A Prospective Trial of a New Policy Eliminating Signed Consent for Do Not Resuscitate Orders

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BACKGROUND: Some institutions require patients and families to give signed consent for Do Not Resuscitate (DNR) orders, especially in New York State. As this may be a barrier to discussions about DNR orders, we changed a signed consent policy to a witnessed verbal consent policy, simplified and modified the DNR order forms, and educated the staff at 1 hospital, comparing the effects with an affiliated hospital where the policy was not changed.

DESIGN: Prospective natural experiment with intervention and comparison sites.

SUBJECTS AND MEASUREMENTS: Pre- and postintervention, we surveyed house officers' confidence and attitudes, reviewed charts to assess the number of concurrent care concerns (CCCs) addressed per DNR order (e.g., limits on intubation or blood products or need for hospice), and at the intervention hospital, measured the stress levels of surrogates consenting for DNR orders using the Horowitz Impact of Event Scale. We also surveyed staff perceptions about the policy following the change.

RESULTS: At the intervention hospital, the percentage of house officers reporting low confidence in their ability to obtain consent for DNR orders declined postintervention (24% to 7%, $P=.002$), while there was no significant change at the comparison hospital (20% vs 15%, $P=.45$). Among intervention hospital house officers, there were declines in percent reporting difficulty talking to patients and families about DNR orders, but no significant changes at the comparison hospital. At the intervention hospital, the mean number of CCCs/DNR order increased (1.0 pre to 4.2 post, $P<.001$), but did not change significantly (1.2 pre to 1.4 post) at the comparison hospital. The mean total stress score for intervention hospital surrogates declined postintervention (23.6 to 17.3, $P=.02$), indicating lower stress. House officers (98%), attendings (59%), and nurses (79%) thought the new policy was better for families.

CONCLUSIONS: The policy change was well received and associated with improved house officer attitudes, more attention to patients' concurrent care concerns, and decreased surrogate stress. The results suggest that DNR orders can be made simpler and clearer, and raise questions about policies requiring signed consent for DNR orders.

KEY WORDS: ethics; resuscitation policies; resuscitation orders; informed consent; self efficacy; stress.

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the same understanding of which treatments a DNR order is supposed to limit.^{4–8} The process of consenting to a DNR order can cause significant stress, anecdotally greater when health care institutions require the signing of written consent forms.^{9–11} The length and complexity of the DNR consent forms used in some settings may confuse or frustrate physicians, patients, and families.^{11,12}

While 15% of physicians nationwide report working at an institution that requires signed consent for DNR orders,¹¹ this practice is particularly widespread in New York State, where a 1987 statute governs DNR orders.¹² Despite the fact that this statute allows witnessed verbal consent, most New York hospitals use a series of 7 consent forms, each 4 pages long, covering various situations in which DNR orders might be written, asking that these forms be signed by the person authorizing the DNR order.^{10,13,14}

In an effort to ameliorate some of these problems, we revised the DNR policy at St. Vincent's Hospital—Manhattan. We transformed the DNR consent form into a DNR order form that documents all intended limits on potentially life-sustaining treatments and includes reminders regarding active aspects of good end-of-life care. We reduced the number of forms from 7 to 1 and made witnessed verbal consent the standard mode for documenting consent. The implementation of the new policy was accompanied by intensive staff education.

Recognizing that a natural experiment was about to take place, we decided to assess the impact of this policy change. We designated another hospital in our system, St. Vincent's Hospital—Staten Island, as a comparison hospital. Both facilities are Catholic teaching hospitals in New York City, affiliated with New York Medical College, and members of the St. Vincent Catholic Medical Centers of New York. Each hospital used the same DNR order consent forms and had similar DNR policies. We hypothesized that: (1) the attitudes and confidence of house officers obtaining informed consent for DNR orders would improve, (2) the new policy would be well received, (3) process measures of the quality of care rendered to patients with DNR orders would improve, and (4) stress levels in surrogates authorizing DNR orders would decrease.

METHODS

Intervention

The new policy was developed in consultation with the Hospital Ethics Committee, hospital attorneys, and medical

Do Not Resuscitate (DNR) orders are intended to facilitate appropriate care for patients at the end of life, but many obstacles hamper their implementation.^{1–3} Staff may not share

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records personnel. The new DNR form is an *order* form, similar to standard order forms for total parenteral nutrition or chemotherapy. It replaced the 7 DNR *consent* forms, still in widespread use in New York State, which require the physician, after signing the consent form, to write the actual DNR order in the chart. These 7 forms were designed to document that all parts of the law regarding consent for specific patient groups (such as "Adult Without Capacity and Without a Surrogate") were followed. The new form lost none of this information but merely simplified the documentation process. The new form is available at <http://www.nymc.edu/bioethics>. The policy change was preceded by a series of Grand Rounds for clinical departments, mailings, and e-mails explaining the new policy. A special session was held to educate attendings in the Section of Pulmonary and Critical Care Medicine. House officers in the Department of Medicine were educated about the new policy before the policy change in small groups as part of their standard palliative care curriculum. Although there had been a session on DNR orders for 5 years as part of their ethics curriculum, a special session on DNR orders was held after the policy change. Both of these sessions were largely devoted to explaining the new policy, but also gave instruction in how to speak with patients and families using the new policy. Nurses were educated through a series of in-service educational sessions. The policy change took effect on January 1, 2003. The Institutional Review Boards at both St. Vincent's Hospital—Manhattan and St. Vincent's Hospital—Staten Island approved the study.

House Officer Confidence

The content of the questionnaire for house officers was developed by interviewing experts in palliative care, survey research, and medical education. Questions about confidence were based upon the notion of perceived self-efficacy in Bandura's^{15,16} theory of behavioral change. We used cognitive pretesting^{17,18} to validate and revise the survey items.

The 4 items that constitute the main dependent variables for the present study were:

- I feel confident in my ability to talk with patients or their surrogates about consent for medical procedures about which I am knowledgeable;
- I feel confident in my ability to talk with patients or their surrogates about DNR orders;
- I find talking to patients about DNR orders difficult;
- When patients cannot speak for themselves, I find talking to patients' surrogates about DNR orders difficult.

Each of these items was scored on a 5-point Likert scale ranging from "agree strongly," to "disagree strongly." All surveys were anonymous. Residents were surveyed before the policy change in May and June 2002, and after the policy change in May and June 2004.

Physician and Nursing Attitudes Regarding the New Policy

Nurses and attendings were surveyed about their views regarding the new policy. A nurse manager solicited nurse participation at shift changes from June through August 2004. Attendings were surveyed by a series of 3 mailings in

September 2003, January 2004, and February 2004. Attending participation was bolstered through announcements and distribution of the surveys at subspecialty section meetings.

Quality of Care

Concurrent care concerns (CCCs) assess whether 11 indicators of the explicitness and comprehensiveness of the care plans are present within 2 days of the writing of the DNR order. The items measuring the explicitness of limits on life-sustaining therapy are intubation, dialysis, blood products, antibiotics, pressors, artificial hydration, and artificial nutrition. The measures of comprehensiveness of the care plans include attention to analgesic and sedative needs, consideration of hospice, consideration of spiritual needs, and consideration of a decrease in the frequency of vital signs. Attention to a CCC is evidenced either by a specific order limiting an intervention, documented consideration of such a limit, or an explicit order. This chart review method is a *process* measure of quality, assessing whether these important aspects of care were carried out. The CCC method is valid and reliable¹⁹ and has been used in multiple previous studies.^{8,19–21}

At both sites, charts of consecutive medical inpatients with DNR orders were reviewed over preselected time frames, as available from medical records after up to 2 repeated requests. In an attempt to be exhaustive, patients with DNR orders were identified by multiple methods including faxes after morning report and verbal reports from charge nurses. The fact that we had used this precise method to identify patients with DNR orders during previous studies^{8,22} meant that we had a sufficient number of preintervention charts even though we had little time to design and implement the study before the intervention. An additional 50 charts were reviewed in 2002 immediately before the policy change. Postintervention charts were reviewed beginning one year after the policy change, from January through June 2004. We reviewed charts for documentation of the DNR order, documentation of consent, attending cosignatures, attention to CCCs, and clinical and sociodemographic data, including severity of illness as measured by the APACHE-III physiology score.²³

Surrogate Stress

Eligible surrogates authorized DNR orders on the medical service at the intervention hospital before (August through December 2002) and after (March through June 2004) the policy change. Eligible participants spoke English, were at least 18 years old, and participated in the DNR decision.

The Impact of Event Scale, an instrument designed to measure current subjective stress for any life event,²⁴ was administered face to face. This well-validated instrument contains subscales for intrusive thoughts and avoidance behaviors associated with the stressful event.²⁵ Participants were paid \$15.00 for their time.

Statistical Analysis

House Officer Confidence. We had a power of 0.95 to detect a 25% difference in dichotomized pre-post house officer responses at $\alpha = .05$ (2-tailed) at the intervention hospital, and a power of 0.80 at the comparison hospital. Because of skew, dependent variables were dichotomized into high (4 or 5) versus low.^{1–3} In comparing house officers' confidence regarding

DNR orders with their confidence regarding procedures, we used the McNemar test. The χ^2 statistic was used to determine pre- to postpolicy changes for each dependent variable. As this study was not randomized, regression models were estimated using independent variables found to be associated with each of the main outcome variables at $P < .10$ to adjust for potentially confounding factors. For house officer confidence, this was a logistic model.

Quality Measures. We had powered our study to be able to detect a change of 0.5 CCCs/DNR order at $\alpha = 0.05$ (2-tailed), $\beta = 0.2$. However, an early look at the data demonstrated such an overwhelming difference that we terminated chart reviews prematurely. We assessed pre-post differences in the total number of CCCs addressed per DNR order using the Mann-Whitney U test. To compare the proportion addressing individual CCCs, the χ^2 statistic was used. The total number of CCCs addressed per DNR order was dichotomized into high (≥ 2) versus low (≤ 1), and logistic regression models were estimated to adjust the significance of pre-post differences in number of CCCs/DNR order by controlling for potentially confounding factors.

Surrogate Stress. The need to conduct interviews rapidly before the policy change forced us to use imbalanced pre-post sample sizes. We had a power of 0.84 to detect a 5.0 point difference in either of the IES subscales at $\alpha = 0.05$, 2-tailed.

t Tests were conducted to determine prepolicy to postpolicy change for each dependent variable. Linear regression models were estimated to adjust for potential confounders of pre- to postpolicy differences. All analyses for the surveys, chart reviews, and surrogate interviews were conducted using SPSS software.

RESULTS

House Officer Confidence

Participation rates for intervention hospital house officers were 78% (83/107) preintervention and 84% (97/115) postintervention. For comparison hospital house officers, the rates were 96% (49/51) preintervention and 91% (48/53) postintervention. Participants did not differ from nonparticipants in age or sex at either site, pre or post, except that at the comparison hospital, in the preintervention period, participating residents were slightly younger (33.2 vs 35.5 years, $P = .04$). The characteristics of the participating house officers are shown in Table 1.

As shown in Figure 1, very few house officers lacked confidence regarding their ability to obtain informed consent for common medical procedures before the intervention at either site, and this did not change after the intervention. Before the intervention, at both sites, house officers were more likely to report low confidence in their ability to obtain consent for DNR orders than in their ability to obtain informed consent for medical procedures ($P = .001$ at the intervention site; $P = .004$ at the comparison site).

After the intervention, the proportion of house officers reporting a lack of confidence in their ability to obtain consent for DNR orders declined significantly at the intervention hospital (24% pre vs 7% post, $P = .002$). However, there was no significant change at the comparison hospital (20% pre vs 15% post, $P = .45$). These results were adjusted for sex, religion, and whether the house officer was categorical, with no change in the statistical significance of the results. Age, postgraduate year, number of DNR patients treated, race, and nation of birth and training were not associated with confidence.

Table 1. House Officer Characteristics

Characteristics	Prepolicy Change			Postpolicy Change		
	Intervention M $\pm$ SD or p (N)	Comparison M $\pm$ SD or p (N)	P Value	Intervention M $\pm$ SD or p (N)	Comparison M $\pm$ SD or p (N)	P Value
Age	28.8 $\pm$ 2.5	33.2 $\pm$ 5.5	<.001**	29.4 $\pm$ 5.9	34.7 $\pm$ 6.0	<.001**
Percent male	50% (41)	59.2% (29)	NS	51.5% (50)	58.3% (28)	NS
Race						
White	54.2% (45)	34.7% (17)	.07 [†]	56.7% (55)	38.3% (18)	.04*
Asian	25.3% (21)	30.6% (15)		19.6% (19)	38.3% (18)	
Other	20.5% (17)	34.7% (17)		23.7% (23)	23.4% (11)	
Training program						
Categorical or medicine/pediatrics	71.1% (59)	77.6% (38)	NS	68.8% (66)	83.3% (40)	.06 [†]
Other	28.9% (24)	22.4% (11)		31.3% (30)	16.7% (8)	
Number of DNR patients in last month						
0 to 2	30.1% (25)	36.7% (18)	.07 [†]	38.1% (37)	31.3% (15)	NS
3 to 5	34.9% (29)	46.9% (23)		35.1% (34)	45.8% (22)	
6 or more	34.9% (29)	16.3% (8)		26.8% (26)	22.9% (11)	
National origin						
Foreign born and trained	1.2% (1)	69.4% (34)	<.001**	1.0% (1)	76.6% (36)	<.001**
All others	98.8% (82)	30.6% (15)		99.0% (95)	23.4% (11)	
Religion						
Any	79.5% (66)	77.1% (37)	NS	85.3% (81)	87.0% (40)	NS
None	20.5% (17)	22.9% (11)		14.7% (14)	13.0% (6)	
Religious attendance						
Less than once a week	90.4% (75)	85.7% (42)	NS	93.4% (85)	85.1% (40)	NS
Once a week or more	9.6% (8)	14.3% (7)		6.6% (6)	14.9% (7)	

Note. All analyses done using either the t test or χ^2 statistic.

[†] $P < .10$, * $P < .05$, ** $P < .01$.

NS, not significant.

FIGURE 1. Percentage of house officers lacking confidence before and after the policy change. **P* value not significant, unadjusted, or adjusted; †*P*=.002; adjusted *P*=.001. Models for Confidence about procedures adjusted for sex. For Confidence about Do Not Resuscitate (DNR) orders, Comparison Site model controlled for sex, religion, and program; Experimental site model controlled for sex and program.

The proportion of intervention house officers reporting difficulty talking to patients about DNR orders declined post-intervention (53% pre vs 23% post, *P*<.001), while there was no such change at the comparison hospital (47% pre vs 46% post, *P*=.91). Similarly, intervention hospital house officers became less likely to express difficulty talking to families and other surrogates about DNR orders postintervention (57% pre vs 32% post, *P*=.001), while there was no such change at the comparison hospital (51% pre vs 52% post, *P*=.92). Adjustment for other factors associated with the outcome variable did not alter the statistical significance of these results.

Intervention hospital house officers became less likely to believe that the old procedure of signing DNR consent forms made the process easier for surrogates (27% pre vs 10% post, *P*=.005), while there was no such pre-post difference at the comparison hospital (43% pre vs 43% post). Similarly, intervention hospital house officers became less likely to believe that the old procedure of signing DNR consent forms made the process easier for the treating team (41% pre vs 17% post, *P*<.001), while there was no such trend at the comparison hospital (61% pre vs 58% post, *P*=.77).

Staff Attitudes Regarding the New Policy

We surveyed staff at the intervention hospital after the change to assess their views about the new DNR policy. Participation rates were 83% for attendings and 94% for nurses. For house officers, we inadvertently omitted these questions from 53 of the 97 returned surveys, and so report only on the 44 who received the correct form. For all 3 groups, participants did not differ from nonparticipants in age or sex.

Attendings were generally enthusiastic, with 61% reporting that they thought it was a better policy for the staff and 59% that the policy was better for patients' families. We surveyed both full-time and private medical attendings, including all subspecialties.

Fully 46% of attendings we surveyed reported not having cared for any patients with DNR orders in the month before the survey. Among attendings, there was a significant correlation between number of DNR patients cared for and belief that the

new policy was better for staff ($\rho=.21$, *P*=.003) and better for families ($\rho=.23$, *P*=.001).

Seventy-five percent of nurses thought that the new policy was better for the staff and 79% thought that the new policy was better for patients' families. Among house officers, 98% thought this was a better policy for the staff and 98% thought that the policy was better for patients' families.

Quality Measures

At the intervention hospital, we reviewed 168 charts preintervention and 101 charts postintervention. At the comparison hospital, we reviewed 80 charts preintervention and 80 post-intervention. The κ value for coding attention to CCCs was 0.65 for a random sample of 10 charts checked by a second reviewer (D.P.S.).

Table 2 shows the characteristics of the patients with DNR orders studied at each site before and after the intervention.

The mean number of CCCs addressed per DNR order increased from 1.0 to 4.2 at the intervention hospital (*P*<.001), while it remained unchanged at the comparison hospital (1.2 vs 1.4, *P*=.54, Mann-Whitney *U* test). Similar results obtained after dichotomizing into high (≥ 2) versus low (≤ 1) CCCs per DNR order. At the intervention hospital, 28% of charts addressed at least 2 CCCs/DNR order preintervention, compared with 80% postintervention (*P*<.001). At the comparison hospital, the proportion addressing at least 2 CCCs/DNR order remained unchanged (34% pre vs 31% post, *P*=.74). Adjustments were made for age, severity of illness, and diagnosis, without change in the statistical significance of the results. Race, sex, insurance type, and presence of an advance directive were unassociated with CCCs.

As shown in Table 3, the postintervention change reflected statistically significant increases in the proportion of charts demonstrating attention to each of the 11 CCCs at the intervention hospital, while at the comparison hospital, only one of the individual CCCs changed.

The proportion of DNR orders cosigned by the attending within 48 hours trended upward at the intervention hospital (52% pre vs 64% post, *P*=.07), while this proportion declined significantly at the comparison hospital (76% pre vs 58% post, *P*=.01). The proportion of charts documenting that the appropriate person was approached for consent (e.g., that the patient gave consent if he or she had decision making capacity) improved significantly at both sites (74% pre vs 88% post at the intervention hospital, *P*=.02; 73% pre vs 96% post at the comparison hospital, *P*<.001).

In addition, we calculated the crude incidence of DNR orders on the medical services before and after the intervention. At the intervention hospital, the incidence of DNR orders increased from 4.53 per 100 admissions preintervention to 7.22 per 100 admissions postintervention (*P*<.001). At the comparison hospital, there was a small decrease in the crude incidence of DNR orders from 3.85 per 100 admissions pre-intervention to 1.95 per 100 admissions postintervention (*P*<.001).

Surrogate Stress

Participation rates for eligible surrogates were 77% (40/52) pre and 61% (80/132) post. Overall, 43 refused and 21 could not be interviewed within the 2-week time frame. Participants did

Table 2. Characteristics of Patients with Do Not Resuscitate Orders

Characteristics	Prepolicy Change			Postpolicy Change		
	Intervention M ± SD or p (N)	Comparison M ± SD or p (N)	P value	Intervention M ± SD or p (N)	Comparison M ± SD or p (N)	P value
Age in years	71.8 ± 18.2	75.4 ± 13.6	NS	75.5 ± 16.2	78.6 ± 12.2	NS
APACHE-APS score	45.5 ± 25.4	51.7 ± 30.9	NS	29.6 ± 19.0	48.7 ± 25.7	<.001**
Percent male	43.5% (73)	37.5% (30)	NS	45.5% (46)	43.8% (35)	NS
Race						
White	61.9% (104)	83.8% (67)	<.001**	57.4% (58)	75.0% (60)	.01
Black	11.3% (19)	11.3% (9)		6.9% (7)	8.8% (7)	
Other	26.8% (45)	5.0% (4)		35.6% (36)	16.3% (13)	
Diagnosis						
Malignancy	26.2% (44)	1.3% (1)	<.001**	31.7% (32)	8.8% (7)	<.001**
Other	73.8% (124)	98.8% (79)		68.3% (69)	91.3% (73)	
Insurance						
Private or private HMO	26.8% (45)	11.3% (9)	<.001**	44.6% (45)	60.0% (48)	.01*
Medicare or Medicare HMO	42.3% (71)	80.0% (64)		41.6% (42)	37.5% (30)	
Medicaid/Medicaid HMO/None	31.0% (52)	8.8% (7)		13.9% (14)	2.5% (2)	
Attending physician						
Generalist	37.4% (61)	80.0% (64)	<.001**	72.3% (73)	75.0% (60)	NS
Specialist	62.6% (102)	20.0% (16)		27.7% (28)	25.0% (20)	
Percent with advance directives	40.5% (68)	25.0% (20)	.02*	38.6% (39)	42.5% (34)	NS

Note. All analyses done using either the t-test or χ^2 statistic.

*P<.05, **P<.001.

NS, not significant.

not differ from nonparticipants in age, sex, race, or relationship to the patient. Interviews took place a mean of 7.7 ± 5.9 days after the DNR order was written. Table 4 shows the characteristics of surrogates before and after the intervention. Results before and after the intervention are shown in Figure 2. Total Horowitz IES scores declined after the intervention (23.6 ± 10.1 pre vs 17.3 ± 15.9 post, $P=.02$). This decline was driven almost exclusively by a decline in the Intrusive Thoughts subscale (16.2 ± 6.2 pre vs 8.4 ± 8.4 post, $P<.001$). There was no significant change in the Avoidance subscale. The significance of these results did not change with adjustment.

DISCUSSION

In the aftermath of this policy change and the educational intervention that accompanied it, we found: (1) improved house officer confidence and attitudes about DNR orders, (2) improved process measures of the quality of care, and (3) diminished surrogate stress. The policy change was smoothly implemented and well received by hospital staff.

House Officer Confidence

While our intervention was not randomized, we employed 2 controls—a comparison site and a comparison question. Intervention hospital house officers' confidence in their ability to obtain informed consent for DNR orders improved significantly after the intervention, but was unchanged in our comparison hospital. Similarly, intervention hospital house officers reported less difficulty talking to families and patients about DNR orders after the policy change, with no such change occurring at the comparison hospital.

These findings strongly suggest that the policy change and its accompanying educational program were responsible for the change. Confidence ("perceived self-efficacy") is associated with behavioral change.^{15,16} While the role of confidence

in behavioral change is complex and may be mediated by factors such as anxiety and perceived level of difficulty of the task,²⁶ taken together, these findings suggest that the house officers would be more likely to speak with appropriate patients or their loved ones about DNR orders after the intervention.

Staff Attitudes

This policy change was well received by attendings, nurses, and house officers. Among house officers (who obtained consent for the majority of DNR orders) these judgments were nearly unanimous. We suspect that the response was somewhat less robust among attendings because many did not care for patients with DNR orders, and our data show that the judgment that the new policy was better was significantly correlated with number of DNR patients treated by the attendings.

Quality of Care

Our chart reviews demonstrated concrete behavioral change. As we had hypothesized, attention to the CCCs of patients improved substantially after the intervention, while remaining unchanged at our comparison hospital. We have previously demonstrated that this chart review method validly represents the understandings of patients, nurses, and house officers,¹⁷ underscoring the clinical importance of persuading attending physicians to document their plans of care with precision.⁴⁻⁸ These improvements in attention to CCCs were accompanied by an increase in attending counter-signatures for DNR orders written by house officers and in the proportion of cases in which the proper person was approached for consent. Thus, the policy change and our accompanying education program appear to have improved multiple process measures of the quality of care rendered to patients with DNR orders.

Table 3. Individual CCCs Addressed per DNR Order Before (Pre) and After (Post) the Policy Change

CCCs	Intervention N=168 Pre and 101 Post			Comparison N=80 Pre and 80 Post		
	Pre (N)	Post (N)	P Value	Pre (N)	Post (N)	P Value
Intubation						
No	78.0% (131)	26.7% (27)	<.001**	48.8% (39)	33.8% (27)	.05
Yes	22.0% (37)	73.3% (74)		51.3% (41)	66.3% (53)	
Dialysis						
No	96.4% (162)	71.3% (72)	<.001**	95.0% (76)	93.8% (75)	NS
Yes	3.6% (6)	28.7% (29)		5.0% (4)	6.3% (5)	
Blood product support						
No	96.4% (162)	80.2% (81)	<.001**	96.3% (77)	100% (80)	NS
Yes	3.6% (6)	19.8% (20)		3.8% (3)	0% (0)	
Antibiotics						
No	92.3% (155)	73.3% (74)	<.001**	96.3% (77)	97.5% (78)	NS
Yes	7.7% (13)	26.7% (27)		3.8% (3)	2.5% (2)	
Pressors						
No	96.4% (162)	67.3% (68)	<.001**	93.8% (75)	87.5% (70)	NS
Yes	3.6% (6)	32.7% (33)		6.3% (5)	12.5% (10)	
Vital sign frequency						
No	99.4% (167)	95.0% (96)	.02*	98.8% (79)	100% (80)	NS
Yes	0.6% (1)	5.0% (5)		1.3% (1)	0% (0)	
Sedatives/Analgesics						
No	68.1% (113)	37.6% (38)	<.001**	85.0% (68)	82.5% (66)	NS
Yes	31.9% (53)	62.4% (63)		15.0% (12)	17.5% (14)	
Hospice						
No	90.5% (152)	54.5% (55)	<.001**	88.8% (71)	87.5% (70)	NS
Yes	9.5% (16)	45.5% (46)		11.3% (9)	12.5% (10)	
Spiritual needs						
No	94.6% (159)	66.3% (67)	<.001**	85.0% (68)	93.8% (75)	.07
Yes	5.4% (9)	33.7% (34)		15.0% (12)	6.3% (5)	
Nutrition						
No	91.1% (153)	53.5% (54)	<.001**	95.0% (76)	95.0% (76)	NS
Yes	8.9% (15)	46.5% (47)		5.0% (4)	5.0% (4)	
Hydration						
No	95.2% (160)	58.4% (59)	<.001**	93.8% (75)	93.8% (75)	NS
Yes	4.8% (8)	41.6% (42)		6.3% (5)	6.3% (5)	
Total number of CCCs						
Zero or one	72.3% (120)	19.8% (20)	<.001**	66.3% (53)	68.8% (55)	NS
Greater than one	27.7% (46)	80.2% (81)		33.8% (27)	31.3% (25)	

Note. All analyses done using the χ^2 statistic.

* $P < .05$, ** $P < .001$.

CCC, concurrent care concern; DNR, do not resuscitate.

The crude incidence of DNR orders increased at the intervention hospital while declining slightly at the comparison hospital. This result might be taken as suggesting that eliminating the barriers imposed by the previous policy facilitated the writing of more DNR orders. However, we would urge extreme caution in interpreting this finding as it is not possible using the data we collected to determine whether all of these DNR orders were morally and medically appropriate.

Surrogate Stress

Anecdotally, family members and other surrogates have sometimes reported that in signing an informed consent form for a DNR order, they felt as if they were “signing a death warrant.”^{9–11} Scores that we report on the Horowitz IES before the intervention were high—equivalent to those reported in studies of survivors of house fires and other disasters—but declined after the intervention. While causal inferences are limited due to the fact that we do not have comparison hospital data for surrogate stress, we attempted to control for possible confounding factors and the decline in stress remained significant after statistical adjustment. Only the intrusive thoughts subscale changed pre to post. While this cannot be

completely explained based on the data in this study, our findings are consistent with the literature. Tilden et al. found that the intrusive thoughts subscale of the IES, but not the avoidance subscale, was lower for surrogates making end-of-life decisions if the patient had an advance directive.²⁷ Further, the pre-post difference in the intrusive thoughts subscale was large enough that the total IES score was significantly lower after the intervention. These results thus suggest, but do not prove, that the policy of not requiring signed consent played a role in diminishing surrogates’ stress levels.

Limitations

For practical reasons, like most policy evaluations, this study was a natural field experiment, not a randomized controlled trial. While this limits casual inferences, we used a comparison hospital with many similarities to the intervention site, and this allowed us to control for secular trends. The intervention and comparison hospitals had dissimilarities in house officer characteristics and case mix. However, we adjusted all of our major pre-post analyses by controlling for any factors that were associated with the main dependent variables in univariate analyses, and our findings remained significant. Moreover,

Table 4. Characteristics of Surrogates Interviewed Before (Pre) and After (Post) the Policy Change

Characteristics	Pre M (SD) or p (N)	Post M (SD) or p (N)	P Value
Age in years	60.0 (16.6)	52.7 (13.1)	.01*
Percent male	24.3% (9)	27.5% (22)	NS
Race/ethnicity			
White	59.5% (22)	56.3% (45)	NS
Other	40.5% (15)	43.8% (35)	
Education			
High school or less	44.7% (17)	48.8% (39)	NS
College or more	55.3% (21)	51.3% (41)	
Religion			
Catholic	45.9% (17)	45.0% (36)	NS
Other	54.1% (20)	55.0% (44)	
Religious attendance			
Less than once a week	51.4% (19)	71.3% (57)	.04*
Once a week or more	48.6% (18)	28.8% (23)	
Experienced death of first degree relative			
Yes	81.1% (30)	70.0% (56)	NS
No	18.9% (7)	30.0% (24)	
Family in hospice			
Yes	18.9% (7)	16.3% (13)	NS
No	81.1% (30)	83.8% (67)	
Lives with patient			
Yes	45.9% (17)	38.8% (31)	NS
No	54.1% (20)	61.3% (49)	
Patient insurance			
Medicaid or none	13.5% (5)	26.3% (21)	NS
Private or medicare	86.5% (32)	73.8% (59)	
Patient diagnosis			
Malignancy	17.5% (7)	32.5% (26)	.03*
Neurologic including dementia	45.0% (18)	22.5% (18)	
Other	37.5% (15)	45.0% (36)	

Note. All analyses done using either the *t* test or χ^2 statistic.
**P* < .05.

as the main outcome variables are the pre-post differences within each institution, differences *between* institutions are of less concern. For ethical reasons, the surveys were anonymous, so we could not link pre and post responses for individual house officers and could not use repeated measures techniques. However, as surveys were conducted 2 years apart and a large number of interns are "preliminary," at most 25% would have completed both pre and post surveys, diminishing

FIGURE 2. Mean Horowitz impact of events scale score before and after the policy change. **P* < .001 unadjusted & adjusted; ***P* = .35 unadjusted, .55 adjusted; †*P* = .02 unadjusted, .05 adjusted. All models controlled for age of participant, length of time from Do Not Resuscitate (DNR) to interview, whether participant lived with patient, how often participant attended religious services, and diagnosis of patient.

concerns about our use of independent statistical measures. The generalizability of the study is limited by the fact that it was conducted at only 2 hospitals in one city. However, DNR order consent forms are statutorily recommended in other jurisdictions,²⁸ and requesting signed consent is not an uncommon practice nationally.¹¹ The study is further limited by the fact that the intervention was complex—a policy change plus staff education. It is not possible to determine which components of the intervention might have led to the changes we witnessed. Nonetheless, any major policy change requires staff education, and if others were to adopt our policy recommendations, we would suggest that they also use a similar staff education program.

Conclusions

We conclude that the intervention was associated with improvements in house officer confidence in discussing DNR orders, decreased levels of perceived difficulty talking to patients and surrogates, an increased incidence of DNR orders, and improvements in attention to the CCCs of patients with DNR orders. Surrogate stress levels declined significantly after the policy change. The policy change was well received by staff. These results suggest that DNR orders can be made simpler and clearer, and raise questions about the wisdom of policies requiring signed informed consent for DNR orders.

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