The do-not-resuscitate order: associations with advance directives, physician specialty and documentation of discussion 15 years after the Patient Self-Determination Act

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ABSTRACT

Background: Since the passage of the Patient Self-Determination Act, numerous policy mandates and institutional measures have been implemented. It is unknown to what extent those measures have affected end-of-life care, particularly with regard to the do-not-resuscitate (DNR) order.

Methods: Retrospective cohort study to assess associations of the frequency and timing of DNR orders with advance directive status, patient demographics, physician's specialty and extent of documentation of discussion on end-of-life care.

Results: DNR orders were more frequent for patients on a medical service than on a surgical service (77.34% vs 64.20%, $p = 0.02$) and were made earlier in the hospital stay for medicine than for surgical patients (adjusted mean ratio of time from DNR orders to death versus total length of stay 0.30 for internists vs 0.21 for surgeons, $p = 0.04$). 22.18% of all patients had some form of an advance directive in their chart, yet this variable had no impact on the frequency or timing of DNR ordering. Documentation of DNR discussion was significantly associated with the frequency of DNR orders and the time from DNR to death (2.1 days with no or minimal discussion vs 2.8 days with extensive discussion, $p<0.01$).

Conclusions: The physician's specialty continues to have a significant impact on the frequency and timing of DNR orders, while advance directive status still has no measurable impact. Additionally, documentation of end-of-life discussions is significantly associated with varying DNR ordering rates and timing.

The do-not-resuscitate (DNR) order was introduced as a way to provide competent patients the chance to express their actions regarding their right to refuse treatment.[1–3] However, numerous studies conducted in the USA during the late 1980s and early 1990s found that factors such as the patient's age,[4–8] diagnosis[4 6–12] and sex,[6] in addition to the physician's specialty,[13] the medical institution[8] and the hospital unit,[6] were all significantly associated with variable patterns of DNR ordering. Perhaps most importantly, the majority of those studies showed that patients were infrequently involved in DNR decisions,[4–6 9–11 13–15] in some cases even when they were judged mentally competent.[9] In response to these findings and what was then a growing perception in the healthcare community that there were substantial ethical shortcomings in end-of-life care, the Patient Self-Determination Act (PSDA) was passed in 1991. This US federal law required that healthcare institutions receiving any type of federal funding inform their patients about their medical decision-making rights, including the right to refuse life-sustaining care such as cardiopulmonary resuscitation.[16] After the passage of the PSDA, data from the Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments (SUPPORT) conducted from 1989 to 1994 revealed that patient involvement in DNR orders (including the influence of advance directives) was still limited and that physician-related factors were still highly influential in end-of-life care.[17–21]

Have the patterns of DNR order writing changed in hospitalised patients 15 years after the passage of the PSDA? In order to address this question, we carried out a retrospective cohort study of patients who were hospitalised and died in one Midwestern US academic hospital in a single calendar year to directly compare the influence of patient-, physician-, and system-specific factors on patterns of DNR ordering. Here we report our results and compare them with findings from studies conducted around the time of the passage of the PSDA and the SUPPORT trial.

METHODS

Data collection

We conducted a retrospective chart review of all patients who died in 2005 at Indiana University Hospital, a 390-bed, tertiary-care hospital in downtown Indianapolis, Indiana. Initial information regarding the age, sex, race, diagnosis-related group (DRG) diagnosis, cause of death and discharging (primary) service was collected for all patients by accessing the billing records for the calendar year 2005.

Secondary patient information was collected through retrospective chart review. Each medical chart was reviewed by one of the authors and information was collected using a data collection sheet of the authors' design. Each patient's length of stay was recorded. We also recorded the number of days between entry of an official DNR order in the patient's chart and the patient's death. Because the range of lengths of stay was so large, we controlled for length of stay by examining the timing of DNR orders as a ratio of the time between DNR order entry and death to overall length of stay. Secondary information collected from each chart included the presence of a written

DNR order in the patient's chart during the terminal encounter (defined as a patient's hospital stay that ended in death); whether the DNR order was a full or a limited order; whether the patient had a written advance directive (and type of advance directive) and whether any discussions regarding the DNR order were documented in the chart. The data regarding DNR discussions came from analysis of DNR notes in the medical record. We were not able to specifically collect data on who actually participated in each DNR discussion (ie, the patient, the patient's family, and so on), because of inadequate documentation in the medical records.

When there was documentation of discussion in the medical record between a patient, the patient's family, chaplains, nurses, powers of attorney, and the hospital care team regarding DNR order status, we subjectively categorised the extent of documentation of the DNR discussions as either minimal or extensive. We defined minimal and extensive discussion based on the number of sentences in the medical record's progress or order notes in addition to the content of those notes. A DNR note that contained more than two sentences describing discussion about DNR orders and whose content we interpreted as ''discussion beyond mere documentation that a dialogue about DNR took place'' was considered extensive.

Statistical analysis

Descriptive statistics for all the variables of interest were calculated. χ^2 Tests were used to examine the association of DNR status and the physician's specialty, advance directive status, the extent of documentation of DNR discussion, gender and race. An association between age and DNR status was assessed with the Student t test. To control for variability in hospital length of stay, we calculated the ratio of the time from DNR order to death versus the length of hospital stay and used Wilcoxon rank sum tests to test for significance.

Table 1 Relation of patient- and physician-dependent variables with frequency of DNR ordering

Variable	No DNR order	DNR order	p Value
Age (SD), years	54.3 (15.6)	58.04 (15.7)	0.08
Gender			
Female	31	103 (76.9%)	0.24
Male	44	106 (70.7%)	
Race			
Black	8	24 (75%)	0.17
White	61	177 (74.4%)	
Hispanic	4	3 (42.9%)	
DRG diagnosis			
Acute respiratory failure	8	22 (73.3%)	0.41
Cancer	17	59 (77.6%)	
Cardiac	6	6 (50%)	
Cirrhosis	10	18 (64.3%)	
MOSF/sepsis	6	13 (68.4%)	
Renal failure	4	12 (75%)	
Other	24	79 (76.7%)	
AD Status			
No	57	164 (74.2%)	0.66
Yes	18	45 (71.4%)	
Documentation of DNR discussion			
No	33	8 (19.5%)*	<0.0001
Yes	42	201 (82.7%)*	

* $p<0.05$.
AD, advance directive; DNR, do not resuscitate; DRG, diagnosis-related group; MOSF, multi organ system failure.

Logistic regression was used to examine the multivariate associations of all factors with $p<0.20$ at the univariate level and the two-way interactions between physician's specialty and the other variables. Analysis of variance (ANOVA) was used to determine whether the variation in time between admission to DNR order, time between DNR and death, and the ratio of time between DNR order and death versus length of stay could be accounted for by factors with $p<0.20$ at univariate level, as well as to examine any two-way interactions between these factors. Backwards model reduction strategy was used to derive the reduced models, with only those factors and interactions remaining in the models that were significant at the $\alpha = 0.10$ level. Adjusted means and 95% confidence intervals were calculated with these models. When significant effects were found, the Tukey–Kramer multiple comparisons test was used to identify differences between the means. Only patients with a stay longer than 5 days were included in the ANOVA models for the ratio of time between DNR order and death versus length of stay.

RESULTS

Study population

Of the 348 deaths at Indiana University Hospital during the 2005 calendar year, 284 (82%) of the charts were retrieved and analysed. Fifty-one deaths were not analysed, because the patients were younger than age 18, while the remaining 13 charts not studied were either under review by regulatory and quality control committees or contained data in the actual medical records that conflicted with the billing records retrieved. Thus, 284 deaths of the 12 005 admissions to the hospital during the 2005 calendar year were reviewed (2.4% overall). Of these 284 patients, 209 (73.6%) had a DNR order at the time of death. Of those 209 patients, 126 (60.3%) had a full DNR and 83 (39.7%) had a limited DNR at the time of death. Men comprised 53.0% and women 47.0% of all deaths. The average age for the entire cohort was 57.1 years. Univariate analysis demonstrated no significant association of patients' gender, race, age, DRG diagnosis or advance directive status with the frequency of DNR ordering (table 1).

DNA orders and physician specialty

Within the studied cohort, 71.5% of patients were admitted to a medicine or medicine subspecialty service and 28.5% were admitted to a surgery or surgical subspecialty service. Critical care medicine (33%) and general surgery (14%) were the most frequently represented services (fig 1). Three services had only one patient die on their inpatient service. Overall, the DNR order frequency at the time of death was higher for patients on medicine or medicine subspecialty services than on surgical services (77.3% vs 64.2%, $p = 0.02$) (fig 1). Surgical services wrote full DNR orders more frequently than medical services (67.3% vs 58%, $p = 0.23$), however the difference was not statistically significant.

Timing of inpatient DNR orders

Univariate analysis revealed no significant association of patients' gender, race or advance directive status with the timing of DNR ordering (fig 2). After patient and physician variables were controlled for, the mean time from admission to DNR order was significantly longer on a surgical than on a medicine service (9.8 days vs 5.1 days, respectively, $p<0.001$). For patients in this study cohort, lengths of hospital stay were highly variable. In order to control for this variability and to

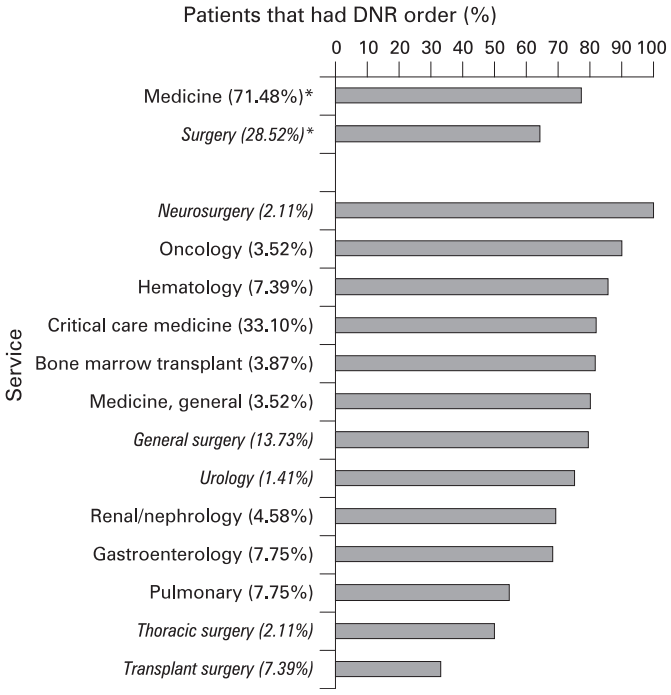

Figure 1 DNR orders by service at time of death. Italics indicate a surgical or a surgical subspecialty service. The percentage of deaths each service had of total study population is shown in parentheses. Services whose percentage of overall deaths was less than 1% were excluded. *p<0.05.

make comparisons between DNR orders written for patients with long versus short lengths of hospital stay more meaningful, we controlled for hospital length of stay in our multivariate analysis and found that the calculated ratio of time between DNR order and death to overall length of stay also differed between patients on surgical and medicine services: surgeons still wrote DNR orders later in the hospital course than internists (ratio 0.21 vs 0.30, respectively, p = 0.04) (fig 2). Thus, we found that medicine patients received DNR orders 9% earlier in hospital course than surgical patients, after length of hospital stay was controlled for. For all patients, full code DNR orders were written later in hospital course than limited code DNR orders (0.31 for full code and 0.19 for limited code, p<0.05) (fig 2), meaning that patients with a limited code received their DNR orders 12% earlier in hospital course than patients who had a full DNR order.

DNR orders and advance directives

We found written advance directives in the charts of 22.2% of all patients (32.1% of surgery patients vs 17.7% of medicine patients) (fig 3). Living wills were the most common type of advance directive (fig 3). In the univariate analysis, there was no significant association between having an advance directive in the chart and having a DNR order written during the terminal admission: 71.4% of patients with an advance directive died after a DNR order, vs 74.2% of patients without an advance directive (p = 0.66) (table 1).

DNR orders and documentation of discussion

The proportion of patients on all inpatient services who had any form of documentation of DNR discussions present in the chart was highly variable, as was the proportion of patients who had extensive documentation of DNR discussions (fig 4). Four per

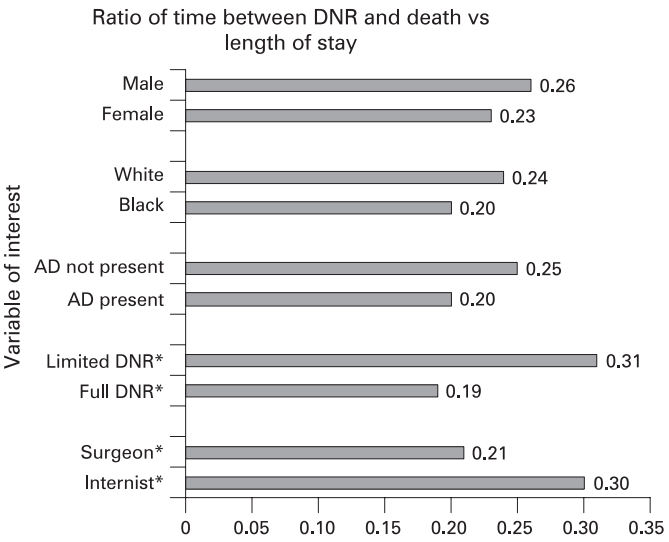

Figure 2 Timing of DNR orders. Length of hospital stay is controlled for, and data are presented as the mean ratio of time between ordering of a DNR and the patient's death. *p<0.05. AD, advance directive.

cent of all patients for whom DNR orders were written had no documentation of a DNR discussion in the chart. We found some form of documentation of DNR order discussions for 89.7% of all patients who died on a medicine service (50.7% extensive discussion) vs 75.3% of all patients who died on a surgical service (43.2% extensive discussion).

In all, 75 (26.4%) patients in our cohort died without a written DNR. Of these, 42 (56.0%) patients had documentation of a DNR discussion that did not result in a DNR order (table 1). The extent of discussion, as documented in patients' charts, was associated with a greater likelihood of having a DNR order subsequently written (p<0.0001). Of patients who had some form of documentation of DNR discussions in the chart, 82.7% went on to have a DNR order written (table 1). However, in patients with no evidence of a documentation of DNR discussion, only 19.5% subsequently had a DNR ordered (table 1). After further discrimination between extensive, minimal and no documentation of discussion, we found that of patients who had extensive documentation of discussion,

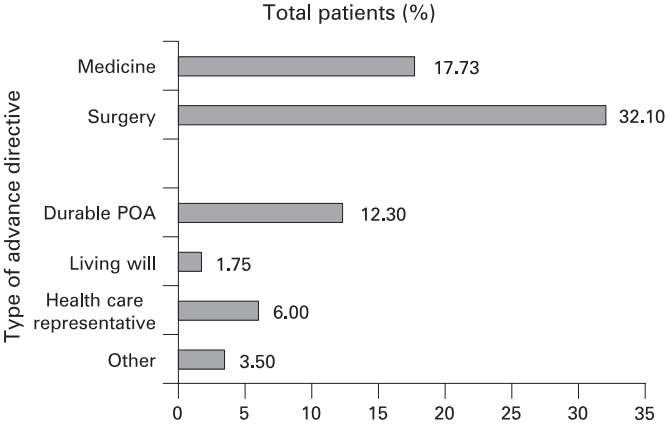

Figure 3 Advance directive status (all patients included). The top set of data represents the total percentage of medical and surgical patients who had advance directives in their chart. The bottom set of data represent the main categories of advance directives that were in all of the charts. POA, power of attorney.

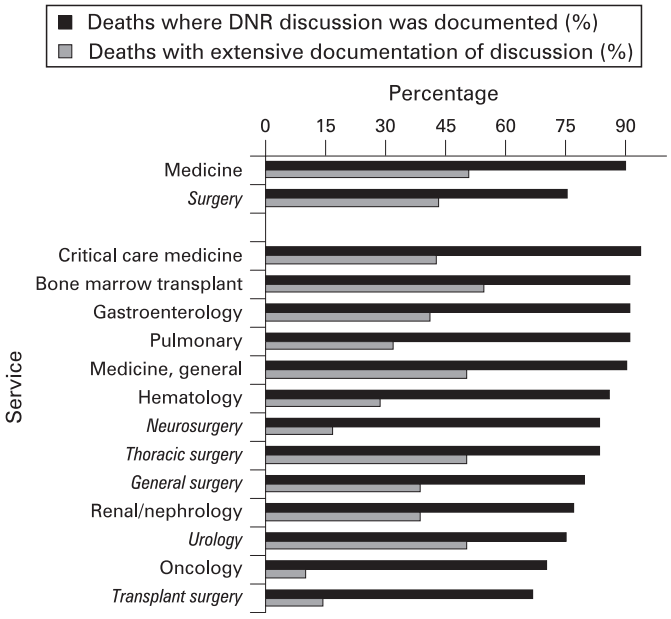

Figure 4 Physician service and extent of documentation of discussion. Italics indicate a surgical or a surgical subspecialty service. Services whose percentage of overall deaths was less than 1% were excluded.

83.8% subsequently went on to have a DNR ordered. Of patients with minimal or no documentation of discussion, 67.6% subsequently went on to have a DNR ordered ($p<0.01$).

In our multivariate model, controlling for patient characteristics and physician specialty, there was a clear association between the extent of documented DNR discussion and the timing of DNR orders. When length of stay was controlled for, the presence of extensive documentation surrounding DNR orders was associated with DNR orders being written earlier in a hospital course, as manifested by the 32% increase in average time from DNR to death in patients with extensively documented DNR orders compared with patients who had minimal or no documentation (2.8 days for extensive documentation of discussion vs 2.1 days for minimal or no documentation of discussion, $p<0.01$). There was no significant association in any patient group between the presence of an advance directive in the medical chart and the amount of discussion documented.

DISCUSSION

The passage of the PSDA, in addition to data from numerous studies associated with end-of-life care during the mid 1990s, represented an acknowledgement by the government and the healthcare community at large that there were severe shortcomings in doctor–patient communication that were ultimately limiting patients' ability to realise end-of-life preferences.[18 19 22 23] While these inadequacies in end-of-life care are relevant to countries outside the USA that are experiencing similar ethical failings in optimising patient autonomy,[24 25] our focus was to measure the influence of policy initiatives specific to the USA.

In our study, which examined the patterns of DNR ordering for patients in a tertiary care medical centre, we found that physician-related variables, such as specialty, still have a significant impact on the frequency and timing of DNR orders, whereas the influence of advance directives and other patient-related variables had much less or no measurable impact. Our data also represent what we think is the first evidence directly taken from a retrospective chart review after passage of the PSDA that correlates the degree of documentation of DNR discussions with patterns of DNR ordering: we found that the extent of documentation of DNR discussions varies with physician specialty and that the extent of documentation of end-of-life discussions is associated with increased rates of DNR ordering and with earlier writing of DNR orders.

Physician specialty and patterns of DNR ordering

In our study, the frequency of DNR ordering among patients who died in the hospital was higher for patients on medicine or medicine subspecialty services than for patients on surgical or surgical subspecialty services (77.3% vs 64.2%, $p = 0.02$). When length of hospital stay was controlled for, medicine patients also received DNR orders earlier in their hospital stay than surgical patients (the ratio of time between DNR and death to length of stay was 0.30 for internists and 0.21 for surgeons, $p = 0.04$). Other investigators have reported wide variability in patterns of DNR ordering between physician specialties (fig 1).[12 13 17 26–29] Specifically, surgeons write DNR orders less frequently and later in the hospital stay than internists.[13 17] The fact that we found persistence of these patterns of writing of DNR orders (figs 1 and 2) implies that the most important influences of patterns of DNR ordering are deeply ingrained in medical and organisational practice. Our findings suggest that 15 years after the passage of the PSDA, the patterns of DNR order writing of different physician specialists remain stable.

Advance directives and patterns of DNR ordering

In our cohort, advance directives continued to exert a limited influence on the timing of DNR orders.[20 30] Over the past 15 years, the proportion of Americans who have completed advance directives—one of the most recognised means for patients to express their goals and values with respect to end-of-life planning—has remained steady at between 20% and 30%.[20 31 32] Similarly, we found written advance directives in the charts of 22.2% of patients in this cohort. While nearly 25% of patients who had an advance directive did not have a DNR order at the time of their terminal hospitalisation, this proportion was nearly the same for patients who did not have an advance directive (table 1). Overall, we found no statistically significant association between advance directives and the frequency or timing of a DNR order (table 1 and fig 2), and no association between advance directives and the extent of documentation of discussions of DNR orders for any subset of patients.

Advance directives have long been championed as a way for patients to exert their personal autonomy and yet, for all their theoretical strengths, appeared to exert little influence on the timing of DNR orders in our study. Previous research has suggested that patients participated directly in DNR discussions only 19% of the time, with family members or surrogates making primary decisions 78% of the time.[13] Although the hospital records examined in our study did not permit an evaluation of how often patients compared with family members or surrogates participated in DNR discussions, we conclude that advance directives are likely not to lead to greater direct participation by patients in decision-making about DNR orders.

Timing of inpatient DNR orders

The SUPPORT study had found that often DNR orders are written less frequently and later than patients would prefer.[17] Research has also shown that delayed DNR orders tend to increase the total economic costs compared with full code and

admission DNR orders.[21 33] However, the timing of the majority of DNR orders written for our cohort suggests that DNR orders are still written very late during a patient's hospital course. The median time from order to death for all patients who had DNR orders written was about 2 days in our study, which is very similar to that found in research conducted before[8 9 13 15] and shortly after[17] passage of the PSDA. In a study of DNR orders conducted before its passage, Maksoud and colleagues found that the majority of all DNR orders written for inpatients who eventually died were written only 1 or 2 days before death.[13] The SUPPORT study also found that the majority of DNR orders were written within 3 days of patients' deaths.[17]

The reluctance of doctors to write DNR orders earlier in patients' hospital course is most likely related to diverse considerations, including the unpredictable nature of critical illness and the emotional and time-intensive character of this type of conversation.[34] Many initiatives over the past decade have been aimed at improving care for the dying with regard to DNR orders: ethics committees,[35] palliative care consultation services,[36] medical school competency-based curricula for students and residents designed to teach and evaluate skills such as effective communication and ethical awareness,[37] and the hospice care movement.[38] Despite all of these interventions, our data suggest that patterns of DNR ordering have changed very little since the passage of the PSDA.

Documentation of DNR order discussion and DNR ordering patterns

The clear association we identified between the extent of documentation of DNR discussions with both the frequency and the timing of DNR orders raises the hypothesis that more extensive end-of-life discussions may allow final end-of-life care plans to evolve earlier in a patient's hospital course. Overall, we found documentation of DNR discussion in the charts of 85.6% of all patients in our cohort (table 1). This figure is slightly higher than numbers from similar studies conducted in Europe, which found DNR discussion rates as reported in physician questionnaires ranging from 44%–78%.[25 39 40]

More extensive documentation was associated with over a 30% increase in the time between DNR ordering and death (the DNR order was made 30% earlier in the hospital course) in comparison with minimal or no documentation of discussion. Additionally, the extent of documentation of DNR discussions was associated with a greater likelihood of having a DNR order written in the chart before death: 83.8% of patients who had extensive documentation of discussion eventually had a DNR order written, compared with 67.6% of patients who had either minimal or no documentation of discussion ($p<0.01$).

Due to the nature of our study, we can only make assumptions about how the degree of documentation surrounding DNR discussions correlated with the actual amount of discussions that occurred. However, presuming that greater documentation followed from greater discussion, this finding suggests that more discussion between physicians and patients or surrogates may lead to earlier and more frequent writing of DNR orders. Regardless of the correlation between documentation of discussion and the amount of actual discussion that takes place, that fact that extensive documentation was present in less than half of all charts is troubling, given the gravity of end-of-life decisions. Better and more extensive documentation helps everyone: transitioning teams of physicians and nurses, consultant physicians, even lawyers and quality-control analysts who review charts after patients' death. The fact that we were consistently unable to determine who actually participated in each DNR discussion is a severe shortcoming in the medical documentation we encountered and if this shortcoming were remedied would most likely lead to improved overall end-of-life care.

Our study has several important limitations. We did not assess severity of illness or injury and therefore could not correlate prognosis with patterns of DNR ordering. Short-term prognosis has been measured as one of the most important variables influencing the timing of DNR orders, and thus not controlling for patient prognosis could have influenced our findings. Additionally, the fact that we found no association between diagnosis and patterns of DNR ordering is surprising. We hypothesise that this was most likely due to the imprecise way in which the diagnosis categories were assigned to each patient by the coding department and each primary team at Indiana University Hospital: patients often had multiple diagnoses and yet only one DRG recorded as the primary diagnosis; there were so many different diagnoses that it was difficult to group patients usefully in order to quantify the relation with DNR orders; and the number of severely ill patients distorted the value of each individual diagnosis in terms of its impact on end-of-life decision-making. Finally, the generalisability of our results is difficult to ascertain, given that our patient population was taken from an academic referral centre. We do not know how our findings might differ from those for other hospital care settings, such as general community hospitals or hospitals outside the USA. However, the patient populations examined in most other studies on end-of-life care have been taken from similar academic centres and thus our results may be comparable with those from earlier studies, including those performed before and after the passage of the PSDA.[8 9 13 15 17 41] Further research is needed to examine the correlation between documentation patterns and the actual practice of physicians, and on measures to increase doctor–patient discussion of end-of-life issues.

Our data suggesting that more extensive documentation of discussion about end-of-life wishes is associated with more and earlier DNR ordering raises the hypothesis that more extensive documentation may reflect more extensive actual discussions. In general, physicians exert a large influence over patients' end-of-life decision-making. In a landmark study conducted by Prendergast and Luce in 1997, over 90% of patients agreed with a physician's recommendation to limit life support.[42] Likewise, Keenan and colleagues found that 88% of patients and families consented to withdrawal of life support after the first or second discussion on the topic had been initiated.[43] Our data may be further evidence that increased initiation of discussion about end-of-life wishes leads to earlier and more frequent DNR ordering and is especially relevant given the lack of influence that advance directives seem to have on end-of-life care. This finding also correlates with those of other studies that measured the impact of documentation of discussion on withdrawal of care without the use of DNR orders.[43] While the SUPPORT study showed that there are many barriers and limitations to improving doctor–patient communication, our findings suggest that when end-of-life discussions are more extensive, DNR orders may be written earlier in the course of a terminal hospitalisation.

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