probability of non-response, these variables should have a small effect on the probability of non-response. Thus, we anticipate that the effects of a potential violation of the missing at random assumption will not be pronounced. Fourth, we sampled from facilities that reported 50% or more residents had a POLST form. Concordance rates may differ in facilities with lower POLST use.

## Conclusions

Study findings indicate a pressing need to overhaul POLST practices in nursing facilities. POLST discussions should be led by trained facilitators and use should be focused on older adults with stable, comfort-focused preferences. Residents with more uncertain clinical courses and/or preferences for full treatment should be prioritized for regular, meaningful review. Residents who are still making their own treatment decisions should be assessed to ensure decisional capacity and supported in the decision making process. Given residents' overall lower levels of cognitive functioning, educational achievement, and health literacy, this support may include videos<sup>42</sup> easy to read materials,<sup>49</sup> trained staff,<sup>50</sup> and the inclusion of trusted family members in the discussion.<sup>43</sup> Finally, facilities procedures to review POLST regularly, particularly when there is a change in condition, need to be developed and followed. Rather than a one-size fits all model where all NH residents are expected to have a POLST, tailored efforts should be focused on prioritizing residents with comfort preferences and on improving the quality of POLST discussions in nursing facilities.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

## ACKNOWLEDGMENTS

### Funding Source:

This study was funded by the National Institute of Nursing Research (NR015255).

### Sponsor's Role

Research reported in this publication was supported by the National Institute of Nursing Research (NR015255). The sponsors played no role in the design, methods, data collection, analysis, or preparation of the paper. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

## REFERENCES

1. Tolle SW, Tilden VP, Nelson CA, Dunn PM. A prospective study of the efficacy of the physician order form for life-sustaining treatment. *J Am Geriatr Soc* 1998;46(9):1097–1102. [PubMed: 9736102]
2. Hickman SE, Keevern E, Hammes BJ. Use of the physician orders for life-sustaining treatment program in the clinical setting: a systematic review of the literature. *J Am Geriatr Soc* 2015;63(2):341–350. [PubMed: 25644280]
3. Hickman SE, Tolle SW, Brummel-Smith K, Carley MM. Use of the Physician Orders for Life-Sustaining Treatment program in Oregon nursing facilities: beyond resuscitation status. *J Am Geriatr Soc* 2004;52(9):1424–1429. [PubMed: 15341541]
4. National POLST. National POLST. Available at: [www.polst.org/](http://www.polst.org/). Accessed January 23, 2020.
5. Hickman SE, Nelson CA, Moss AH, et al. Use of the Physician Orders for Life-Sustaining Treatment (POLST) paradigm program in the hospice setting. *J Palliat Med* 2009;12(2):133–141. [PubMed: 19207056]
6. Hammes BJ, Rooney BL, Gundrum JD, Hickman SE, Hager N. The POLST program: a retrospective review of the demographics of use and outcomes in one community where advance directives are prevalent. *J Palliat Med* 2012;15(1):77–85. [PubMed: 22233467]

7. Lee MA, Brummel-Smith K, Meyer J, Drew N, London MR. Physician orders for life-sustaining treatment (POLST): outcomes in a PACE program. Program of All-Inclusive Care for the Elderly. *J Am Geriatr Soc* 2000;48(10):1219–1225. [PubMed: 11037008]
8. Richardson DK, Fromme E, Zive D, Fu R, Newgard CD. Concordance of out-of-hospital and emergency department cardiac arrest resuscitation with documented end-of-life choices in Oregon. *Ann Emerg Med* 2014;63(4):375–383. [PubMed: 24210466]
9. Schmidt TA, Olszewski EA, Zive D, Fromme EK, Tolle SW. The Oregon physician orders for life-sustaining treatment registry: a preliminary study of emergency medical services utilization. *J Emerg Med* 2013;44(4):796–805. [PubMed: 23332803]
10. Hickman SE, Nelson CA, Moss AH, Tolle SW, Perrin NA, Hammes BJ. The 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(11):2091–2099. [PubMed: 22092007]
11. Hickman SE, Nelson CA, Perrin NA, Moss AH, Hammes BJ, Tolle SW. A comparison of methods to communicate treatment preferences in nursing facilities: traditional practices versus the physician orders for life-sustaining treatment program. *J Am Geriatr Soc* 2010;58(7):1241–1248. [PubMed: 20649687]
12. Fromme EK, Zive D, Schmidt TA, Cook JN, Tolle SW. Association between Physician Orders for Life-Sustaining Treatment for Scope of Treatment and in-hospital death in Oregon. *J Am Geriatr Soc* 2014;62(7):1246–1251. [PubMed: 24913043]
13. Lee RY, Brumback LC, Sathitratanacheewin S, et al. Association of Physician Orders for Life-Sustaining Treatment With ICU Admission Among Patients Hospitalized Near the End of Life. *JAMA* 2020;323(10):950–960. [PubMed: 32062674]
14. Meyers JL, Moore C, McGrory A, Sparr J, Ahern M. Physician orders for life-sustaining treatment form: honoring end-of-life directives for nursing home residents. *J Gerontol Nurs* 2004;30(9):37–46.
15. Hickman SE, Hammes BJ, Torke AM, Sudore RL, Sachs GA. The Quality of Physician Orders for Life-Sustaining Treatment Decisions: A Pilot Study. *J Palliat Med* 2017;20(2):155–162. [PubMed: 27802064]
16. Hickman SE, Nelson CA, Smith-Howell E, Hammes BJ. Use of the Physician Orders for Life-Sustaining Treatment program for patients being discharged from the hospital to the nursing facility. *J Palliat Med* 2014;17(1):43–49. [PubMed: 24351129]
17. Hickman SE, Torke AM, Sachs GA, et al. Do life sustaining treatment orders match patient and surrogate preferences? *J Gen Intern Med*. 2021;36(2):413–421. [PubMed: 33111241]
18. Hickman SE, Sudore RL, Sachs GA, et al. Use of the Physician Orders for Scope of Treatment Program in Indiana Nursing Homes. *J Am Geriatr Soc* 2018;66(6):1096–1100. [PubMed: 29566429]
19. Brandt J, Spencer M, Folstein M. The Telephone Interview for Cognitive Status. *Neuropsychiatry, Neuropsychology, and Behavioral Neurology* 1988;1(2):111–117.
20. Sudore RL, Landefeld CS, Williams BA, Barnes DE, Lindquist K, Schillinger D. Use of a modified informed consent process among vulnerable patients: a descriptive study. *J Gen Intern Med* 2006;21(8):867–873. [PubMed: 16881949]
21. Rietjens JA, Korfage IJ, Dunleavy L, et al. Advance care planning--a multi-centre cluster randomised clinical trial: the research protocol of the ACTION study. *BMC Cancer* 2016;16:264. [PubMed: 27059593]
22. Respecting Choices. Respecting Choices. Available at: [www.respectingchoices.org/](http://www.respectingchoices.org/). Accessed September 19, 2020.
23. The OPTIMISTIC Project. Available at: <https://www.optimistic-care.org/>. Accessed January 24, 2021.
24. Morris JN, Fries BE, Morris SA. Scaling ADLs within the MDS. *J Gerontol A Biol Sci Med Sci* 1999;54(11):M546–553. [PubMed: 10619316]
25. Thomas KS, Dosa D, Wysocki A, Mor V. The Minimum Data Set 3.0 Cognitive Function Scale. *Med Care* 2017;55(9):e68–e72. [PubMed: 25763665]
26. Chew LD, Bradley KA, Boyko EJ. Brief questions to identify patients with inadequate health literacy. *Fam Med* 2004;36(8):588–594. [PubMed: 15343421]

27. Chew LD, Griffin JM, Partin MR, et al. Validation of screening questions for limited health literacy in a large VA outpatient population. *J Gen Intern Med* 2008;23(5):561–566. [PubMed: 18335281]
28. Ware JE Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care* 1992;30(6):473–483. [PubMed: 1593914]
29. Hickman SE, Torke AM, Sachs GA, et al. A Tool to Assess Patient and Surrogate Knowledge About the POLST (Physician Orders for Life-Sustaining Treatment) Program. *J Pain Symptom Manage* 2019;57(6):1143–1150 e1145. [PubMed: 30853552]
30. SAS Institute. SAS 9.4. Cary, N.C.2013.
31. Team R. RStudio: Integrated Development for R. Boston, MA: RStudio; 2020.
32. Kim JK, Kim JJ. Nonresponse weighting adjustment using estimated response probability. *Canadian Journal of Statistics* 2007;35(4):501–514.
33. Field CA, Welsh AH. Bootstrapping clustered data. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)* 2007;69(3):369–390.
34. Shao J An Asymptomatic Theory for Linear Model Selection. *Statistica Sinica* 1997;7(2):221–242.
35. Ditto PH, Jacobson JA, Smucker WD, Danks JH, Fagerlin A. Context changes choices: a prospective study of the effects of hospitalization on life-sustaining treatment preferences. *Med Decis Making* 2006;26(4):313–322. [PubMed: 16855121]
36. Emanuel LL, Emanuel EJ, Stoeckle JD, Hummel LR, Barry MJ. Advance directives. Stability of patients' treatment choices. *Arch Intern Med* 1994;154(2):209–217. [PubMed: 8285816]
37. Everhart MA, Pearlman RA. Stability of patient preferences regarding life-sustaining treatments. *Chest* 1990;97(1):159–164. [PubMed: 2104791]
38. Heyland DK. Advance Care Planning (ACP) vs. Advance Serious Illness Preparations and Planning (ASIPP). *Healthcare (Basel)* 2020;8(3).
39. Cohen SM, Volandes AE, Shaffer ML, Hanson LC, Habtemariam D, Mitchell SL. Concordance Between Proxy Level of Care Preference and Advance Directives Among Nursing Home Residents With Advanced Dementia: A Cluster Randomized Clinical Trial. *J Pain Symptom Manage* 2019;57(1):37–46 e31. [PubMed: 30273717]
40. Unroe KT, O'Kelly Phillips E, Effler S, Ersek MT, Hickman SE. Comfort Measures Orders and Hospital Transfers: Insights From the OPTIMISTIC Demonstration Project. *J Pain Symptom Manage* 2019;58(4):559–566. [PubMed: 31233842]
41. Lee RY, Curtis JR, Kross EK. Physician Orders for Life-Sustaining Treatment and ICU Admission Near the End of Life-Reply. *JAMA* 2020;324(6):608–609.
42. Hanson LC, Zimmerman S, Song MK, et al. Effect of the Goals of Care Intervention for Advanced Dementia: A Randomized Clinical Trial. *JAMA Intern Med* 2017;177(1):24–31. [PubMed: 27893884]
43. Song MK, Unruh ML, Manatunga A, et al. SPIRIT trial: A phase III pragmatic trial of an advance care planning intervention in ESRD. *Contemp Clin Trials* 2018;64:188–194. [PubMed: 28993286]
44. Lee RY, Modes ME, Sathitrataneewin S, Engelberg RA, Curtis JR, Kross EK. Conflicting Orders in Physician Orders for Life-Sustaining Treatment Forms. *J Am Geriatr Soc* 2020.
45. Piers RD, van Eechoud IJ, Van Camp S, et al. Advance Care Planning in terminally ill and frail older persons. *Patient Educ Couns* 2013;90(3):323–329. [PubMed: 21813261]
46. Wenger NS, Citko J, O'Malley K, et al. Implementation of Physician Orders for Life Sustaining Treatment in nursing homes in California: evaluation of a novel statewide dissemination mechanism. *J Gen Intern Med* 2013;28(1):51–57. [PubMed: 22878851]
47. Caprio AJ, Rollins VP, Roberts E. Health care professionals' perceptions and use of the medical orders for scope of treatment (MOST) form in North Carolina nursing homes. *J Am Med Dir Assoc* 2012;13(2):162–168. [PubMed: 21450195]
48. Vo H, Pekmezaris R, Guzik H, et al. Knowledge and attitudes of health care workers regarding MOLST (Medical Orders for Life-Sustaining Treatment) implementation in long-term care facilities. *Geriatr Nurs* 2011;32(1):58–62. [PubMed: 21387579]
49. Freytag J, Street RL Jr., Barnes DE, et al. Empowering Older Adults to Discuss Advance Care Planning During Clinical Visits: The PREPARE Randomized Trial. *J Am Geriatr Soc* 2020;68(6):1210–1217. [PubMed: 32157684]

50. Kirchoff KT, Hammes BJ, Kehl KA, Briggs LA, Brown RL. Effect of a disease-specific advance care planning intervention on end-of-life care. *J Am Geriatr Soc* 2012;60(5):946–950. [PubMed: 22458336]

Author Manuscript

Author Manuscript

Author Manuscript

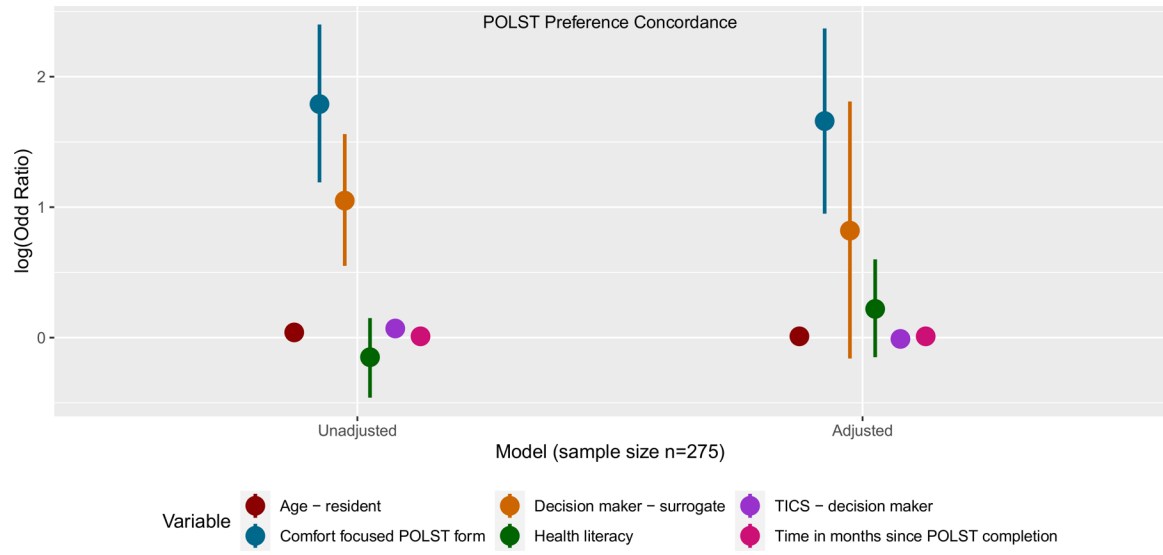
Author Manuscript

**Key Points**

1. Overall POLST preference concordance rates are low.
2. POLST forms were over 5 times more likely to be concordant when orders reflected comfort-focused care.
3. Further work is needed to improve the quality of POLST use in nursing facilities.

**Why This Matters**

When POLST orders are concordant with treatment preferences, it increases the likelihood that patients will receive goal concordant care.



**Figure 1.** Unadjusted and adjusted model of variables associated with POLST concordance.



**Table 1.**

Characteristics of participating POLST decision-makers and nursing facility residents with POLST.

Characteristics	POLST Decision-Maker			
	Resident (n = 123)	Surrogate (n = 152)	Total (n=275)	P value
	Median(IQR)	Median(IQR)	Median(IQR)	
Age (decision maker)	78.7 (14.5)	62.5 (13.0)	69.0 (17.7)	<.0001
Cognition (TICS scores) <sup>a</sup>	30.0 (5.0)	36.0 (3.0)	34.0 (7.0)	<.0001
Health Literacy <sup>b</sup>	1.7 (1.0)	0.7 (1.0)	1.0 (1.3)	<.0001
POLST knowledge <sup>c</sup>	14.0 (5.0)	18.0 (3.0)	17.0 (5.0)	<.0001
Months since POLST completion	10.0 (14.0)	13.0 (15.5)	11.0 (15.0)	0.129
	N(%)	N(%)	N(%)	
Gender, Female	83 (67.5%)	109 (71.7%)	192 (69.8%)	0.447
Race, Non-white	25 (20.3%)	13 (8.6%)	38 (13.8%)	0.005
Schooling (decision maker)				
Some school	65 (52.8%)	32 (21.1%)	97 (35.3%)	<.0001
Some college	32 (26.0%)	53 (34.9%)	85 (30.9%)	
College and above	26 (21.1%)	67 (44.1%)	93 (33.8%)	
	Residents with POLST forms			
	Median(IQR)	Median(IQR)	Median(IQR)	
Age (resident)	78.7 (14.5)	86.1 (11.5)	83.2 (14.1)	<.001
Length of stay in years	1.6 (2.7)	2.0 (2.1)	1.8 (2.3)	0.354
Activities of Daily Living/functional status <sup>d</sup>	16.0 (8.0)	19.0 (7.0)	18.0 (7.0)	<.001
Cognitive Functioning (CFS scores) <sup>e</sup>	1.0 (0.0)	3.0 (1.0)	2.0 (2.0)	<.001
	N(%)	N(%)	N(%)	
Alzheimer's Disease and/or other dementia	37 (30.1%)	115 (75.7%)	152 (55.3%)	<.001
Race (non-white)	25 (20.3%)	15 (9.9%)	40 (14.5%)	0.015
Prognosis (J1400) of less than 6 months, % yes	1 (0.8%)	6 (3.9%)	7(2.5%)	0.101
Hospice (O0100), % yes	1 (0.8%)	7 (4.6%)	8(2.9%)	0.063
Change in resident's health status over the past year				
Better	32 (26.0%)	25 (16.4%)	57 (20.7%)	0.002
About the Same	34 (27.6%)	25 (16.4%)	59 (21.5%)	
Worse	57 (46.3%)	102 (67.1%)	159 (57.8%)	

Note: Participating POLST decision-makers included nursing facility residents with the capacity to make their own medical decisions and the surrogates of nursing facility residents without decisional capacity. Information about participants was obtained directly from the participants. Information about the characteristics of residents with POLST were obtained from the medical record and include both the residents interviewed as their own decision-makers and the residents without decisional capacity.

<sup>a</sup>TICS™ (Telephone Interview for Cognitive Status) score is a measure of cognition, where scores <20 indicate moderate to severe impairment, 21–25 indicates mild impairment, 26–32 indicates ambiguous cognitive status, and 33–41 indicates no impairment.<sup>19</sup>

<sup>b</sup>Health literacy score ranges from 0–4, where higher scores indicate lower health literacy.<sup>26,27</sup>;

<sup>c</sup>POLST knowledge score ranges from 0 – 19, where higher scores indicate greater knowledge.<sup>29</sup>;

<sup>d</sup>ADL scores = higher scores reflect better functioning<sup>24</sup>;

<sup>e</sup>Cognitive Function Scale: 0–2= intact/mild impairment; 3–4=moderate impairment; 5–6=severe impairment<sup>25</sup>

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

**Table 2.**

POLST Concordance and Direction of Discordance between Existing POLST and Current Preferences for Residents and Surrogates.

Concordance	Resident N = 123	Surrogate N = 152	Total N = 275	p value
Section A- Resuscitation, % concordance	96 (78.0%)	140 (92.1%)	236 (85.8%)	<.001
Section B - Medical Interventions, % concordance	66 (53.7%)	108 (71.1%)	174 (63.3%)	0.003
Section D – Artificial Nutrition, % concordance	66 (53.7%)	118 (77.6%)	184 (66.9%)	<.001
Section A, B, and C combined, % concordance	38 (30.9%)	84 (55.2%)	122 (44.4%)	<.001
Direction of Discordance				
Section A - Resuscitation				
wanted higher level of treatment than documented, %	20 (74.1%)	4 (33.3%)	24 (61.5%)	0.016
wanted lower level of treatment than documented, %	7 (25.9%)	8 (66.7%)	15 (38.5%)	
Section B – Medical Interventions				
wanted higher level of treatment than documented, %	46 (80.7%)	22 (50.0%)	68 (67.3%)	0.001
wanted lower level of treatment than documented, %	11 (19.3%)	22 (50.0%)	33 (32.7%)	
Section D – Artificial Nutrition				
wanted higher level of treatment than documented, %	37 (64.9%)	19 (55.9%)	56 (61.5%)	0.392
wanted lower level of treatment than documented, %	20 (35.1%)	15 (44.1%)	35 (38.5%)	

**Table 3.**

Covariate characteristics by concordance between preferences and orders with all three sections of POLST.

	concordance: yes (n = 122)	concordance: no (n = 153)	Total (n=275)	p-value
	Median(IQR)	Median(IQR)	Median(IQR)	
Age (resident)	86.1 (12.1)	81.4 (12.8)	83.2 (14.1)	0.001
ADLs/function status(resident) <sup>a</sup>	18.5 (9.0)	17.0 (8.0)	18.0 (7.0)	0.014
Cognitive functioning (resident - CFS) <sup>b</sup>	2.0 (2.0)	1.0 (1.0)	2.0 (2.0)	0.001
Cognition (decision maker- TICS scores) <sup>c</sup>	35.0 (6.0)	33.0 (7.0)	34.0 (7.0)	0.023
Health Literacy <sup>d</sup>	1.0 (1.3)	1.3 (1.0)	1.0 (1.3)	0.235
POLST knowledge <sup>e</sup>	17.0 (4.0)	16.0 (5.0)	17.0 (5.0)	0.017
Time since POLST completion (months)	12.0 (15.0)	11.0 (15.0)	11.0 (15.0)	0.458
	N(%)	N(%)	N(%)	
Alzheimer's and /or other Dementia	80 (65.6%)	72 (47.1%)	152 (55.3%)	0.002
Who the decision-maker is				
resident	38 (31.1%)	85 (55.6%)	123 (44.7%)	<.001
surrogate	84 (68.9%)	68 (44.4%)	152 (55.3%)	
Minority status (resident)-Non-white	13 (10.7%)	27 (17.6%)	40 (14.5%)	0.102
Remember talking with someone about POLST form	54 (44.3%)	60 (39.2%)	114 (41.5%)	0.399
Schooling(decision maker)				
Some school	39 (32.0%)	58 (37.9%)	97 (35.3%)	0.544
Some college	41 (33.6%)	44 (28.8%)	85 (30.9%)	
College and above	42 (34.4%)	51 (33.3%)	93 (33.8%)	
Change in residents' health status over past year				
better	22 (18.0%)	35 (22.9%)	57 (20.7%)	0.059
About the same	20 (16.4%)	39 (25.5%)	59 (21.5%)	
worse	80 (65.6%)	79 (51.6%)	159 (57.8%)	
Facility has a certified Respecting Choice Advanced Steps facilitator on site	29 (23.8%)	32 (20.9%)	61 (22.2%)	0.571
Comfort focused POLST form <sup>f</sup>	80 (68.4%)	37 (31.6%)	117 (42.5%)	<.001

<sup>a</sup> ADL scores = higher scores reflect better functioning;

<sup>b</sup> Cognitive Function Scale: 0–2= intact/mild impairment; 3–4=moderate impairment; 5–6=severe impairment;

<sup>c</sup> TICS™ (Telephone Interview for Cognitive Status) score is a measure of cognition, where scores <20 indicate moderate to severe impairment, 21–25 indicates mild impairment, 26–32 indicates ambiguous cognitive status, and 33–41 indicates no impairment.<sup>19</sup>;

<sup>d</sup> Health literacy score ranges from 0–4, where higher scores indicate lower health literacy.<sup>26,27</sup>;

<sup>e</sup> POLST knowledge score ranges from 0 – 19, where higher scores indicate greater knowledge.<sup>29</sup>;

<sup>f</sup> Comfort focused POLSTs contain orders for the lowest level of treatment in each category on POLST (do not resuscitate, comfort measures, and no artificial nutrition).

**Table 4.**

Unadjusted and adjusted model for predictors of POLST concordance.

Variables	Unadjusted model results				Adjusted model results			
	Estimated OR	OR Lower Limit	OR Upper Limit	P value	Estimated OR	OR Lower Limit	OR Upper Limit	P value
Age - resident	1.04	1.01	1.07	<.01	1.01	0.97	1.05	0.64
TICS - decision maker <sup>a</sup>	1.07	1.02	1.13	<.01	0.99	0.92	1.06	0.78
Time in months since POLST completion	1.01	0.99	1.03	0.62	1.01	0.99	1.03	0.45
Decision maker - surrogate	2.87	1.73	4.75	<.01	2.28	0.85	6.10	0.10
Health literacy <sup>b</sup>	0.86	0.63	1.16	0.33	1.25	0.86	1.82	0.24
Comfort focused POLST form <sup>c</sup>	6.01	3.29	11.00	<.01	5.28	2.59	10.73	<.01

Note: Best model according to Akaike's Information Criterion (AIC).<sup>34</sup>

<sup>a</sup>TICS™ (Telephone Interview for Cognitive Status) score is a measure of cognition, where scores <20 indicate moderate to severe impairment, 21–25 indicates mild impairment, 26–32 indicates ambiguous cognitive status, and 33–41 indicates no impairment.<sup>19</sup>;

<sup>b</sup>Health literacy score ranges from 0–4, where higher scores indicate lower health literacy.<sup>26,27</sup>;

<sup>c</sup>Comfort focused POLSTs contain orders for the lowest level of treatment in each POLST category (do not resuscitate, comfort Measures, and no artificial nutrition).