

Is the Emergency Department an Inappropriate Venue for Code Status Discussions?

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Abstract

Background: Historically, it has been assumed that the Emergency Department (ED) is a place for maximally aggressive care and that Emergency Medicine Providers (EMPs) are biased towards life-prolonging care. However, emphasis on early recognition of code status preferences is increasingly making the ED a venue for code status discussions (CSDs). In 2018, our hospital implemented a policy requiring EMPs to place a code status order (CSO) for all patients admitted through the ED. We hypothesized that if EMPs enter CSDs with a bias toward life-prolonging care, or if the venue of the ED biases CSDs towards life-prolonging care, then we would observe a decrease in the percentage of patients selecting DNR status following our institution's aforementioned CSO mandate. **Methods:** We present a retrospective analysis of rates of DNR orders placed for patients admitted through our ED comparing six-month periods before and after the implementation of the above policy. **Results:** Using quality improvement data, we identified patients admitted through the ED during pre (n=7,858) and post (n=8,069) study periods. We observed the following: after implementation DNR preference identified prior to hospital admission from the ED increased from 0.4% to 5.3% (relative risk (RR) 12.5; 95% CI: 5.2-29.9), defining CS in the ED setting at the time of admission increased from 2.4% to 98.6% (p <0.001), and DNR orders placed during inpatient admission was unchanged (RR=0.97 (95% CI = 0.88-1.07)). **Discussion:** Our results suggest that the ED can be an appropriate venue for CSDs.

Keywords

emergency department, advance care planning, resuscitation orders, electronic health records, quality improvement, emergency medicine

Introduction

Since the origins of the specialty of emergency medicine (EM), EM physicians (EMPs) have been identified with the need to preserve and prolong life. It is only in recent years that the value of conversations directed toward the goals of treatment and potential outcomes have changed our perspective on the need to discuss do-not-resuscitate (DNR) orders with our patients and have led to innovations such as the Improving Palliative Care in Emergency Medicine Collaboration.¹ While EMPs have improved at having code status discussions (CSDs) with patients and families in which further care is futile, there is less documented success of EMPs having these discussions with patients who are not in imminent need of resuscitation. Despite a possible reluctance to have these discussions, these patients may have strong opinions about the type of care they will accept.²⁻⁴ The original American College of Emergency Physicians "Choosing Wisely" campaign of 2013 recommended that all patients who would likely benefit from such a discussion should not have it delayed until they are admitted

to the hospital.⁵ Early CSD has been shown to benefit select patients and may result in improved quality of life, as these patients are allowed to have some control over the death process. Patients with early CSDs die less often in hospital settings and have fewer heroic procedures such as cardiopulmonary resuscitation (CPR) performed.⁶ Patients and families that have participated in goals-of-care discussions report greater satisfaction with care, fewer hospitalizations, and better mental health outcomes.⁷

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Demographic changes show the United States is entering an era where up to 1 in 5 Americans will be over the age of 65.⁸ Also accepted is that the most expensive care is delivered in the last year of life.⁹ Emergency medicine physicians may do a valuable service to both their patients and the larger community by initiating goals-of-care discussions in the emergency department (ED), as it has been shown that appropriate DNR orders reduce overall ED use in the last year of life, reducing overall health care costs to society, and that ED goals-of-care discussion increase hospice referrals and reduce inpatient admissions.^{7,10} Nevertheless, authors continue to express concern that the ED is a challenging, perhaps even inappropriate, venue for CSDs to occur and that EMPs are uncomfortable with and perhaps inadequately trained to discuss code status (CS).^{11,12} It has even been said that “the DNR concept runs contrary to the credo of EM, which is to preserve life.”¹³

Our study investigates the hypothesis that the ED is an inappropriate venue for CSDs. Code status discussions are held infrequently in the ED, and EMPs may lack adequate training to have these discussions.¹⁴ The purpose of this study was to assess the impact of mandating EMPs to enter CS on all patients prior to admission from the ED to inpatient wards. We hypothesized that if EMPs enter CSDs with a bias toward life-prolonging care or if the venue of the ED biases CSDs toward life-prolonging care, then we would observe a decrease in the percentage of patients selecting DNR status during their inpatient stay following our institution’s mandate that CS orders be entered for all admissions through the ED.

Methods

Study Design, Sample, and Setting

This was an observational analysis of data collected for quality improvement purposes. We compared outcomes of patients before and after a policy implementation that took place between September 2017 and November 2018. The setting for this study included both an ED and inpatient service of a Midwestern academic medical center in the United States with an annual visit volume of 60 000 ED patients and daily inpatient census of 650 patients. Adult patients (≥ 18 years) who entered the health care system via the ED and were admitted were eligible for the study. This analysis of quality improvement data study was granted a waiver by our local institutional review board, and the study is reported in accordance with the Standards for Quality Improvement Reporting Excellence guidelines.¹⁵

Institutional Intervention, Treatment, and Control Arms

In 2018, our hospital’s chief medical officer announced a policy that all patients admitted to the hospital through the ED must have a CS designated before an inpatient bed would be assigned. This was achieved by adding an order for CS to the electronic order set used to request inpatient beds that had to be signed before bed requests would be processed. This order required an EM staff provider to select one of 3 options, “full

code,” “DNR,” or “other.” This new order set was implemented on April 18, 2018. This requirement was not applied to patients who were transferred directly to inpatient beds from other institutions, patients admitted for elective procedures, or patients directly admitted from a clinic.

The preintervention period included patients who were admitted through the ED between September 1, 2017, and March 30, 2018. The postintervention period included patients who were admitted through the ED between May 1, 2018, and November 30, 2018. As part of a sensitivity analysis, we also included a control arm of patients who were admitted through transfers (ie, not admissions from the ED).

Patient-level characteristics compared between the intervention periods included age (<18 , 18-44, 45-64, ≥ 65 years old), gender, ethnicity (Hispanic, non-Hispanic, other), marital status (married, not married, unknown/missing), religion (Christian, non-Christian/other/missing), and acuity (Emergency Severity Index level 1-3 [urgent] vs 4-5 [nonurgent]).

Outcomes of Interest

The primary outcome in this study was the proportion of DNR CS orders placed in the ED. The CS was evaluated using a combination of key time points and when an updated CS was placed. The time points included date/time stamps of the patient’s ED arrival, hospital bed request (which was used as the proxy for inpatient admission), and hospital discharge date/time. Each time a CS was updated, the time stamp of the order was compared to where the patient was at that time (ie, ED or admitted). Possible outcomes in the ED included missing CS, full code, DNR, or “other” status. Because some patients requested “partial” CSOs (eg, decline CPR but accept intubation) and some patients were transferred to procedure suites without a bed request order in the ED (eg, ST-segment elevation myocardial infarction patients transferred to the catheterization suite), we characterized inpatient CS as “missing,” “full code,” “other” code, or “DNR.” If multiple orders were placed for the patient, we retained the last CS order placed by location (ED and inpatient).

Secondary outcomes in this study included in-hospital mortality (measured as by a final hospital disposition of death), intensive care unit (ICU) admission, and overall hospital length of stay (LOS). These data were obtained from administrative hospital data.

Statistical Data Analysis

Overview. Demographic characteristics of patients were compared between the pre- and postintervention periods by Pearson χ^2 tests. For the primary before and after analysis, we compared differences in each outcome. As part of a sensitivity analysis, we performed a difference-in-difference analysis using a comparison group of admitted patients within the hospital that did not go through the ED.

Main analysis. The primary analysis was a before-and-after study of admissions originating in the ED. For the primary

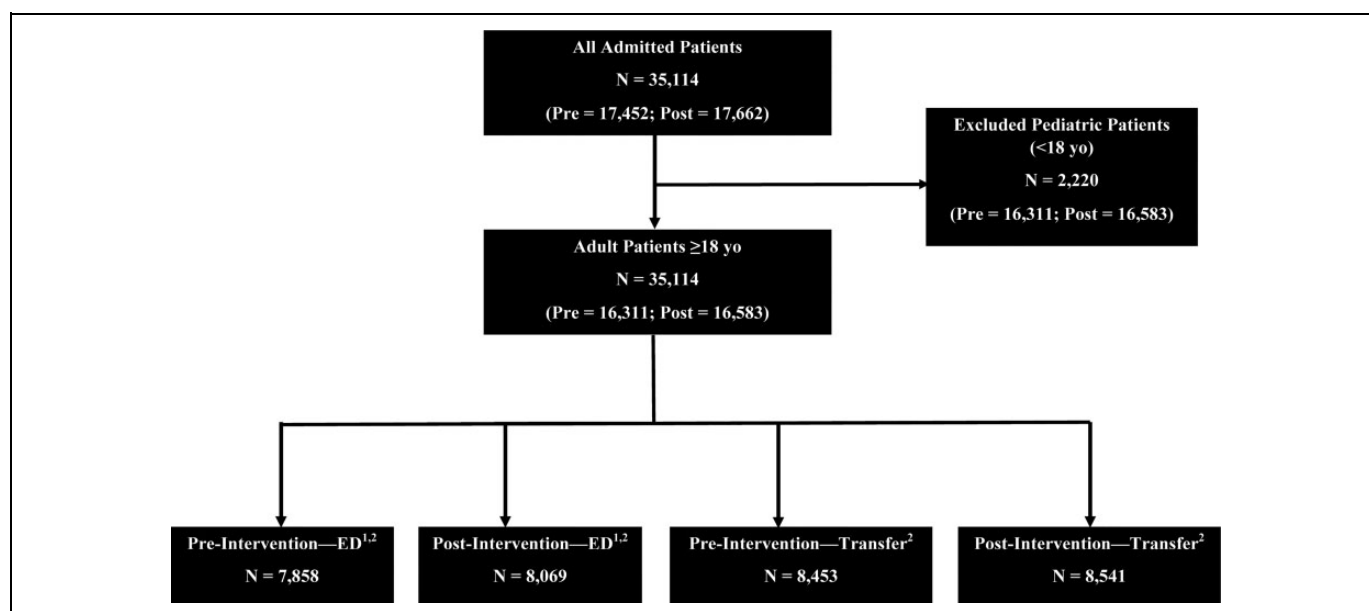


Figure 1. Flowchart of study the population. ¹Used for primary analysis—before-and-after analysis. ²Used for sensitivity analysis—difference-in-difference analysis.

outcome, the proportion of patients for whom a DNR order was placed in the ED was evaluated for the pre- and postintervention periods. Bivariate analyses for the association between the intervention status and the proportion of DNRs ordered in the ED were evaluated using generalized linear models to identify the relative risks (RR) and the 95% CI. This same approach was used with the secondary outcomes of the proportion of in-hospital mortality and ICU admissions. All tests were considered significant at $\alpha < .05$ using 2-tailed tests. Analyses were completed using SAS version 9.4 (SAS Institute, Cary, North Carolina).

Sensitivity analysis. One concern with our before-and-after design was that the possibility of some temporal-related changes that may have occurred over time unrelated to the intervention. In order to determine whether we could have attributed the change in DNR orders due to the intervention that took place in the ED, we performed a sensitivity analysis using a difference-in-difference design. In this approach, we included a comparison group of patients who were transferred to the hospital and admitted as a comparison group. We then evaluated the change in proportion of any DNR placed in the group that received the intervention (ED patients who were admitted), as well as the change in proportion of DNR placed in the group who were transferred. The main reason for including this type of analysis was to also ensure the parallel trends assumption, which would allow us to assess whether the trends in the intervention group would resemble the trends in the control group in the absence of the intervention. To provide evidence for this assumption, we evaluated the trends in both the treatment and control groups in the preintervention period only. We fit an interaction term between the time period (month) and the treatment group

to determine if there was any significant change over time between the intervention and control groups.

Results

Description of Study Population

Overall, there were 15 927 adult patients admitted through the ED in the primary analysis (Figure 1). There were 7858 and 8069 patients in the preintervention and postintervention groups, respectively. The plurality of patients were 65 years or older (43.0%), non-Hispanic (95.3%), Christian (58.7%), and of urgent acuity (99.6%; Table 1). Demographics of study subjects did not differ between the pre- and postintervention groups.

Primary Outcome: DNR Ordered in the ED

After the intervention, the proportion of patients with a DNR CS documented in the patient's chart while in ED increased from 0.4% to 5.3% (RR: 12.5, 95% CI: 5.2-29.9; Table 2). Emergency department CSs were also much less likely to be missing in postperiod (pre: 98.6% vs post: 2.4%; Figure 2). Overall, in the inpatient and ED settings, there was a small increase in any DNR CS (pre: 10.0% vs post: 12.6%; $P < .001$). This overall increase in DNR codes was due to increased ED codes, as there was no change in inpatient DNR codes after the intervention (RR: 0.97, 95% CI: 0.88-1.07; Table 2).

Secondary Outcomes: Encounter Mortality, ICU Admission, and Hospital LOS

There was no difference in hospital encounter mortality after the intervention when compared to before the intervention (pre: 4.1% vs post: 4.0%, RR: 0.97, 95% CI: 0.83-1.13;

Table 1. Characteristics of Population in the Preintervention and Postintervention Periods.

Characteristic	Preintervention		Postintervention		χ^2 P value
	September 2017 to March 2018		May 2018 to October 2018		
	n = 7858		n = 8069		
	n	%	n	%	
Age (years)					
18-44	1736	22.1	1695	21.0	.124
45-64	2796	35.6	2844	35.2	
≥65	3326	42.3	3530	43.7	
Gender					
Female	3559	45.3	3665	45.4	.870
Male	4299	54.7	4404	54.6	
Marital status					
Married	3369	42.9	3576	44.3	.178
Not married	3799	48.3	3812	47.2	
Unknown/missing	690	8.8	681	8.4	
Ethnicity					
Hispanic	274	3.5	284	3.5	.340
Non-Hispanic	7497	95.4	7675	95.1	
Unknown/missing	87	1.1	110	1.4	
Religion					
Christian	4600	58.5	4750	58.9	.674
Non-Christian	3258	41.5	3319	41.1	
Acuity					
Less urgent/nonurgent	31	0.4	31	0.4	.917
Urgent	7827	99.6	8038	99.6	

Table 2. Associations Between Intervention and Study Outcomes.

	Preintervention		Postintervention			
Outcomes	n = 7858		n = 8069		Measure of Association/95% CI	
Primary outcome: DNR ordered	n	%	n	%	RR	95% CI
ED	33	0.4	424	5.3	12.5	5.2 to 29.9
Inpatient	773	9.8	772	9.6	0.97	0.88 to 1.07
Secondary outcome: mortality	n	%	n	%	RR	95% CI
Overall	324	4.1	322	4.0	0.97	0.83 to 1.13
Among those with ED DNR	10	30.3	48	11.3	0.37	0.24 to 0.59
Secondary outcome: ICU admit	n	%	n	%	RR	95% CI
Overall	2007	25.5	2110	26.2	1.02	0.97 to 1.08
Among those with ED DNR	12	36.4	100	23.6	0.65	0.42 to 1.01
Secondary outcome: hospital LOS	Median	IQR	Median	IQR	MD	95% CI
Overall	4	2-7	4	2-7	0.09	−0.1 to 0.29
Among those with ED DNR	3	1-6	4	2-7	0	−0.02 to 0.03

Abbreviations: DNR, do not resuscitate; ED, emergency department; ICU, intensive care unit; IQR, interquartile range; LOS, length of stay (days); MD, mean difference; RR, relative risk.

Table 2). There was also no change between groups in the proportion of patients admitted to the ICU (RR: 1.02, 95% CI: 0.97-1.08) and no change in hospital LOS (mean difference: 0.09 days, 95% CI: −0.10 to 0.29; Table 2). Similarly, there were no changes in hospital mortality, ICU admission, and hospital LOS in the subgroup of those with a DNR CS in the ED (Table 2).

Sensitivity Analysis: Difference-in-Difference Models

Using a difference-in-difference model, the sensitivity analysis estimated the effect of the intervention after accounting for any underlying temporal changes in DNR CS. For this sensitivity analysis, the comparator group were inpatients admitted via transfer, admissions for elective procedures, and direct

admissions from clinics (not through the ED; $n = 16\,994$). In the preintervention period, there was no difference in monthly proportions of a DNR code overall between patients admitted through the ED and those who were non-ED admissions (RR: 0.98, 95% CI: 0.93-1.02), suggesting the parallel trends assumption was not violated. The difference-in-difference estimator was 1.43 (95% CI: 1.01-1.96; Figure 3). This indicates a 1.43 times increase in the proportion of overall DNR status in the patients admitted to the ED compared to the control group over time from pre- to postintervention.

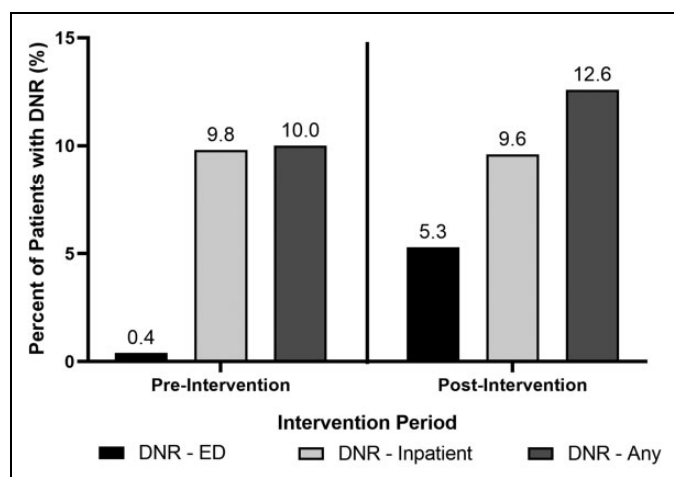


Figure 2. Before and after analysis: proportion of do-not-resuscitate (DNR) orders placed by service and intervention time period.

Discussion

After our hospital added a mandatory CS order to our bed request order set for ED admissions, we observed a large increase in the proportion of patients with CS defined prior to transfer to inpatient setting (2.4% pre, 98.6% post; $P < .001$). This is in accordance with previous studies that have found standardization of CS documentation improves its clarity and completeness, and the effect size was larger than previously reported effects from electronic medical record-based initiatives.^{16,17}

Patients' DNR preferences were 12.5 times (95% CI: 5.2-29.9) as likely to be identified prior to admission to the inpatient setting. We observed no change in selecting DNR status within the inpatient setting, thereby refuting the hypothesis that the ED is an inappropriate setting for CSDs or that "the DNR concept runs contrary to the credo of EM."¹⁶ There is no consensus on what consists of a standard CSD as it is important to provide information about CPR in the context of the patient's illness. However, our study is suggestive that these complicated conversations may be occurring more frequently with the implementation of the mandatory order rather than as a "check the box" question. To our knowledge, no study to date has reported outcomes when a CS order is mandated in the ED.

In the postintervention group, we observed a decrease in mortality among patients selecting DNR status while in the ED. This likely reflects an improved ability to identify DNR preferences in less moribund patients though our hospital's policy rather than a survival benefit owing to DNR status. We observed an additive effect on the proportion of patients selecting DNR status in all settings (10% pre, 12.6% post; $P <$

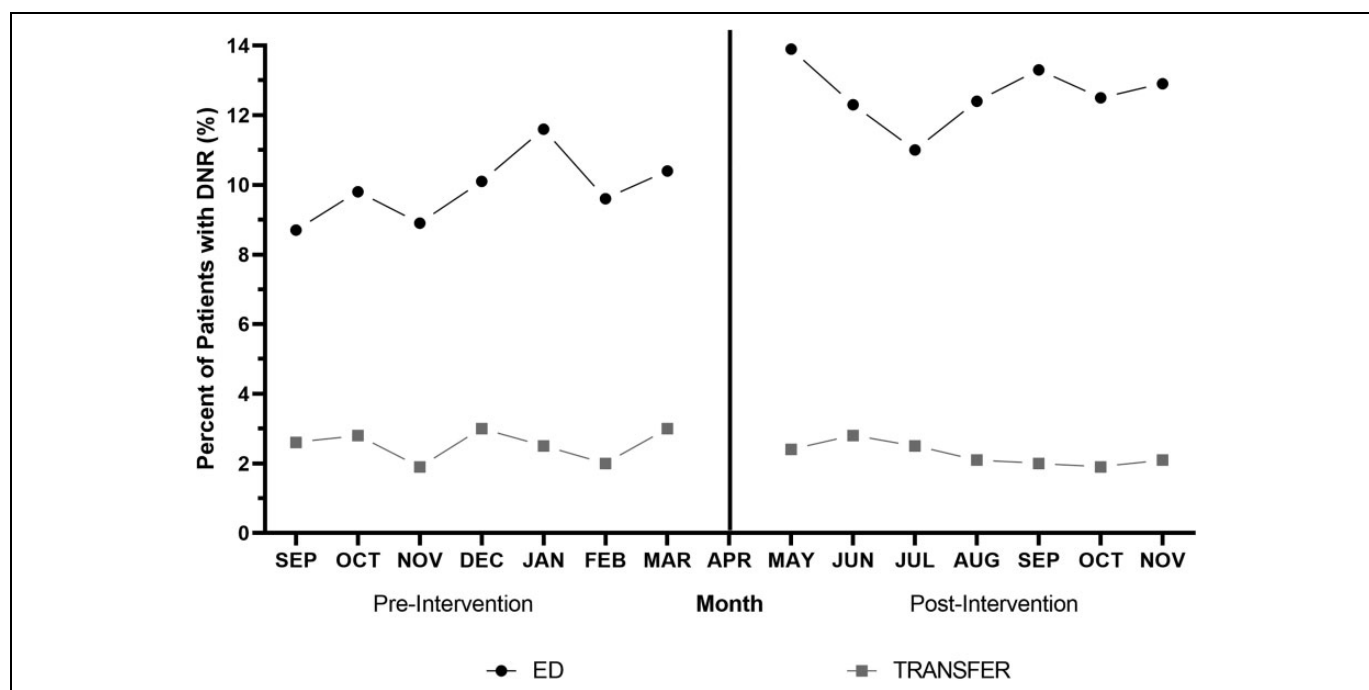


Figure 3. Difference-in-difference sensitivity analysis: comparison of do-not-resuscitate (DNR) proportions between emergency department (ED) and non-ED admissions by intervention period.

.001). This is in accordance with previous findings that a communication intervention decreases patients' preferences for CPR and suggests that enquiring about CS in the ED identified some patients with DNR preferences who were not being identified in the inpatient setting.¹⁸ Future study is perhaps warranted to identify patient factors related to this.

Our study has several limitations. As a pre-post analysis, our results may suggest, but cannot establish, a causal relationship between the intervention and the outcomes. As this is a single-institution study, the generalizability of our results is limited. Due to the limitations of our quality improvement-derived data set, we were unable to identify which specific patients with DNR preferences were captured after the intervention who were being missed prior to the intervention. We also did not systematically observe the nature of the CS discussions that occurred after the intervention and thus are not able to comment on the quality of these discussions.

Conclusion

In our study, we found that implementing a mandatory code status order for patients admitted from the Emergency Department to the inpatient setting resulted in a substantial increase in the rate of identifying DNR preference without any decrease in patients' selecting DNR status in the inpatient setting. These results suggest that the ED may be an appropriate setting for CS discussions. It has been previously recognized that the highly individual nature of CS and goals-of-care discussions make it difficult to study them with randomized controlled trials so mixed-methods studies may have to supplement our knowledge.¹⁹ We would like to further investigate the quality of goals of care and CSDs in the ED using additional methods, including systematic observations of these discussions and structured interviews of EMPs. Such mixed-methods studies can investigate EMPs' comfort with goals of care and CSDs and possibly identify barriers to effective end-of-life discussions taking place in the ED. Results of such studies may aid in the development of educational interventions to improve end-of-life care in the ED.

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Declaration of Conflicting Interests

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