
Original Contributions

TRIAD II: DO LIVING WILLS HAVE AN IMPACT ON PRE-HOSPITAL LIFESAVING CARE?

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Abstract—Background: Living wills accompany patients who present for emergent care. To the best of our knowledge, no studies assess pre-hospital provider interpretations of these instructions. **Objectives:** Determine how a living will is interpreted and assess how interpretation impacts lifesaving care. **Design setting:** Three-part survey administered at a regional emergency medical system educational symposium to 150 emergency medical technicians (EMTs) and paramedics. **Part I** assessed understanding of the living will and do-not-resuscitate (DNR) orders. **Part II** assessed the living will's impact in clinical situations of patients requiring lifesaving interventions. **Part III** was similar to part II except a code status designation (full code) was incorporated into the living will. **Results:** There were 127 surveys completed, yielding an 87% response rate. The majority were male (55%) and EMTs (74%). The average age was 44 years and the average duration of employment was 15 years. Ninety percent (95% confidence interval [CI] 84.6–95.4%) of respondents determined that, after review of the living will, the patient's code status was DNR, and 92% (95% CI 86.5–96.6%) defined their understanding of DNR as comfort care/end-of-life care. When the living will was applied to clinical situations, it resulted in a higher proportion of patients being classified as DNR as opposed to full code (Case A 78% [95% CI 71.2–85.6%] vs. 22% [95% CI 14.4–28.8%], respectively; Case B 67% [95% CI 58.4–74.9%] vs. 33% [95% CI 25.1–41.6%], respectively; Case C 63% [95% CI 55.1–71.9%] vs. 37% [95% CI 28.1–44.9%]), respectively. With the scenarios presented, this DNR classification resulted in a lack of or a delay in lifesaving

interventions. Incorporating a code status into the living will produced statistically significant increases in the provision of lifesaving care. In Case A, intubation increased from 15% to 56% ($p < 0.0001$); Case B, defibrillation increased from 40% to 59% ($p < 0.0001$); and Case C, defibrillation increased from 36% to 65% ($p < 0.0001$). **Conclusions:** Significant confusion and concern for patient safety exists in the pre-hospital setting due to the understanding and implementation of living wills and DNR orders. This confusion can be corrected by implementing clearly defined code status into the living will. © 2009 Elsevier Inc.

Keywords—living will; do not resuscitate; full code; effective vs. enacted living will; interpretation

INTRODUCTION

A recently published case series raised the question of a possible compromise to patient safety with variations in understanding and interpretations of living wills (1). Published information over the past two decades illustrates that there is significant confusion among health care providers in the interpretation and implementation of do-not-resuscitate (DNR) orders. This confusion poses a concern for health care professionals, especially pre-hospital health care personnel responding to life-threatening emergencies.

Over 22 million Americans summon emergency medical services (EMS) for acute medical conditions every year (2). Approximately 400,000 people die annually outside of hospitals or chronic care facilities in the United States from sudden cardiac death (3). In community settings and hospital emergency departments, clinicians often do not know the patient's end-of-life wishes. For this reason, the American Heart Association has long maintained that "except in narrowly defined circumstances . . . professional first responders are expected to always attempt BLS (basic life support) and ACLS (advanced cardiac life support)" (4).

In emergency situations, to prevent futile attempts at resuscitation of patients with a terminal illness who would not benefit from aggressive intervention, the "out-of-hospital do-not-resuscitate (DNR) order" was created. The out-of-hospital DNR is a written order that is issued by a patient's attending physician that directs EMS providers to withhold cardiopulmonary resuscitation (CPR) and resuscitative measures in the event of a life-threatening emergency (4). These orders are usually implemented through the use of special forms, medical wristbands or necklaces.

In addition to the out-of-hospital DNR, there is the traditional DNR order. This order is written in health care facilities, and directs caregivers not to attempt resuscitation of the patient if they are found pulseless or apneic (5–10). In addition to the out-of-hospital DNR and DNR orders, there is also the living will. A living will is activated when there is a terminal condition, persistent vegetative state, or state of permanent unconsciousness. The Living Will Act, which is a State-specific act, does not permit an EMS provider to withhold CPR from any patient unless an out-of-hospital DNR order is active. If there is no out-of-hospital DNR order, the EMS provider is obligated to initiate CPR while waiting for medical direction (11). This intervention may occur even if it is contrary to the person's wishes stated in their living will. In such cases, the living will is subject to the bias and interpretation of the pre-hospital professional and the physician giving medical command. If either misconstrues the living will, the patient's safety is potentially compromised due to a delay of or the lack of instituting lifesaving care.

The Realistic Interpretation of Advanced Directives I (TRIAD I) study identified concerns about patient safety with regard to pre-hospital personnel interpretation of living wills and understanding of DNR orders. When health care personnel (doctors, nurses, paramedics and emergency medical technicians [EMTs]) were asked to review a hypothetical living will and to assign a code status based upon it, 89% of EMS personnel incorrectly designated the code status as DNR. In comparison, 79% of nurses and 64% of doctors incorrectly designated the

code status for the hypothetical patient as DNR. Also, 94% of EMS responders in the study indicated their understanding of DNR to mean comfort or end-of-life care (12).

The results of the TRIAD I study combined with local experience and absence of any previous study focusing on pre-hospital interpretation of living wills and DNR prompted the TRIAD II study. Similar to the TRIAD I design, TRIAD II participants were asked to review and interpret fictitious living wills, but only pre-hospital personnel (paramedics and EMTs) were included. The TRIAD II objectives were: 1) to investigate how the structure of the living will conveyed a code status; 2) to determine the participant's understanding of the DNR designation; 3) to understand how the participant's background (i.e., years of experience and education in living wills) affected his/her interpretation of a particular living will; 4) to determine how a living will is interpreted in a critical medical situation; and 5) to determine if the presence of a clearly defined code status designation in the living will affects the participant's treatment decision.

MATERIALS AND METHODS

The study population consisted of EMTs and paramedics with varying amounts of experience and training in advance directives. They were all licensed to practice in the state of Pennsylvania. Recruitment consisted of a voluntary survey administered at an EMT/paramedic educational symposium.

Participants underwent an introduction followed by the administration of a three-part survey, which was approved by the Institutional Review Board at Hamot Medical Center. The first part of the survey gathered demographic information about each participant's gender, age, years of experience, and prior training in the area of advance directives.

The survey consisted of a fictitious advance directive in the form of a living will (Figure 1). The participants were asked to read the end-of-life wishes of the fictitious patient expressed in this document. The living will globally declined lifesaving measures if the patient was in a terminal condition or persistent state of unconsciousness. The participants were asked to identify the patient's code status as either full code or DNR. They were then asked to define their understanding of the code status designation of DNR as either comfort care/end-of-life care or full care.

In Part II of the survey, participants were given several different fictitious case scenarios (Figure 2) of patients in either respiratory distress or a life-threatening dysrhythmia (ventricular fibrillation). Each patient had a living will (Figure 3) that was identical to the one pre-

Living Will

(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 my 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 (✓) do not want cardiopulmonary resuscitation.

I () do (✓) do not want electrocardioversion.

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

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

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

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

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

I () do (✓) do not want antibiotics.

Questions:

1. Based on this living will, what is the patient's code status?
 - a. DNR
 - b. Full Code
2. What is your understanding of DNR status?
 - a. Comfort care/end-of-life care
 - b. Full care

Figure 1. Part I.

sented in Part I of the survey. Based on the clinical presentation and the living will presented, the participants were asked to interpret the code status for each patient as either full code or DNR. The participants were then prompted that there was a change in the patient's condition in the form of a respiratory arrest or ventricular fibrillation. They were then given 20 s to determine their next course of action. The options were intubation or defi-

brillation, no intubation, no defibrillation, or call for medical direction. For the purpose of the analysis, action was defined as choosing intubation or defibrillation, and non- or delayed action was defined as choosing no intubation, no defibrillation or call for medical direction.

In Part III of the survey, the participants were presented with the same clinical presentations (Figure 2), however, the living will (Figure 4) contained a clearly

	Baseline	Warning!	Change in Status
Case A	78-year-old man with complaints of chest pain and shortness of breath. Vitals: RR: 40 breaths/min, SaO ₂ : 60% RA, 82% Non-rebreather BP 80/60 mm Hg, P: 127 beats/min Patient is confused and in respiratory distress; wife is present and gives you living will and list of medications.	Warning! Change in clinical condition about to happen!	As you are evaluating him, he develops agonal respirations and becomes unresponsive.
Case B	69-year-old woman with a history of diabetes, hypertension, CAD s/p CABG 5 years ago. Patient experiencing chest pain. You see signs of mild distress. Vitals: T: 36°C (97°F), P: 66 beats/min, RR: 26 breaths/min, SaO ₂ 97% She is clammy. The family gives you her list of medications and her living will.	Warning! Change in clinical condition about to happen!	In the ambulance, she develops increased shortness of breath and chest pain. She then develops a VT/VF arrest.
Case C	45-year-old man with complaints of chest pain and diaphoresis. Vitals: P: 120 beats/min, RR: 32 breaths/min, BP: 120/60 mm Hg, T: 36°C (97°F), SaO ₂ :96% on RA On examination, the patient is in mild distress. Lungs are clear to auscultation bilaterally, heart has a regular rate and rhythm, and pulses are equal in all extremities. Your pre-hospital ECG shows an acute ST elevation anterior myocardial infarction. You give him aspirin, SL nitroglycerine, and package him for transport. Patient provides a living will to you.	Warning! Change in clinical condition about to happen!	In transport, the patient becomes unresponsive with absent pulses and monitor is showing ventricular fibrillation.

Figure 2. Part II and III case examples.

RR = respiratory rate; RA = room air; BP = blood pressure; P = pulse; CAD = coronary artery disease; CABG = coronary artery bypass graft; T = temperature; ECG = electrocardiogram.

defined code status designation (full code). Participants were again prompted that there would be a change in the patient's clinical condition requiring intervention. The participants were asked to choose their next course of action with the same options as in Part II of the survey.

Descriptive statistical analysis of the demographic information was compared using a Z-test to analyze the difference in rate of response, with the exception of the years of experience and age, where a T-test of means was used to compare groups. The participants' baseline living will interpretation, as well as the comparisons of their rate of response to the questions in each case presentation was analyzed using a Z-test of rates. The McNemar test was used to compare responses to survey questions before and after the addition of code status. A *p* value of < 0.05 was considered statistically significant, and 95% confidence intervals were utilized to describe percentages. Statistical software used for analysis included SAS software, version 9.1.3 (SAS Institute, Cary, NC) and

AICE! Millennium software, version 3.22 (ICPA Inc., Austin, TX).

RESULTS

A total of 150 surveys were distributed and 131 were completed adequately, for an overall response rate of 87%. Four surveys were excluded because occupation was other than that of EMT or paramedic, leaving 127 surveys for analysis (Table 1). Some tables display totals not equaling 127 due to missing responses to survey questions. The majority of respondents were male (55%) and the overall group had a mean age of 44 years (range 19–74 years). There was a significantly higher number of EMTs than paramedics (74% vs. 26%, *p* < 0.0001). Overall, 63% of the respondents had reported having advanced directive training. However, the proportion of paramedics having advanced directive training was higher than EMTs (76% vs. 59%, *p* = 0.06). Paramedics had an average of 20 years of experience (range 5–35 years), which was

LIVING WILL

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 my dying, if I should be in a terminal condition or in a state of persistent unconsciousness.

I direct that treatment to 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 (✓) do not want cardiopulmonary resuscitation.

I () do (✓) do not want electrocardioversion.

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

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

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

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

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

I () do (✓) do not want antibiotics

Figure 3. Part II living will (Cases A, B, C).

significantly higher than the EMTs' average of 14 years (range 1–57 years) ($p = 0.004$). There was no significant difference between EMTs and paramedics with respect to average age.

Table 2 displays the distribution of responses to Parts I and II of the survey. The baseline overall response to code status revealed a higher proportion incorrectly assigned a DNR ($n = 108$ [90%], 95% confidence interval [CI] 84.6%–95.4%) compared to full code ($n = 12$ [10%], 95% CI 4.6%–15.4%). The overall response to the understanding of DNR revealed a higher incorrect response rate of comfort care/end of life care ($n = 108$ [92%], 95% CI 86.5%–96.6%) compared to full care ($n = 10$ [8%], 95% CI 3.5%–13.5%). No significant difference was seen between EMTs' and paramedics' rate of response to code status and understanding of DNR.

In Part II of the survey, there was a higher percentage of respondents that incorrectly assigned the code status as DNR for cases A (78%, 95% CI 71.2%–85.6%), B (67%, 95% CI 58.4%–74.9%) and C (63%, 95% CI 55.1%–71.9%) compared to full code. No significant difference in the code status rate of response between EMTs and paramedics was seen for Cases A, B, or C. When comparing non- and delayed action to action in Case A, a higher rate of response was seen for no intubation and calling for medical command (85%, 95% CI 78.5%–91.1%) compared to appropriate intubation (15%, 95% CI 8.9%–21.5%). A similar response, comparing non- and delayed action to appropriate action (defibrillation), was seen in Case B (60%, 95% CI 51%–68.1% vs. 40%, 95% CI 31.9%–49.1%, respectively) and C (64%, 95% CI 55.1%–71.9% vs. 36%, 95% CI 28.1%–44.9%, re-

Living Will

(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.

Code Status Designation: FULL CODE

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

I direct that treatment to 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 (✓) do not want cardiopulmonary resuscitation.

I () do (✓) do not want electrocardioversion.

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

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

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

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

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

I () do (✓) do not want antibiotics

Figure 4. Part III living will (Cases A, B, C).

spectively). Only Case C revealed a difference in responses between EMTs and paramedics. A significantly higher proportion of paramedics were likely to defibrillate Case C than EMTs (56% vs. 30%, respectively, $p = 0.008$).

Table 3 displays the interpretation of the code status for each scenario, matching the code status response to the action response for each respondent. In Case A, 26 respondents said they would assign the code status as full code, however, only 10 of the 26 (8% overall) stated their action would be intubation, whereas 16 of the 26 (13% overall) would provide no action or call for medical command. Similar mismatches were demonstrated in

the responses to Cases B and C. Case B demonstrated 42 respondents assigning full code as the appropriate code status, however, only 24 of the 42 stated their action would appropriately be defibrillation, whereas 18 of the 42 (14% overall) would provide no defibrillation or call for medical command. In Case C, 46 respondents assigned full code as the appropriate code status, however, only 23% overall (29/125) stated their action would be defibrillation, whereas 14% overall (17/125) would provide no defibrillation or call medical command. Respondents assigning full code for the code status and choosing full care actions (intubate or defibrillate) increased from Case A to B to C with 8% (10/123), 19% (24/125), and

Table 1. Respondent Demographics Detailing Gender, Training, Experience, Age, and Profession

Variable	n	EMT	Paramedic	EMT vs. Paramedic <i>p</i> < 0.05
Total participants	127	94 (74%)	33 (26%)	< 0.0001
Gender				
Male	67 (55%)	45 (50%)	22 (71%)	0.03
Female	54 (45%)	45 (50%)	9 (29%)	
Advance directive training				
Yes	80 (63%)	55 (59%)	25 (76%)	0.06
No	47 (37%)	39 (41%)	8 (24%)	
Experience (years)	Avg 15	Avg 14	Avg 20	0.004
	Min 1	Min 1	Min 5	
	Max 57	Max 57	Max 35	
Age	Avg 44	Avg 44	Avg 43	NS
	Min 19	Min 19	Min 23	
	Max 74	Max 74	Max 35	

EMT = emergency medical technician.

23% (29/125) of the responses, respectively, matching the correct action.

Results of Part III of the survey are demonstrated in Table 4 and reveal the change in responses before and

after a clearly defined code status (full code) was added to the living will for each case scenario. The addition of the code status to the living will showed significant increases in the responses assigning full care for all

Table 2. Responses to Parts I and II of the Survey*

Scenario	Overall Response		EMT	Paramedic	EMT vs. Paramedic <i>p</i> < 0.05
	n (%)	95% CI			
Part I Baseline					
Code status					
Full code	12 (10%)	4.6–15.4	8 (9%)	4 (13%)	NS
DNR	108 (90%)	84.6–95.4	81 (91%)	27 (87%)	NS
Understanding DNR					
Full care	10 (8%)	3.5–13.5	9 (10%)	1 (3%)	NS
Comfort care	108 (92%)	86.5–96.6	79 (90%)	29 (97%)	NS
Part II Case A					
Code status					
Full code	27 (22%)	14.4–28.8	21 (22%)	6 (19%)	NS
DNR	98 (78%)	71.2–85.6	73 (78%)	25 (81%)	NS
Action					
Intubate	19 (15%)	8.9–21.5	14 (15%)	5 (16%)	NS
No intubation	47 (38%)	29.1–46.0	39 (41%)	8 (25%)	NS
Call med com	59 (47%)	38.5–56.0	41 (44%)	19 (59%)	NS
Part II Case B					
Code status					
Full code	42 (33%)	25.1–41.6	32 (34%)	10 (31%)	NS
DNR	84 (67%)	58.4–74.9	62 (66%)	22 (69%)	NS
Action					
Defibrillate	51 (40%)	31.9–49.1	35 (37%)	16 (50%)	NS
No defibrillate	40 (32%)	23.6–39.9	34 (36%)	6 (19%)	0.06
Call med com	35 (28%)	20.0–35.6	25 (27%)	10 (31%)	NS
Part II Case C					
Code Status					
Full code	46 (37%)	28.1–44.9	36 (38%)	10 (31%)	NS
DNR	80 (63%)	55.1–71.9	58 (62%)	22 (69%)	NS
Action					
Defibrillate	46 (36%)	28.1–44.9	28 (30%)	18 (56%)	0.008
No defibrillate	40 (32%)	23.6–39.9	36 (38%)	4 (13%)	0.008
Call med com	40 (32%)	23.6–39.9	30 (32%)	10 (31%)	NS

* Part I: No Clinical Information; Part II: Clinical Scenario; Overall responses as well as by case scenario and profession. EMT = emergency medical technician; DNR = do not resuscitate.

Table 3. Direct Matching of Responses in Part II of the Survey Depicting the Designated Code Status and the Action Response

	Action	Code Status	
		Full Code	DNR
Case A	Intubate	10 (8%)	9 (7%)
	No intubation or call medical command	16 (13%)	88 (72%)
Case B	Defibrillate	24 (19%)	26 (21%)
	No defibrillation or call medical command	18 (14%)	57 (46%)
Case C	Defibrillate	29 (23%)	17 (14%)
	No defibrillation or call medical command	17 (14%)	62 (49%)

DNR = do not resuscitate.

cases. Case A (intubation) showed an increase in response rate from 15% to 56% ($p < 0.0001$), Case B (defibrillation) from 40% to 59% ($p < 0.0001$), and Case C (defibrillation) from 36% to 65% ($p < 0.0001$). The reverse effect was also seen, as the non- or delayed action responses decreased across all cases. A similar effect was observed when the respondents were broken down by occupation, EMT and paramedic. EMTs had a significant increase in their action response in each of the cases, with A (intubation) increasing from 15% to 49% ($p < 0.0001$), B (defibrillation) from 36% to 51% ($p = 0.009$), and C (defibrillation) from 30% to 60% ($p < 0.0001$). Paramedics had significant increase in Case A (intubation) from 16% to 75% ($p < 0.0001$), Case B (defibrillation) from 50% to 79% ($p = 0.002$), and Case C (defibrillation) from 56% to 81% ($p = 0.02$).

DISCUSSION

Our data reveal that the pre-hospital system is compromised by the current level of understanding of living wills, DNR, and out-of-hospital DNR orders. The data show that most respondents, both with and without clinical information, interpreted the living will to define a DNR designation and thus would not institute or delayed instituting lifesaving care. This raises a vast number of questions with respect to the safety of patients who summon 911 for a life-threatening emergency. Of the demographic and background data collected, factors such as prior training in advance directives, years of experience, and gender had no effect on these results.

The survey was administered in three parts. Part I assessed the responses devoid of clinical information to ascertain if it is the structure of the living will that is problematic or misleading. Part II incorporated clinical information to investigate how the current level of un-

Table 4. Comparison of Responses for Parts II and III With and Without Code Status Designation

Action	Case A			Case B			Case C		
	LW no Code Status	LW with Code Status	Change $p < 0.05$	LW no Code Status	LW with Code Status	Change $p < 0.05$	LW no Code Status	LW with Code Status	Change $p < 0.05$
Intubate									
All Responses	19 (15%)	70 (56%)	<0.0001	50 (40%)	74 (59%)	<0.0001	46 (36%)	82 (65%)	<0.0001
	14 (15%)	46 (49%)	<0.0001	34 (36%)	48 (51%)	0.009	28 (30%)	56 (60%)	<0.0001
	5 (16%)	24 (75%)	<0.0001	16 (50%)	26 (79%)	0.002	18 (56%)	26 (81%)	0.02
EMTs									
Paramedics									

LW = living will.

derstanding of living wills and DNR would impact care provided in an emergent setting. Part III incorporated a clearly defined code status designation in the living will in an attempt to provide more clarity and promote patient safety.

In Part I, our data revealed that 90% of the participants incorrectly interpreted the living will as a DNR. This interpretation was independent regardless of status as an EMT or paramedic. Furthermore, 92% indicated that their understanding of DNR status was defined as comfort care/end-of-life care. Again, this understanding was independent of status as an EMT or paramedic.

Part II of the survey assessed how the current understanding of living wills and DNR translated into actions or lack of actions. Each case depicted a patient suffering from a critical illness. In each case, the participant incorrectly interpreted the living will as DNR significantly more often than full code. Their current level of understanding of DNR translated into either no lifesaving care or a significant delay in lifesaving care. The delay in intubation or defibrillation in these clinical situations would almost always result in death. We theorize that the respondents acted as they did because they either believed the living will was enacted, or they only reviewed the "I Do" or "I Do Not" check boxes at the top of the living will rather than having the time to review the entire document. All participants responded similarly, with one exception. In comparing EMTs and paramedics in Case C, a statistically significant portion of the paramedics would provide lifesaving defibrillation to a young patient (30% vs. 56%, $p = 0.008$). In comparing responses, if the participant incorrectly interpreted the living will and assigned a DNR, we found that the patient would have lifesaving care either delayed or withheld. Conversely, if the patient was designated as a full code, the majority of participants would institute lifesaving care.

In Part III of the survey, our data revealed that by incorporating a clearly defined code status designation in the living will, the percentages of those who instituted care increased significantly. Furthermore, the percentages of those who would not institute care or would delay instituting care decreased significantly. This effect was statistically significant in both EMTs and paramedics. In Part II of the survey, a significantly higher portion of paramedics acted to defibrillate in Case C even though they had classified the patient as a DNR. This likely occurred because the patient was considered young and therefore was treated more aggressively.

The results support that living wills are equated with automatic DNR orders regardless of clinical information. Furthermore, DNR orders are not understood in the pre-

hospital setting and are equated with comfort care/end-of-life care. This interpretation is in conflict with the Pennsylvania statute in terms of the conditions for enacting a DNR.

Living wills should not be considered synonymous with DNR orders. Currently, state law governs the implementation for advance directives. In Pennsylvania, state statute stipulates and defines that life support be provided to a person with a living will unless the patient is terminal or in a state of permanent unconsciousness (13). Whether this statute has widespread recognition is unknown at present. Furthermore, there is significant difference between an "effective" vs. an "enacted" living will. An "effective" living will is one that is valid and legally binding, but is not activated. An "enacted" living will is one that has become activated by the triggers in the document, most commonly a terminal condition or a persistent vegetative state. None of the case scenarios provided in this survey enacted the patient's living will. However, the presence of a living will did result in pre-hospital providers' not instituting, or delaying, lifesaving care.

This confusion surrounding the living will is a newly discovered phenomenon. It not only affects health care personnel but the lay public as well. Patients and families are often under the impression that a living will is to be utilized to preclude treatment regardless of reason or cause (14). However, confusion surrounding DNR is not a provincial phenomenon and has afflicted health care for two decades, as first reported by Eisendrath and Jonsen (1983) (15). Ultimately, a Cleveland University Hospital system required the submission of a separate "STOP" order to clarify the role of life support in patients with a living will (16). Clarity in instructions and intent is why several authors have argued that communication with the patient is needed to ensure understanding and to promote autonomy (17). It is unrealistic to believe that this dialogue could be achieved in the current pre-hospital emergent setting, which leads to a heavy reliance on directives (the living will, DNR or out-of-hospital DNR) or health care proxy. Recently, there have been several recommendations for the complete abandonment of living wills due to problems in their implementation (18–21).

The problems associated with interpreting living wills as a DNR result from a multitude of factors. Primarily, there is a fundamental lack of understanding about the conditions that set an advance directive in motion. Furthermore, these conditions can be transitory and must be constantly re-evaluated in the context of the patient's current medical status (22). Our results did not reveal an influence of the participant by gender, age, experience, or training. The fact that prior training in advance directives

had no effect on the responses should prompt a review of the current educational processes.

Limitations

Limitations to this study include the purposeful omission of clinical information in Part I of the survey. Clinical information was excluded to ascertain if the content or structure of the living will, in isolation, is problematic and misleading. Also, there was no control group of patients without a living will. We assumed as a control measure that any patient without a living will, presented in similar case scenarios, would receive full and aggressive therapy as defined by current standards of care.

We recognize that the participants may produce a local bias and limited sampling, as our study population was recruited in a single region of the state. In addition, we sampled both EMTs and paramedics. However, the results have a significant degree of generalizability and support that this is a nationwide problem rather than a local problem. It is recognized that EMTs are not licensed to intubate or defibrillate in all states. This lack of formal training may have affected their responses. Specifically, paramedics who perform these interventions are more likely to have a better understanding of the indications for them than the EMTs, who do not perform the interventions. Currently, many states are exploring the expansion of the EMT role to include such lifesaving interventions. These study results can be utilized to direct educational efforts in these areas. Furthermore, EMTs are often the first providers on scene and place automatic external defibrillators and alternative airway devices, and ventilate patients. Finally, the 20-s response time was chosen to simulate real-life experience that requires immediate action. Participants were also informed that a change in the patient's clinical status was about to happen. Real-life situations rarely afford this warning.

CONCLUSION

At present, there is significant confusion in the pre-hospital setting with respect to the understanding of living wills and DNR orders. The results of this study suggest that the current structure of the living will leads the majority of pre-hospital health care providers to incorrectly assume a patient is a DNR. In addition, DNR is misunderstood to define comfort care/end-of-life care. This confusion has been shown to compromise lifesaving care when applied to a clinical scenario. This confusion

and concern for patient safety can be rectified by incorporating a clearly defined code status designation within the living will. Educational efforts and provider protocols must be reevaluated and implemented to ensure patient safety.

REFERENCES

1. Mirarchi FL. Does a living will equal a DNR? Are living wills compromising patient safety? *J Emerg Med* 2007;33:299–305.
2. Maguire BJ, Walz BJ. Current emergency medical services workforce issues in the United States. *J Emerg Manag* 2004;2:17–26.
3. Iserson KV, Rouse F. Prehospital DNR orders. *Hastings Cent Rep* 1989;19:17–9.
4. Kellermann A, Lynn J. Withholding resuscitation in prehospital care. *Ann Intern Med* 2006;144:692–3.
5. Henneman EA, Baird B, Bellamy PE, Faber LL, Oye RK. Effect of do-not-resuscitate orders on the nursing care of critically ill patients. *Am J Crit Care* 1994;3:467–72.
6. Bartholome WG. 'Do not resuscitate' orders. Accepting responsibility. *Arch Intern Med* 1988;148:2345–6.
7. Guidelines for cardiopulmonary resuscitation and emergency cardiac care. Emergency Cardiac Care Committee and Subcommittees, American Heart Association. Part VIII. Ethical considerations in resuscitation. *JAMA* 1992;268:2282–8.
8. Miles SH, Cranford R, Schultz AL. The do-not-resuscitate order in a teaching hospital: considerations and a suggested policy. *Ann Intern Med* 1982;96:660–4.
9. National Conference on Cardiopulmonary Resuscitation (CPR) and Emergency Cardiac Care (ECC). Standards and guidelines for cardiopulmonary resuscitation (CPR) and emergency cardiac care (ECC). Part VIII. Medicolegal considerations and recommendations. *JAMA* 1986;255:2979–84.
10. Sherman DA, Branum K. Critical care nurses' perceptions of appropriate care of the patient with orders not to resuscitate. *Heart Lung* 1995;24:321–9.
11. PA Department of Health. Out-of-hospital do-not-resuscitate orders (January 26, 2007). Available at: <http://www.dsf.health.state.pa.us/health/cwp/view.asp?a=170&q=236932>. Accessed October 4, 2007.
12. Mirarchi FL, Hite LA, Cooney TE, Kisiel TM, Henry P. TRIAD I – The Realistic Interpretation of Advanced Directives. *J Patient Saf* 2008;4:235–40.
13. Pa. C.S. Title 20; Chapter 54. Advanced directives for health care, Sections 5401–16.
14. Upadya A, Muralidharan V, Thorevska N, Amoateng-Adjepong Y, Manthous CA. Patient, physician, and family member understanding of living wills. *Am J Respir Crit Care Med* 2002;166:1430–5.
15. Eisendrath SJ, Jonsen AR. The living will. Help or hindrance? *JAMA* 1983;249:2054–8.
16. O'Toole EE, Youngner SJ, Juknialis BW, Daly B, Bartlett ET, Landefeld CS. Evaluation of a treatment limitation policy with a specific treatment-limiting order page. *Arch Intern Med* 1994;154:425–32.
17. Hilden HM, Louhiala P, Palo J. End of life decisions: attitudes of Finnish physicians. *J Med Ethics* 2004;30:362–5.
18. Manthous CA. Are living wills useful? In search of a new paradigm. *Conn Med* 2003;67:283–90; discussion 291–2.
19. Culver CM. Advance directives. *Psychol Public Policy Law* 1998;4:676–87.
20. Teno JM. Advance directives: time to move on. *Ann Intern Med* 2004;141:159–60.
21. Fagerlin A, Schneider CE. Enough. The failure of the living will. *Hastings Cent Rep* 2004;34:30–42.
22. 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;26:313–22.

ARTICLE SUMMARY

1. Why is this topic important?

The use of living wills and their impact on patient care has not been adequately studied. These documents have the potential to impact patient care for the patient who summons 911 for a medical emergency.

2. What does this study attempt to show?

This study attempts to show that there is a lack of education and understanding in what sets a living will in motion in the pre-hospital setting. Education and implementation of code status designations can clarify this confusion.

3. What are the key findings?

We found that the structure of the living will when declining lifesaving care is presumed to be enacted and equated with a DNR (do not resuscitate) order. When the living will is present with the patient who experiences a critical illness, it has the potential to limit or delay lifesaving care. When a clearly defined code status designation was incorporated into the living will, we saw statistically significant increases in the provision of lifesaving care.

4. How is patient care impacted?

This study provides clarification as to when a living will is enacted and promotes patient care and safety. It ensures the provision of lifesaving care for those who summon 911 for a medical emergency.