TRIAD VIII: Nationwide Multicenter Evaluation to Determine Whether Patient Video Testimonials Can Safely Help Ensure Appropriate Critical Versus End-of-Life Care

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Objective: End-of-life interventions should be predicated on consensus understanding of patient wishes. Written documents are not always understood; adding a video testimonial/message (VM) might improve clarity. Goals of this study were to (1) determine baseline rates of consensus in assigning code status and resuscitation decisions in critically ill scenarios and (2) determine whether adding a VM increases consensus.

Methods: We randomly assigned 2 web-based survey links to 1366 faculty and resident physicians at institutions with graduate medical education programs in emergency medicine, family practice, and internal medicine. Each survey asked for code status interpretation of stand-alone Physician Orders for Life-Sustaining Treatment (POLST) and living will (LW) documents in 9 scenarios. Respondents assigned code status and resuscitation decisions to each scenario. For 1 of 2 surveys, a VM was included to help clarify patient wishes.

Results: Response rate was 54%, and most were male emergency physicians who lacked formal advanced planning document interpretation training. Consensus was not achievable for stand-alone POLST or LW documents (68%–78% noted "DNR"). Two of 9 scenarios attained consensus for code status (97%–98% responses) and treatment decisions (96%–99%). Adding a VM significantly changed code status responses by 9% to 62% ($P \leq 0.026$) in 7 of 9 scenarios with 4 achieving consensus. Resuscitation responses changed by 7% to 57% ($P \leq 0.005$) with 4 of 9 achieving consensus with VMs.

Conclusions: For most scenarios, consensus was not attained for code status and resuscitation decisions with stand-alone LW and POLST documents. Adding VMs produced significant impacts toward achieving interpretive consensus.

Key Words: patient safety, living will, Physicians Orders for Life Sustaining Treatment, do not resuscitate, patient video message, TRIAD

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With the aging population and concomitant rise in elderly patients with chronic illness, there is a critical need for clarity in establishing goals of care in patients presenting for emergency or other acute care. In this time-sensitive setting, patient wishes must be represented and interpreted in a rapid and accurate fashion. Without effective communication, patients may receive unethical and potentially ineffective care in the form of either overaggressive or underaggressive treatments.

To promote patient autonomy and communication of advance care planning, the Federal Government enacted the Patient Self Determination Act (1990) mandating hospitals to ask individuals presenting for acute care whether they had an advance directive or living will (LW) document.[1] Living wills contain conditional statements (e.g., if end-stage or permanently unconscious, then…) steering medical treatments in the event the patient loses decision-making capacity. Yet, their conditionality calls into question the application of LWs in the acute care setting. To address this limitation, the Physicians Orders for Life-Sustaining Treatment (POLST) paradigm was developed to allow patients or surrogates to enact actionable medical orders delineating their goals of care. Since 1991, POLST forms and variations (medical orders for life sustaining treatment, medical orders for scope of treatment, physician orders for scope of treatment, transportable physician orders for patient preferences) have been adopted in 26 states.[2]

Both POLST and LWs are subject to interpretation error. Previous research has demonstrated that healthcare providers conflate do-not-resuscitate (DNR) code status with "do not treat" when patients present in nonarrest situations.[3–6] A recent retrospective analysis revealed a nearly doubled perioperative mortality in DNR versus non-DNR vascular surgery patients despite similar comorbidities and perioperative complication rates. This suggests a difference in the approach to perioperative care in DNR patients, previously denoted "failure to rescue."[7] A similar propensity was identified in a trauma registry with preadmission DNR being

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independently predictive of a 5-fold mortality increase after controlling for other variables.[8]

With potential misinterpretation of advanced planning documents and/or DNR status in the acute care setting, there is a need to evaluate new modalities for ensuring both concordant and accurate interpretation of LWs and POLST. Our objective is to evaluate whether video testimonials augment "concordant" interpretation of LWs and POLST when considering clinical scenarios in the acute care setting. We hypothesize that the addition of video testimonial would lead to more accurate interpretation of such documents when compared with written documents alone.

METHODS

We conducted an anonymous, multicenter, randomized, internet-based survey involving resident and attending physicians who are hospitalists or emergency, family, or internal medicine (IM) physicians at 13 teaching institutions across the United States (Table 1). The survey introduction gave a brief explanation of the purpose of the study, listed inclusion criteria, and emphasized voluntary participation. A total of 1366 residents and faculty members were identified and solicited to participate in this study.

The survey began with 3 questions that asked for the appropriate code status for a POLST document specifying DNR/full treatment and a LW document declining all lifesaving interventions (Figs. 1, 2). This was followed by a question that prompted the appropriate care for a "DNR" order. Nine clinical scenarios were then presented involving patients who arrest with either a POLST or an LW (Table 2). Specific orders on the POLST form varied, including cardiopulmonary resuscitation (CPR) or DNR and level of treatment support ("full," "limited," or "comfort measures only" [CMO]). Respondents were asked to choose the appropriate code status of the patients and make resuscitation decisions. At the conclusion of the scenarios, demographic information was collected, including information about specialty (emergency medicine [EM], hospitalist, IM, family practice), experience (both in years and in terms of attending versus resident physician status), and previous training in the use and/or interpretation of POLST and LW documents. We also assessed respondent perceptions of the adequacy of the informed consent process for POLST and LW documents by asking for respondent comfort level in withholding care when/whether patients presented with these documents. Physician specialty, experience, previous training, and comfort level with informed consent were considered secondary factors that might influence coding or treatment decisions. This survey was designated "survey A." A variant of this, "survey B," was identical in content but used patient video testimonials/messages (VMs) intended to clarify patient wishes. The following 3 VMs were evaluated: full aggressive treatment (full code), aggressive care with a trial of CPR for 3 minutes when in cardiac arrest, and end-of-life (EOL) care with no CPR/allow natural death (CMO, Table 2). Surveys were created in SurveyMonkey with a unique web-based link generated for each. Scenario content was validated by medical and legal peer review. To preclude a sequence or ordering effect, the order of the scenarios with each survey was randomized. The reliability of these surveys has been addressed in previous studies.[4,5] Consistency in responses was assessed by comparing concordance of responses to duplicate scenarios (E, I) using Chronbach α, a measure of reliability.

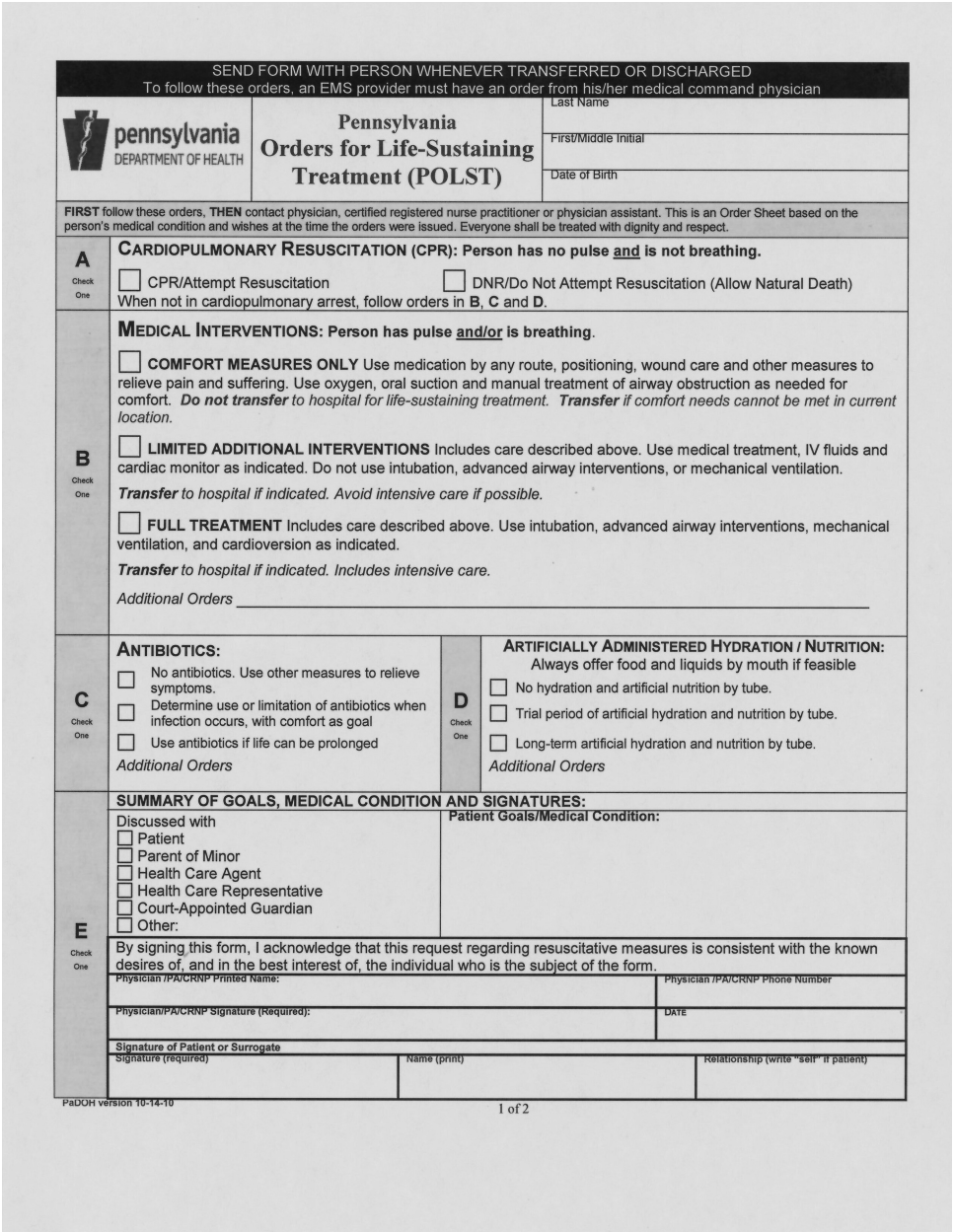
Rosters of teaching faculty and residents were generated from each participating institution and forwarded to one of the study investigators who randomized survey assignment to 1 of the 2 survey links. Randomization was conducted for all participants on an institution-by-institution basis using a web-based site (http://www.graphpad.com/quickcalcs/randomize1/). Rosters with randomizations were then returned to collaborating investigators at participating academic centers. Collaborators e-mailed a standardized solicitation letter to each prospective participant along with the survey link corresponding to their group assignment and sent a reminder notification 2 weeks after the initial e-mail request. The study design underwent both medical and legal peer review and was evaluated by the coordinating center institutional review board and granted exempt status. Each institution's institutional review board also reviewed and approved this study.

Survey responses were analyzed not for "correct" responses but consensus. We interpreted consensus to infer clarity of understanding. For this study, consensus reflected a supermajority of 95% or greater concordant responses. As an example, if 95% of the cohort designates DNR as the appropriate code status for a patient depicted in a scenario, this level of agreement indicates consensus and, by inference, clarity in the information provided about the patient's preferences. With the critical issue of fidelity to patient wishes and safety, we submit that this is the minimum level of clarity required for decision making about life-sustaining treatment (LST).

Responses rates were contrasted across survey groups to determine whether video testimonials improved agreement and led to greater consensus. Secondary factors were also considered including physician specialty (EM versus IM/family practice/hospitalist), experience (attendings versus residents), previous training in POLST, LW document interpretation, and comfort

TABLE 1. Participating Sites

Site	Location
UPMC Hamot	Erie, Pennsylvania
University of Pittsburgh School of Medicine	Pittsburgh, Pennsylvania
Temple University School of Medicine	Philadelphia, Pennsylvania
Stanford University School of Medicine	Stanford, California
Allegheny General Hospital, Allegheny Health Network	Pittsburgh, Pennsylvania
University of Alabama at Birmingham Huntsville Campus and Huntsville Hospital	Birmingham, Alabama
Saint Vincent Health System, Allegheny Health Network	Erie, Pennsylvania
State University of New York at Buffalo	Buffalo, New York
Northwestern University Feinberg School of Medicine	Chicago, Illinois
University of South Florida	Tampa, Florida
University of Minnesota Medical School	Minneapolis, Minnesota
INTEGRIS Southwest Medical Center Oklahoma State University Center for Health Sciences	Oklahoma City, Oklahoma
St. Joseph's Regional Medical Center, New York Medical College	Paterson, New Jersey



SEND FORM WITH PERSON WHENEVER TRANSFERRED OR DISCHARGED
To follow these orders, an EMS provider must have an order from his/her medical command physician

pennsylvania DEPARTMENT OF HEALTH

Pennsylvania Orders for Life-Sustaining Treatment (POLST)

Last Name
First/Middle Initial
Date of Birth

FIRST follow these orders, **THEN** contact physician, certified registered nurse practitioner or physician assistant. This is an Order Sheet based on the person's medical condition and wishes at the time the orders were issued. Everyone shall be treated with dignity and respect.

A Check One

CARDIOPULMONARY RESUSCITATION (CPR): Person has no pulse and is not breathing.

☐ CPR/Attempt Resuscitation ☐ DNR/Do Not Attempt Resuscitation (Allow Natural Death)
When not in cardiopulmonary arrest, follow orders in **B**, **C** and **D**.

B Check One

MEDICAL INTERVENTIONS: Person has pulse and/or is breathing.

☐ **COMFORT MEASURES ONLY** Use medication by any route, positioning, wound care and other measures to relieve pain and suffering. Use oxygen, oral suction and manual treatment of airway obstruction as needed for comfort. ***Do not transfer*** *to hospital for life-sustaining treatment.* ***Transfer*** *if comfort needs cannot be met in current location.*

☐ **LIMITED ADDITIONAL INTERVENTIONS** Includes care described above. Use medical treatment, IV fluids and cardiac monitor as indicated. Do not use intubation, advanced airway interventions, or mechanical ventilation.

Transfer *to hospital if indicated. Avoid intensive care if possible.*

☐ **FULL TREATMENT** Includes care described above. Use intubation, advanced airway interventions, mechanical ventilation, and cardioversion as indicated.

Transfer *to hospital if indicated. Includes intensive care.*

Additional Orders _____

C Check One

ANTIBIOTICS:

☐ No antibiotics. Use other measures to relieve symptoms.
☐ Determine use or limitation of antibiotics when infection occurs, with comfort as goal
☐ Use antibiotics if life can be prolonged

Additional Orders

D Check One

ARTIFICIALLY ADMINISTERED HYDRATION / NUTRITION:
Always offer food and liquids by mouth if feasible

☐ No hydration and artificial nutrition by tube.
☐ Trial period of artificial hydration and nutrition by tube.
☐ Long-term artificial hydration and nutrition by tube.

Additional Orders

E Check One

SUMMARY OF GOALS, MEDICAL CONDITION AND SIGNATURES:

Discussed with
☐ Patient
☐ Parent of Minor
☐ Health Care Agent
☐ Health Care Representative
☐ Court-Appointed Guardian
☐ Other:

Patient Goals/Medical Condition:

By signing this form, I acknowledge that this request regarding resuscitative measures is consistent with the known desires of, and in the best interest of, the individual who is the subject of the form.

Physician /PA/CRNP Printed Name: | Physician /PA/CRNP Phone Number
Physician/PA/CRNP Signature (Required): | DATE

Signature of Patient or Surrogate
Signature (required) | Name (print) | Relationship (write "self" if patient)

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FIGURE 1. Physician Orders for Life-Sustaining Treatment document.

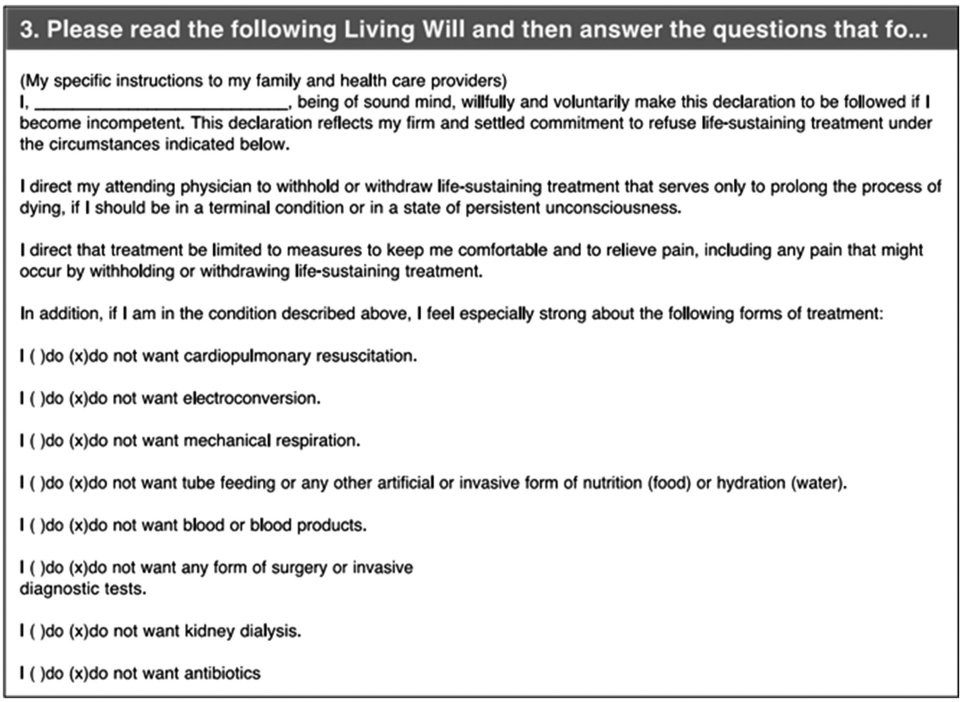
with the informed consent process leading to document execution for their impact on responses. These factors were screened using univariate χ^2 tests to examine differences in rates of responses. Logistic regression was used to generate odds ratios for responses in the context of a multivariate approach. Potential predictor variables included use of the video testimonial (±), practice experience (attending, resident), previous POLST training (±), previous advance directives training (±), comfort with the POLST consenting process (±), and comfort with the LW consenting process (±). A power analysis indicated that a minimum of 59 respondents were required per survey group (118 total) to have an 80% certainty of detecting a between-groups response difference of at least 25%.

The impact of missing data was analyzed by identifying scenarios impacted by withdrawals or absent responses. Dummy grouping variables were created in these cases to represent responders and nonresponders for each affected scenario. These groups were then compared for responses to questions unaffected or minimally affected by missing data. We posited that, if response rates were similar, then withdrawals or failure to respond to specific scenarios did not unduly bias study outcomes. We chose this method to ascertain missing data effects because rates of missing data for some of the scenarios were in excess of 20% and data imputation was considered inappropriate.

RESULTS

Participant Demographics

There were 741 responses, representing a response rate of 54% (741/1366). Respondents were mainly males (63%) and


3. Please read the following Living Will and then answer the questions that fo...

(My specific instructions to my family and health care providers)
I, _____, being of sound mind, willfully and voluntarily make this declaration to be followed if I become incompetent. This declaration reflects my firm and settled commitment to refuse life-sustaining treatment under the circumstances indicated below.

I direct my attending physician to withhold or withdraw life-sustaining treatment that serves only to prolong the process of dying, if I should be in a terminal condition or in a state of persistent unconsciousness.

I direct that treatment be limited to measures to keep me comfortable and to relieve pain, including any pain that might occur by withholding or withdrawing life-sustaining treatment.

In addition, if I am in the condition described above, I feel especially strong about the following forms of treatment:

I ( )do (x)do not want cardiopulmonary resuscitation.

I ( )do (x)do not want electroconversion.

I ( )do (x)do not want mechanical respiration.

I ( )do (x)do not want tube feeding or any other artificial or invasive form of nutrition (food) or hydration (water).

I ( )do (x)do not want blood or blood products.

I ( )do (x)do not want any form of surgery or invasive diagnostic tests.

I ( )do (x)do not want kidney dialysis.

I ( )do (x)do not want antibiotics

FIGURE 2. Depiction of LW declining life-saving measures.

EM physicians. Approximately half were attending and board-certified physicians. Most had no training in either POLST or LW documentation. The mean (standard deviation [SD]) age of the cohort was 36(10)years. Faculty experience in years was a mean (SD, median) of 12.7(15.3, 8.0). Group demographics were similar, suggesting homogeneity between survey groups (Table 3).

Code Status of Stand-Alone Documents and Interpretation of Care for DNR

Of the respondents, 68.3% (95% confidence interval [CI], 64.9%–71.7%) selected DNR as the code status of a POLST document (formatted DNR/full TX [treatment]) and 78.4% (95% CI, 75.4%–81.4%) of an LW. Almost half (46.1%) equated DNR with comfort care/EOL care (95% CI, 42.5%–49.7%) beyond an arrest event; the remaining responses were equally split between full care and unsure/uncertain. Group differences for these initial 3 questions were negligible (≤3%). Neither group evidenced consensus in responses (Table 4).

Code Status Decisions by Group

For survey A (documents only), 2 of the 9 scenarios evidenced consensus. Ninety-seven percent coded DNR for scenario C, (POLST DNR/CMO). Ninety-seven percent selected full code for scenario H, (POLST attempt CPR/full TX). For the remaining scenarios, DNR was most frequently selected, representing 64% to 88% of the code status decisions (Table 4).

For survey B, adding a video testimonial significantly changed code status responses by 9% to 62% ($P \leq 0.026$) in 7 of the 9 scenarios. Four of the 9 scenarios attained (or nearly attained) code status consensus: the 2 previously mentioned (scenario C + H) along with scenario D, a patient with terminal lung Ca, a LW, and a "no CPR/allow natural death" VM (94% responded DNR) and scenario F, a patient with advanced stage Parkinson and a "no CPR/allow natural death" VM (95% responded DNR). For the remaining scenarios, full code was the most common response, representing 44% to 68% of the code status decisions.

Treatment Decisions by Group

For survey A (documents only), 2 of the 9 scenarios reached treatment consensus. Ninety-six percent selected "do not intubate" for scenario C (terminal lymphoma) and 99% would intubate in the case of scenario H. For the remaining scenarios, approximately half would have resuscitated in scenario A; for all other scenarios (B–I), withholding resuscitation was the most common choice (58%–87%, Table 4).

Adding a VM (survey B) significantly changed resuscitation responses by 7% to 57% ($P \leq 0.005$) with the following 4 of the 9 attaining consensus: scenarios C (96%, do not intubate), scenario D (94%, do not intubate), scenario F (95%, do not defibrillate), and scenario H (99%, intubate). For the remaining scenarios (A, B, E, G, I), resuscitation was the most common response (76%–86%).

Internal Consistency (Reliability)

Chronbach α value for coding responses was 0.776 and for treatment responses, 0.859, representing "substantial agreement."[9]

Effect of Secondary Factors on Responses

For survey A, physician specialty did not exert a significant effect on code status or treatment responses. Physician experience (attending versus resident) affected 3 of the 9 scenarios with differences from 12% to 17% ($P \leq 0.048$). Scenarios affected were B, F, and G. Attendings chose DNR less frequently and chose resuscitation more often. Neither POLST nor LW training exerted an effect. Perception of comfort with POLST informed consent affected 3 of the 9 scenarios, A, E, and F, with differences of 11% to 20% ($P \leq 0.031$). Those who were "comfortable" with the adequacy of consent chose DNR more often and resuscitated less. Perception of comfort with LW informed consent affected 5 of

TABLE 2. Survey Content

Survey A	Survey B
POLST document only: code status?	POLST document only: code status?
LW document only: code status?	LW document only: code status?
DNR = ?	DNR = ?
Scenario A: POLST (DNR/full TX): 66-year-old man, chest pain, SOB, and diaphoresis. Vitals: P, 110; RR, 30; Sa_{O_2}, 97% RA; T, 37°C, BP, 130/70. Abrupt VT/VF.	Scenario A + POLST+ VM: full code with CPR
Scenario B (LW): 61-year-old man, chest pain, SOB, diaphoresis. Vitals: P, 100; RR, 24; Sa_{O_2}, 97% RA; T, 37°C; BP, 100/70. Abrupt VT/VF arrest.	Scenario B + LW + VM: full code with CPR
Scenario C (POLST DNR/CMO): 52 years old, terminal lymphoma, chest pain, SOB, diaphoresis. Vitals: P, 110; RR, 30; Sa_{O_2}, 97% RA; T, 37°C; BP, 130/70. Abruptly unresponsive, arrests.	Scenario C + POLST + VM: no CPR/allow natural death
Scenario D (LW): 62 years old, terminal stage IV lung CA, chest pain, SOB, diaphoresis. Vitals: P, 120; RR, 36; Sa_{O_2}: 94% RA; T, 37°C; BP, 150/90. Abruptly unresponsive, arrests.	Scenario D + LW + VM: no CPR/allow natural death
Scenario E (POLST DNR/LTD): 70 years old, DM, HTN, dyslipidemia, and CAD s/p CABG, chest pain, clammy, distress. Vitals: T, 36°C; P, 60; BP, 100/60; RR, 22; Sa_{O_2}, 98% RA. Abruptly unresponsive, no pulse, VT.	Scenario E + POLST + VM: trial of CPR for 3 min
Scenario F (LW): 79 years old, Hx CAD, emphysema, diabetic retinopathy, and advanced stage Parkinson, chest pain, clammy, distress. Vitals: T, 37°C; P, 69; BP, 95/50; RR, 31; Sa_{O_2}, 92% RA. Abruptly unresponsive, no pulse, VT.	Scenario F + LW + VM: no CPR/allow natural death
Scenario G (LW): 61 years old, chest pain, SOB, diaphoresis. Vitals: P, 100; RR, 24; Sa_{O_2}, 97% RA; T, 37°C; BP, 100/70. Abruptly unresponsive, arrests.	Scenario G + LW + VM: full code with CPR
Scenario H (POLST CPR/full TX): 90 years old, SOB, agitated, confused, severe respiratory distress. Vitals: P, 120; RR, 46; BP, 84/60; T, 37°C; Sa_{O_2}, 72% on nonrebreather. Abruptly arrests.	Scenario H + POLST + VM: full code with CPR
Scenario I: repeat of scenario E (POLST DNR/LTD)	Scenario I: repeat of scenario E

BP, blood pressure; CABG, coronary artery bypass graft; DM, diabetes melitus; HTN, hypertension; Hx, history (medical); P, pulse; RA, room air; RR, respiration rate; Sa_{O_2}, oxygen saturation; SOB, shortness of breath; T, temperature; VT, ventricular tachycardia.

the 9 scenarios with differences of 13% to 27% ($P \leq 0.026$). Again, those comfortable with the consent process chose DNR more often and resuscitated less (Supplementary Material, Tables S1–S3, http://links.lww.com/JPS/A77).

For survey B, physician specialty exerted no effect on code status or treatment responses. Physician experience (attending versus resident) significantly affected only scenario (E): 11% more attendings chose to intubate ($P = 0.048$). Neither POLST nor LW training had any impact. Comfort with POLST consent process significantly affected 2 of the 9 scenarios. Those uncertain about the adequacy of POLST consent were also more uncertain about a code status for scenario A (21%, $P = 0.003$). For scenario F, those comfortable with consent chose DNR 11% more often ($P \sim 0.017$). Perception of comfort with LW informed consent process significantly affected 1 scenario (B, 16% difference in resuscitation decision, $P = 0.020$).

Multivariate Modeling of Responses

The effect of the identified factors on predicting a full-code response showed that addition of a VM significantly affected 7 of the 9 scenarios (Table 5), 5 of which evidenced increased likelihood of selecting full code by up to 40 times (A, B, E, G, I reflecting full-code video messages) and 2 decreased likelihood (D, F reflecting DNR messages). Physician specialty was a predictor of code status response in only 1 scenario (F, the Parkinson patient, with the non-EM physician *less* likely to choose full code). Resident physicians were less likely to choose full code for scenarios B and F. Physicians who were uncomfortable with either POLST or LW patient informed consent were *more* likely to choose full code for scenarios F, B, and G. Previous training had no impact on coding decisions.

Addition of a VM increased the likelihood of resuscitation decisions (Table 6) in 5 of the 9 scenarios up to nearly 17 times (A, B, E, G, I full-code messages) and decreased likelihood in 2 others (D, F; DNR messages). Resident physicians were less likely to choose resuscitation in scenarios B, F, and G. Physicians uncomfortable with patient informed consent for either POLST or LW were roughly twice as likely to choose to resuscitate in scenarios B, E to G, and I.

Overall, addition of VM was the most consistent predictor of either code status determination or resuscitation choices achieving consensus.

Missing Data

Rates of missing data amounted to no more than 2.6% for the initial 3 survey questions (Table 2). Subsequent rates of missing data for scenarios varied from 18.5% to 22%. Differences between scenario "responders" and "nonresponders" were evident in 3

TABLE 3. Respondent Demographics

Variable	Survey A	Survey B	*P*
Age, mean (SD, median)	36.9 (10.35, 33.0)	35.7 (9.64, 32.0)	0.290*
Years of practice, mean (SD, median)	12.5 (10.29, 10.0)	12.1 (19.71, 7.0)	0.094*
Sex, female, n (%)	303 (37)	252 (37)	0.930†
Specialty, n	302	246	0.648‡
EM, %	77	76	
IM/hospitalist, %	20	20	
FP, %	3	5	
Experience, n	303	251	
PGY1, %	13	14	
PGY2, %	14	16	0.600‡
PGY3, %	16	14	
PGY4, %	3	6	
Fellow, %	2	2	
Attending, %	53	48	
Board certification: yes, n (%)	305 (51)	246 (46)	0.231†
Previous training, POLST documents, n (%)	304 (41)	250 (37)	0.431†
Hours of POLST training, mean (SD, median)	2.3 (4.32, 1.0)	2.0 (2.58, 1.0)	0.565*
Previous training, LW documents, n (%)	299 (33)	246 (29)	0.307†
Hours of LW training, mean (SD, median)	2.4 (2.79, 1.8)	2.2 (2.78, 1.8)	0.963*

*Mann-Whitney *U* test.

†Fisher exact test.

‡χ^2 test.

EM, emergency medicine; FP, family practice; IM, internal medicine; PGY, post graduate year.

(12.5%) of 24 sets of responses. The magnitude of these differences was approximately 10% (Supplementary Material, Table S4, http://links.lww.com/JPS/A77).

DISCUSSION

The term EOL care and its associated costs have received increased attention for the previous decade. In 2014, the Institute of Medicine released a report entitled "Dying in America," which advised that the health care system is broken, in need of reform, and that the current US $170 billion in EOL expenditures will exceed US $350 billion in 5 years.[10] Many recommend to have discussions for EOL care early in the disease process.[11–18] As such, it is imperative that we ensure that the discussions are safe, unbiased, and with appropriate patient selection. Both LWs and POLST have already shown promise and proven benefits to help ensure patient autonomy, prevent perceived unwanted resuscitations, reduce in-hospital mortality, and control medical expenditures at EOL.[19–21] More recent studies reveal that use of most POLST forms is timely and may be a predictor of timing of death.[22] The POLST use has also resulted in 22% more out-of-hospital deaths than for those with LWs.[23] Currently, LWs are being increasingly used[24] but are also being challenged by the rapid proliferation of POLST across the United States and globally.[25]

Thus, would the POLST paradigm concurrently support patient autonomy yet ensure appropriate, safe care and is it ready for nationwide use? Previous research has questioned how well medical providers understand LWs, DNR, and POLST forms and have inferred that use of these documents could pose a patient safety issue.[3,4,21] More recently, there has been a call for a more evidence-based evaluation of POLST processes before the increased nationalization of POLST.[26,27] At present, the POLST paradigm contends that there is more than even enough research to support nationalization.[28] This contention is rebutted with the concern that premature nationalization of POLST threatens patient-centered, medical decision making and that even if documents accurately reflect patient wishes, they still may produce interpretation errors on the part of medical professionals.[26,29] A question not answered to date is whether nationalization of POLST, even with errors in interpretation, be better than the current state of practice with LW and DNR orders.

An example of significant concern in interpretation and application is how LWs, DNR, and POLST orders may impact the clinical decision making in conditions that have high perception of neurological devastation. Just as there are guidelines to recommend early goals of care discussions, there are also guidelines to delay those discussions until a condition can evolve and declare itself. Two examples of such guidelines are for out of hospital cardiac arrest with return of spontaneous circulation and for intracerebral hemorrhage.[30,31] Both guidelines emphasize the delay to withdraw lifesaving interventions for 48 to 72 hours. Previous reports related to intracerebral hemorrhage have shown falsely elevated mortality rates related to early adoption of DNR orders.[32] A recent multicenter out of hospital cardiac arrest trial confirmed that guidelines are followed in only 50% of eligible treatment opportunities.[33] This could be impacted by multiple confounders such as medicine's introduction to public reporting of outcomes and also the use of LWs, DNR, and POLST, which have seen increased proliferation with the aging of the patient population and are taken to be representations of a desire to forego a trial of critical care treatment and rehabilitation. A secondary analysis of this trial asserts that one third of the patients had a premature withdrawal of LST for perceived poor neurological prognosis.[34] Those in this category include stable patients with pre-existing advance directives or health care agent perceived understanding of patient wishes. The trial extrapolates that 2300 Americans die prematurely each year and nearly 1500 might have had functional

TABLE 4. Differences in Survey Responses by Group

Statement/Scenario	Response Choices	Survey A	Survey B	Difference (A–B)	*P*
POLST: DNR/full TX	POLST code status, n	367	374	−1%	0.669
	DNR	68%	69%	+2%	
	FC	13%	11%	0	
	Unsure	20%	20%		
LW: declining LST	LW code status, n	364	368	+3%	0.073
	DNR	80%	77%	−3%	
	FC	3%	6%	+1%	
	Unsure	18%	17%		
What is the meaning of DNR?	DNR = ?, n	361	361	+2%	0.924
	FC	47%	45%	0	
	CC	26%	26%	−1%	
	Unsure	28%	29%		
Scenario A POLST (DNR/full TX)	Scenario A code status, n	333	270	+48%	**<0.0001**
	DNR	64%	16%	−50%	
	FC	18%	68%	+2%	
	Unsure	18%	16%		
	Scenario A response, n	332	271	−33%	**<0.0001**
	Defib	53%	86%	+33%	
	Do not defib	47%	14%		
Scenario B (LW)	Scenario B code status, n	331	275	+49%	**<0.0001**
	DNR	69%	20%	−50%	
	FC	18%	68%	+2%	
	Unsure	14%	12%		
	Scenario B response, n	328	275	−45%	**<0.0001**
	Defib	36%	81%	+45%	
	Do not defib	64%	19%		
Scenario C (POLST DNR/CMO)	Scenario C code status, n	333	279	0	**~0.026**
	DNR	97%	97%	−2%	
	FC	<1%	3%	+2%	
	Unsure	2%	<1%		
	Scenario C response, n	334	277	0	0.834
	Intubate	4%	4%	0	
	Do not intubate	96%	96%		
Scenario D (LW)	Scenario D code status, n	335	276	−9%	**<0.0001**
	DNR	85%	94%	+3%	
	FC	7%	4%	+6%	
	Unsure	8%	2%		
	Scenario D response, n	335	276	+7%	**0.005**
	Intubate	13%	6%	−7%	
	Do not intubate	87%	94%		
Scenario E (POLST DNR/LTD)	Scenario E code status, n	330	277	+55%	**<0.0001**
	DNR	87%	32%	−40%	
	FC	4%	44%	−15%	
	Unsure	9%	24%		
	Scenario E response, n	331	273	−43%	**<0.0001**
	Defib	23%	76%	+43%	
	Do not defib	77%	25%		

(Continued next page)

TABLE 4. *(Continued)*

Statement/Scenario	Response Choices	Survey A	Survey B	Difference (A–B)	*P*
Scenario F (LW)	Scenario F code status, n	325	262	−22%	**<0.0001**
	DNR	73%	95%	+6%	
	FC	9%	3%	+16%	
	Unsure	18%	2%		
	Scenario F response, n	326	263	+24%	**<0.0001**
	Defib	29%	5%	−24%	
	Do not defib	72%	95%		
Scenario G (LW)	Scenario G code status, n	324	260	+48%	**<0.0001**
	DNR	64%	16%	−53%	
	FC	21%	74%	+5%	
	Unsure	15%	10%		
	Scenario G response, n	(324)	(260)	−42%	**<0.0001**
	Defib	42%	84%	+42%	
	Do not defib	58%	17%		
Scenario H (POLST CPR/full TX)	Scenario H code status, n	323	259	0	0.821
	DNR	2%	2%	−1%	
	FC	97%	98%	0	
	Unsure	1%	1%		
	Scenario H response, n	321	260	0	~0.415
	Intubate	99%	99%	−1%	
	Do not intubate	1%	2%		
Scenario I repeat of scenario E (POLST DNR/LTD)	Scenario I code status, n	319	258	+62%	**<0.0001**
	DNR	88%	26%	−41%	
	FC	4%	45%		
	Unsure	9%	30%	−21%	
	Scenario I response, n	321	257	−57%	**<0.0001**
	Defib	23%	80%	+57%	
	Do not defib	77%	20%		

Data in bold denotes statistically significant change.
defib, defibrillate; FC, full code.

recovery.[34] This concern is supported by the Worchester Heart Attack Study, which showed a 9-fold increase in mortality for this condition in the presence of a DNR order, suggesting a premature withholding or withdrawing of treatment measures even in the absence of an arrest event (44% versus 0.5%).[35]

As practice aids evolve, there is a growing body of literature revealing that video support tools can substantially improve medical decision making, particularly about CPR.[36,37] Video tools help patients better understand their treatment choices by enabling them both to envision future circumstances and to deliberate about

TABLE 5. Predicting Coding Response of Full Code

	Scenarios								
Factors	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
Group	Group B: +15.5×	Group B: +21.3×	NS	Group B: −76%	Group B +39.6×	Group B: −70%	Group B: +13×	NS	Group B: +36.7×
Specialty (EM versus other)	NS	NS	NS	NS	NS	Non-EM: −85%	NS	NS	NS
Experience (attending versus resident)	NS	Resident: −44%	NS	NS	NS	Resident: −80%	NS	NS	NS
Comfort with POLST consent	NS	NS	NS	NS	NS	NC: +3.1×	NS	NS	NS
Comfort with LW consent	NS	NC: +2.9×	NS	NS	NS	NS	NC: +1.8×	NS	NS
POLST training	NS	NS	NS	NS	NS	NS	NS	NS	NS
LW training	NS	NS	NS	NS	NS	NS	NS	NS	NS

NC, not comfortable with LW/POLST consenting; Non-EM, services other than emergency medicine; NS, not significant.

TABLE 6. Predicting Resuscitation Decisions

	Scenarios								
Factors	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
Group	Group B: +5.5×	Group B: +9.4×	NS	Group B: −65%	Group B +11.6×	Group B: −85%	Group B: +6.4×	NS	Group B: +16.5×
Specialty (EM versus other)	NS	NS	NS	NS	NS	NS	NS	NS	NS
Experience (attending versus resident)	NS	Resident: −46% ×	NS	NS	NS	Resident: −51%	Resident: −41%	NS	NS
Comfort with POLST consent	NS	NS	NS	NS	NS	NS	NS	NS	NC: +1.9×
Comfort with LW consent	NS	NC: +2.8×	NS	NS	NC: +2.4×	NC: +2.1×	NC: +2.2×	NS	NS
POLST training	NS	NS	NS	NS	NS	NS	NS	NS	NS
LW training	NS	NS	NS	NS	NS	NS	NS	NS	NS

EM, emergency medicine; NC, not comfortable with LW/POLST consenting; NS, not significant.

their decisions.[38] Most of this research focuses on using videos to inform patients, and our study focuses on using videos to communicate patient wishes back to clinicians. Just as videos work successfully as patient decision aids, they should also work as communication tools. The nonverbal information in a patient-recorded video LW should help both the healthcare team and the family understand (and accept) the patient's wishes. For example, a video will allow doctors to see facial muscles, hear the inflection of a person's voice, and better understand nuances.[39] Contrasted against these factors, written documents are subjected to degrees of interpretation with respect to current patient medical status and their desire for treatment. The question is whether a video testimonial can help foster understanding of written patient prerogatives.

If consensus reflects cohort understanding, then written documentation fails the litmus test. The current data reveal that only 2 (C and H) of the 9 scenarios achieved consensus. Adding a video testimonial significantly changed responses in 7 of these 9 scenarios and increased the number of consensus scenarios to 4. Logistic modeling of either code status or resuscitation responses demonstrated that the use of video testimonials was the dominant predictor variable, regardless of specialty or experience. This suggests that the incorporation of a VM with a LW or POLST can increase consensus understanding of patient goals in times of acute medical crisis.

Our data also show the importance of health provider education on the interpretation of LWs and POLST. The data indicate that no more than 41% had previous training in either POLST or LW documents with median training times of between 1 and 2 hours. Nowhere is this substandard training more evident than in the responses to scenario F. In survey A, participants viewed advanced Parkinson disease as a terminal or end-stage condition, chose DNR, and elected not to institute LST. In survey B, they chose DNR, elected not to institute LST, but had the benefit of reviewing an EOL VM to support their decision making. This points to either a lack of education or, as suggested by Turnbull et al,[40] the need for continuing (refresher) education. Ultimately, regulatory oversight might be required to ensure and set standards for educating health care providers on LWs and POLST interpretation.

Responses to scenario F should also raise concern related to understanding of neurologic disease and physical disability (e.g., spinal cord injury) and the specter of personal bias. This issue of personal bias may be related to the participants' feelings as to how they themselves would want to be treated[41–43] or how they were trained (paternalistic versus patient centered) rather than how patients perceive to have consented to their LW document. This finding should prompt more research involving chronic conditions and those with significant disabilities (e.g., neurologic and physical) and how documents such as LWs and POLST impact their care and treatment. To date, no study has evaluated this potential safety concern.

An area that requires clarification is how physicians describe cardiac arrest and its outcomes. For years, we have pessimistically portrayed dismal outcomes in cardiac arrest.[44] Research has also been published stating that after 30-minute resuscitation is futile. More recently, research suggests that prolonged resuscitations are not futile and even those with prolonged resuscitation can have good functional outcomes.[45] What patients consent to as far as cardiac arrest may not be as clear. Living wills do not say "Do not treat me when in cardiac arrest." In contrast, POLST may or may not choose that. Further research is required to see that we get this right for patients. Patient VMs can specifically provide clarity to ensure we get it right for individual patient choices and have the ability to be integrated into electronic health records across practice settings.

Study Limitations

One limitation of our study is that we did not control for how states define DNR. In some states, DNR is for patients both pulseless and apneic, and in other states, the definition is pulseless or apneic.[46–48] How we defined consensus also represents a limitation. We equated consensus with a super majority value of 95%; some readers may find this value too stringent and unacceptable. Others may find it not stringent enough because it accepts a 5% error rate, and these are life or death decisions. Similarly, this study made no attempt to specify correct treatment choices. We leave this to the discretion of the reader to interpret the scenarios and use their own judgment to self-evaluate how they would respond in a similar clinical situation. The use of a VM itself may also pose limitations. We only evaluated 3 messages. The messaging asking for a trial of CPR could also have been created to decline a trial of CPR with the POLST DNR/LTD. Now that the study is completed, we expect that a message crafted to withhold the application of CPR would have shown similar benefits and possibly prevented the unsure code status responses in POLST DNR/LTD scenarios. Finally, we are unaware of any data to date revealing a correlation between responses to hypothetical, written scenarios versus decisions during actual emergent conditions with critically ill patients; it is possible that physicians more accurately interpret these scenarios in actual practice. However, publications of case series as well as actual patient events support

the safety concerns we describe and support the need for further research.[29,49,50]

CONCLUSIONS

Ethical and financial pressures are mounting to change how we care for patients at EOL. Living wills and POLST have proven benefits. They are much needed and can be effective in helping to ensure that patient wishes are honored. At present, this process of how to interpret and act on documents requires a need for safe guards to ensure we "get it right" for patients who wish to accept or decline lifesaving interventions. Our results show that addition of a VM produced statistically significant changes toward consensus in code status interpretation as well as the decision to resuscitate and reinforces the decision to withhold LST. Video messaging has the potential to ensure the safe interpretation of LWs and POLST documents and ensure that these documents are faithful to the wishes and goals of the patient producing benefits for all stakeholders in the health care system.

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