

Advance Care Planning Norms May Contribute to Hospital Variation in End-of-Life ICU Use: A Simulation Study

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Background. There is wide variation in end-of-life (EOL) intensive care unit (ICU) use among academic medical centers (AMCs). Our objective was to develop hypotheses regarding medical decision-making factors underlying this variation. **Methods.** This was a high-fidelity simulation experiment involving a critically and terminally ill elder, followed by a survey and debriefing cognitive interview and evaluated using triangulated quantitative-qualitative comparative analysis. The study was conducted in 2 AMCs in the same state and health care system with disparate EOL ICU use. Subjects were hospital-based physicians responsible for ICU admission decisions. Measurements included treatment plan, prognosis, diagnosis, qualitative case perceptions, and clinical reasoning. **Results.** Sixty-seven of 111 (60%) eligible physicians agreed to participate; 48 (72%) could be scheduled. There were no significant between-AMC differences in 3-

month prognosis or treatment plan, but there were systematic differences in perceptions of the case. Case perceptions at the low-intensity AMC seemed to be influenced by the absence of a do-not-resuscitate order in the context of norms of universal code status discussion and documentation upon admission, whereas case perceptions at the high-intensity AMC seemed to be influenced by the patient's known metastatic gastric cancer in the context of norms of oncologists' avoiding code status discussions. **Conclusions:** In this simulation study of 2 AMCs, hospital-based physicians had different perceptions of an identical case. We hypothesize that different advance care planning norms may have influenced their decision-making heuristics. **Key words:** terminal care; palliative care; intensive care; physician decision making; heuristics; cancer; simulation; variation; Medicare; national health policy; qualitative research. (*Med Decis Making* 2014;34:473-484)

The use of intensive care at the end of life varies substantially across US hospitals, with little evidence that higher use is associated with long-term health benefits.¹⁻⁴ This apparent inefficiency has prompted policy makers to propose policy reforms to reduce unnecessary intensive care unit (ICU) use. However, without knowing the root cause of variation in end-of-life ICU use, it is impossible to develop effective interventions. Of particular interest are the influences of provider and institutional factors.⁵

Our recent observational study of decision making in the ICU of one low-intensity and one high-intensity academic medical center (AMC) in the same state and health care system found differences in physician practice patterns and institutional norms associated with life-sustaining treatment use and ICU length of stay.⁶ Specifically, we identified differences in goals of life-sustaining treatment, determination of when a patient is "dying," relative concerns about harms of commission versus omission, and physician self-efficacy for decisions to limit treatment. These social norms resulted in time-limited trials of life-sustaining treatment at the low-intensity AMC and open-ended life-sustaining treatment use at the high-intensity AMC. These norms of decision making explain some of the differences in the AMCs' nationally profiled end-of-life ICU use through their influence on ICU length of stay, conditional upon

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admission. However, it is possible that there exist differences in norms governing hospital-based physicians' "upstream" decisions to admit patients to the ICU in the first place.

The purpose of the current study was to develop hypotheses regarding mechanisms underlying decisions made by hospital-based physicians regarding initial ICU admission for critically and terminally ill elders in these 2 AMCs using high-fidelity simulation. We used simulation because naturalistic study of unscheduled and time-pressured ICU admission decision making is infeasible. We hypothesized that physicians from the high-intensity AMC would be more likely to admit the identical patient to the ICU and that these decisions would be influenced by institutional norms rather than differences in clinical reasoning.

MATERIALS AND METHODS

Hospital Sample

We purposively sampled 2 AMCs in the same state and health care system at opposite extremes of end-of-life treatment intensity based on Dartmouth Atlas Medicare fee-for-service measures.³ Chronically ill elders who died between 2003 and 2007 at the low-intensity AMC were less likely to be admitted to the ICU (51% v. 74%, $P < 0.001$) or to be mechanically

ventilated (34% v. 45%, $P < 0.001$) than those who died at the high-intensity AMC.⁶

Physician Sample

We recruited hospital-based emergency medicine, hospitalist, and critical care physicians responsible for ICU admission and intubation decisions from staff lists of each AMC via e-mail and telephone. Critical care providers at both AMCs consult regarding ICU admission decisions. To be eligible for participation, physicians had to be board-certified attendings (at the low-intensity AMC, licensed critical care nurse practitioners responsible for ICU admission decisions also were eligible), to be on staff at the institution a minimum of 36 months, and to provide clinical services for a minimum of 2 months per year. At a target sample size of 33 subjects per AMC, we had 80% power to detect a difference in ICU admission as large as seen in Medicare data (i.e., 51% v. 74%).

Simulation

We describe details of the simulation experiment elsewhere.⁷ The simulation included a hospital room, standardized patients played by the same 2 actors used in the published pilot, a medical chart, and bedside vital signs tracings (Figure 1). The case depicted a 78-year-old man with metastatic gastric cancer who was transferred from a skilled nursing home with hypoxia most likely attributable to cancer progression. Subject physicians were asked to imagine that they were summoned to the bedside (in the emergency department [ED] while awaiting a ward bed [for ED physician subjects] or on the ward [for hospitalist and critical care subjects]) approximately 8 hours after the patient's transfer and initial evaluation to assess his gradually increasing tachypnea, tachycardia, hypotension, and hypoxia. The patient and his caregiver wife understood from the oncologist that he was "too weak" for further curative chemotherapy and that he was unlikely to live another 3–6 months. He had stable preferences to avoid ICU admission and intubation documented in a living will at home and a do-not-resuscitate (DNR) order at the nursing home. They shared information about their knowledge of prognosis and treatment preferences only if the physician inquired, and there was no DNR order on the medical chart. During the simulation, a nurse implemented physician orders and provided test results. The simulation ended when the physician articulated a plan and left the room to write a chart note and orders.

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Figure 1 Screenshot of the simulation, as observed from the control room and recorded on video. The simulation included a hospital room, standardized patients, a medical chart, and bedside vital signs tracings. The case depicted a 78-year-old man with metastatic gastric cancer, accompanied by his caregiver wife. The patient was transferred from a skilled nursing facility with hypoxia most likely attributable to cancer progression. Physician subjects were summoned to the bedside by a nurse, approximately 8 hours after the patient's transfer and initial evaluation, to assess his gradually increasing tachypnea, tachycardia, hypotension, and hypoxia.

Data Collection

Four investigators (AEB, DM, RKL, YMH) conducted the simulations in the fall of 2009 at each AMC's simulation center. We recorded treatment decisions made during the live simulation encounter on a standardized form, audio- and video-recorded each encounter, and later transcribed each encounter.

After the encounter, the subject wrote a brief chart note and orders using a web-based survey in an adjacent conference room. The web-based survey also collected subject demographic, training, and employment information and subjects' case perceptions, including closed-ended questions about prognosis and an open-ended question: "What is the cause of the patient's current clinical deterioration?"

Finally, each subject completed a cognitive interview, which we audiotaped and later transcribed (see online appendix). During this interview, we watched a video of the subject's encounter, paused at prespecified triggers (e.g., after scripted actor statements) or every 2 minutes, whichever was more frequent, and said "Tell me what was going on here" to assess the subjects' perceptions of the situation

and to encourage recollection of their clinical reasoning process. To identify sanctions reinforcing norms, when physicians made a treatment decision X (such as admit to the ICU or intubate), we asked, "What would happen to the patient if you didn't do X?" and "What would your colleagues think, do, or say if you didn't do X?" At the end, we explored case representativeness ("How does this family compare with a typical family at [your institution]?") and bias ("Prior to participating, had you read the published study describing the simulation? Did you know or suspect that the study was about end-of-life decision making?")

Analyses

We compared physician characteristics between the AMCs using the chi-square test, Fisher exact test, Student's *t* test, or Wilcoxon rank sum (Mann-Whitney) test as appropriate. We assessed the bivariable relationship between institution and those variables found to predict ICU admission in our prior study (hospital role [emergency medicine, hospitalist, or intensivist; and experience] and years since medical school graduation).⁷ We used logistic regression to assess the multivariable associations between institution, hospital role, and years since medical school graduation and the dichotomous treatment decisions. We compared perceptions of the prognosis, cause of deterioration, and representativeness of the case using the chi-square test. To classify the cause of deterioration, we summarized physicians' free-text responses to the survey question "What is the cause of the patient's current clinical deterioration" into diagnoses, which we then classified into mutually exclusive categories of "infection or other reversible condition," "cancer progression," or "neither/don't know." We classified any mention of a potentially reversible condition as "potentially reversible" (e.g., pneumonia, sepsis, respiratory failure, pulmonary embolism); if responses only mentioned cancer progression, we classified them as "cancer." To classify case representativeness, 2 investigators (AEB, DM) independently coded physicians' responses to the representativeness question during the cognitive interview into mutually exclusive categories of "typical" or "atypical." Representativeness classification achieved an interrater reliability of ≥ 0.77 , indicating substantial agreement.⁸ The two investigators reached consensus on disagreements through discussion.

Finally, we analyzed encounter and interview transcripts using the "editing" approach by Crabtree

and Miller⁹ designed for qualitative analysis in the medical setting. Two investigators conducted iterative close readings and discussions of the texts, triangulating findings with the quantitative data regarding treatment decisions and case perceptions, to identify emergent concepts, categories, and relationships in the data.

To test the validity of our qualitative findings, we conducted member checking with AMC physicians. Additionally, a third investigator blinded to the hospital intensity independently reviewed the debriefing interviews from non-critical care physicians.

Human Subjects

The University of Pittsburgh and the institutional review boards of the study AMCs approved the protocol, which required deliberate omission of the specific study purpose from the consent form (end-of-life decision making). Subjects completed written informed consent with the understanding that they were participating in a study of treatment decisions for critically ill patients made by hospital-based physicians who did not have an established relationship with the patient. Subjects received \$100 for their 1-hour participation. The funding agencies had no role in data collection, analysis, interpretation, or manuscript preparation.

RESULTS

Subjects

Sixty-seven of 111 (60%) eligible physicians agreed to participate, of whom 48 (72%) completed the study (Figure 2; Table 1). Two physicians from the low-intensity AMC and 1 from the high-intensity AMC had read a published description of the simulation, but no others knew or guessed that the study was about end-of-life decision making.

Observed Simulation Treatment Decisions

Treatment decisions made by the low-intensity AMC and high-intensity AMC physicians did not differ statistically (Table 2). Most elicited and documented intubation preferences, more than half initiated comfort measures only (CMO), many transferred the patient to the ICU, and a minority intubated him.

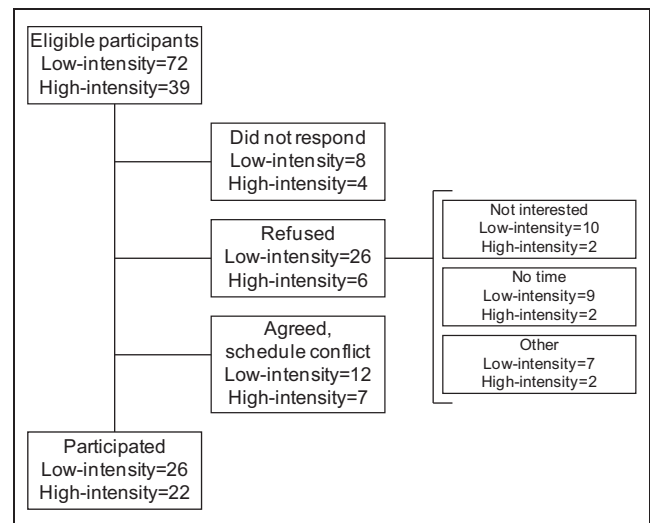


Figure 2 Subject recruitment. We recruited subjects from staff lists. We ascertained eligibility from departmental staff and contacted physicians. Thirty-eight (53%) of 72 eligible physicians from the low-intensity AMC agreed to participate, of whom 26 (68%) could be scheduled, for a total participation rate of 36%. Twenty-nine (74%) of 39 eligible physicians from the high-intensity AMC agreed to participate, of whom 22 (76%) could be scheduled, for a total participation rate of 56%.

Survey-Reported Prognosis and Diagnosis

All subjects recognized that the patient was terminally ill; the median estimate of his likelihood of 3-month survival was 0%–9%, and this did not differ by AMC ($P = 0.84$). However, subjects from the low-intensity AMC were more likely to attribute the cause of the patient's clinical deterioration to potentially reversible processes ($P = 0.03$), although this finding may have been due to an imbalance in the representation of critical care physicians in the two samples (Table 3).

Qualitative Analysis of Debriefing Interviews

Subjects from the high-intensity AMC were less likely to perceive the case as "typical" (low: 69% v. high: 18%; $P = 0.001$; Table 4). Specifically, they reported that it was unusual for a patient at the high-intensity AMC to have preferences against intubation: "Oh, they [were] completely atypical. Most families . . . want to go on gung-ho." Attributions for high-intensity AMC patients' expectations for aggressive treatment included the AMCs reputation: "the aura of [high-intensity AMC] is one of [making] miracles happen" and oncologists' willingness to

Table 1 Characteristics of the Study Subjects ($N = 48$)

Characteristic	Low-Intensity AMC ($n = 26$)	High-Intensity AMC ($n = 22$)	<i>P</i> Value
Age, ^a \bar{x} (s), years	37.3 (7.6)	38.8 (9.4)	0.641
Male, ^b n (%)	15 (58)	16 (73)	0.278
Race, ^c n (%)			0.375
Non-Hispanic white	18 (69)	10 (45)	
Hispanic white	0 (0)	2 (9)	
Asian	8 (31)	10 (45)	
Role, ^c n (%)			0.290
Emergency	4 (15)	5 (23)	
Hospitalist	9 (35)	11 (50)	
Critical care	13 (50)	6 (27)	
Years since medical school graduation, ^a \bar{x} (s)	8.9 (5.9)	11.7 (9.1)	0.216
Years at current institution, ^a \bar{x} (s)	6.3 (5.0)	8.9 (7.4)	0.225
Months on service annually, ^a \bar{x} (s)	6.3 (3.9)	7.8 (3.1)	0.190

Note: AMC = academic medical center.

a. Wilcoxon rank sum (Mann-Whitney) test.

b. Pearson chi-square test.

c. Fisher's exact test.

Table 2 Treatment Decisions ($N = 48$)

Decision	Low-Intensity AMC ($n = 26$), n (%)	High-Intensity AMC ($n = 22$), n (%)	Crude <i>P</i> Value ^a	Adjusted <i>P</i> Value ^b
Opiate for symptoms	17 (65)	11 (50)	0.381	0.225
Elicited preferences	22 (85)	20 (91)	0.674	0.375
Documented preferences	20 (77)	18 (82)	0.735	0.570
Admitted to ICU	12 (46)	8 (36)	0.565	0.599
Intubated	4 (15)	1 (5)	0.357	0.120
Comfort measures only	16 (62)	13 (59)	>0.99	0.673
Palliative intent	16 (62)	16 (73)	0.542	0.499
Consulted palliative care	5 (19)	4 (18)	>0.99	0.930

Note: AMC = academic medical center; ICU = intensive care unit.

a. Fisher's exact test.

b. Adjusts for potentially confounding physician characteristics (e.g., role, years since medical school graduation).

offer treatment others won't: "There will always be some additional experimental therapy that their oncologist always has . . . up their sleeve . . . there is always sort of a plan B that, yeah, this may not work, but we are going to try it."

Differences between the two sites regarding advance care planning norms and their influence on decision making arose as a key theme in qualitative comparison of the encounters and debriefing interviews between the AMCs (Table 5). At the low-intensity AMC, universal discussion and documentation of code status upon admission is expected: "When [the nurse] first told me he has got widely metastatic cancer, the first thing I asked her in the hallway was if there was any DNR orders with this patient . . . at [low-intensity AMC] goals of care are discussed at the

time of admission . . . but she told me there were no DNR orders on the chart." At the bedside many physicians flipped through the chart, looking for something. One hospitalist explained: "At this point I am still sort of furiously . . . flipping through the chart trying to find some indication of his code status, but it was not there." At the low-intensity AMC, the absence of a DNR order on the chart was informative in the context of universal code status discussion and documentation. Indeed, the absence of the DNR order implied to several low-intensity AMC physicians that the patient was full code, prompting intubation without preference elicitation:

In our institution if someone is DNR or DNI, in this kind of situation, that is usually very apparent, very

Table 3 Survey-Reported Diagnosis of the Cause of Deterioration ($N = 48$)

Cause	All Subjects ^a		Non-Critical Care Subjects ^b	
	Low-Intensity AMC ($n = 26$)	High-Intensity AMC ($n = 22$)	Low-Intensity AMC ($n = 13$)	High-Intensity AMC ($n = 16$)
Cancer ^c	6 (23)	12 (55)	4 (31)	7 (44)
Potentially reversible condition ^d	20 (77)	9 (41)	9 (69)	8 (50)
Unknown	—	1 (4)	—	1 (6)

Note: AMC = academic medical center. All values are n (%).

a. $P = 0.03$.

b. $P = 0.46$.

c. Cancer was the only diagnosis listed.

d. Pneumonia, sepsis, pulmonary embolism, respiratory failure; if a subject reported cancer and a reversible cause (e.g., pneumonia), the condition was classified as potentially reversible.

clear . . . no one has said anything, so I was under the impression that he's a full-code, but I did not have that discussion with him.

Other low-intensity AMC physicians ascertained intubation preferences but nonetheless elected ICU admission because of clinical uncertainty introduced by the absence of a DNR order:

It is a little unsatisfying to go comfort care if you don't fully understand the pathophysiology of what is causing it. . . . I think if there had been clearly documented discussion regarding code status and goals of care I could have perhaps maybe have made that decision right there to not admit him to the ICU and go comfort care.

In contrast, at the high-intensity AMC, cross-covering physicians did not expect prior discussion and documentation of code status: "It is the minority of patients who have actually had the DNR discussion." Providers attributed failure to discuss code status to admitting specialists, especially oncologists: "I think some of the specialists at [high-intensity AMC] don't ever discuss these issues with the patients even though their patients are very, very sick." At the high-intensity AMC, the presence of metastatic cancer was informative in the context of norms of oncologists' avoiding code status discussions: "Reviewing the record that I had to review, it seemed like that was the predominant problem was his metastatic cancer and that there was not going to be anything that was remotely reversible." The study physicians were relieved that the patient and his wife did not want life-sustaining treatment: "It would be a mess to intubate this guy and the prognosis wouldn't be changed. . . . I wanted to keep it that way by reinforcing that their decision [not to be intubated] is a good thing."

DISCUSSION

In this study of hospital-based physicians from 2 AMCs at opposite extremes of end-of-life intensity faced with an identical patient, doctors did not differ in prognosis and treatment decisions but they did differ in their perceptions of the case. Qualitative analysis of debriefing interviews suggested that different institutional norms for advance care planning for cancer patients at the 2 AMCs might explain these differences in case perceptions.

Based upon these observations, we speculated that institutional norms of advance care planning may influence treatment decisions directly and indirectly, by influencing physicians' intuitive judgments—or heuristics—about the case (Figure 3). Prior studies have demonstrated that advance care planning influences end-of-life ICU and life-sustaining treatment use. In an observational study, Wright and others¹⁰ found that patients with advanced cancer who reported having an end-of-life discussion with their physician were less likely to die in an ICU or to be mechanically ventilated. Detering and others¹¹ demonstrated that randomization to an advance care planning intervention reduced the likelihood of death in the ICU. Nicholas and others¹² found that patients with advance directives specifying limitations in end-of-life care were less likely to die in the hospital or to receive life-sustaining treatments but that this association was concentrated in regions with higher end-of-life treatment intensity, which had lower rates of advance care planning. This suggests that local norms of intensive end-of-life treatment, although influential, can be partially counteracted by individual acts of discussing and documenting treatment-limiting advance directives. This is consistent with our finding that high-intensity

Table 4 Interview Quotes: Case Representativeness

Low-Intensity Academic Medical Center (LI-AMC)	High-Intensity Academic Medical Center (HI-AMC)
<p>“Some families cope and adapt as this family is and others would demand that everything be done and some others might have some disbelief that this is happening, so this could be consistent with a typical family.”—Subject 5, LI-AMC</p>	<p>“I would say this family is in the minority. At [this AMC] I think the majority of families and patients feel that . . . if they don’t like what that physician has to say they are going to actually ask for another physician to come by. I mean they’re interested in multiple opinions, which is not necessarily wrong. It’s just that they’re more apt to question a physician’s thought process, and want to, you know, get another opinion or get someone else on the case. Or, you know, that they decided that you’re wrong, and that they want to pursue everything despite what you’ve told them. So I think this would be a pretty atypical family at [this AMC].”—Subject 11, HI-AMC</p>
<p>“The wife . . . knew what [a living will] was and she referred without any doubt that he did not want anything and it was easy because again he confirmed that, so it was pretty straightforward actually, which is maybe a third [of cases].”—Subject 6, LI-AMC</p>	<p>“By the time that they get here they have been really been through the community hospital, they have already been through the personal physician, and the aura of [this AMC] is one of [making] miracles happen. It doesn’t do us any favors I can assure you.”—Subject 12, HI-AMC</p>
<p>“I think that [the wife] had a reasonable understanding of his disease and a reasonable understanding of his goals. I think that so maybe 40% of the time I feel like I am in a situation [like this].”—Subject 7, LI-AMC</p>	<p>“In my experience, most of the patients at [this AMC] that do have a malignancy, generally are not told that there is really nothing else that can be done. Because usually there will be, it seems to me that there will be some additional experimental therapy that their oncologist always has sort of up their sleeve, you know. It may not be proven, but it may be experimental. And so most of our patients generally do not come in with that, you know, being told, ‘Oh there is nothing else that can be done for you.’ You know, usually there is always sort of a plan B that, yeah, this may not work, but we are going to try it, and so that is sort of the mindset of many of our patients.”—Subject 7, HI-AMC</p>
<p>“A good percentage, probably half of them are . . . this way . . . in the sense that he and his wife both really know, I got the feeling from them very quickly that this is, they knew kind of where they wanted to go with their care, that they did not want to go to kind of extreme lifesaving measures and some families are definitely ready for this and they can make this kind of decision pretty quickly. Other families, you know, even though somebody has had metastatic disease for a while they are not ready for it kind of for the end and they, they want everything done.”—Subject 27, LI-AMC</p>	<p>“Most patients at [this AMC] that we encounter want everything done, so if I have to give percentages, maybe it’s 70/30, maybe 65/35 of the patients that want everything done versus those that understand the limitations that we have as medical professionals, and opt to go down this road [of comfort measures only].”—Subject 18, HI-AMC</p>
	<p>“I would say that I would see this in no more than 15 percent of patients. Most of the families that I deal with would express a certain degree of more aggressiveness. Yeah, that is emphasizing hope or potential benefit and minimizing downsides.”—Subject 19, HI-AMC</p>
	<p>“At [this AMC] I think a lot of patients they come to us because they have exhausted, everybody else has maybe closed the door and said that nothing is going to happen and then they come here and there is an oncologist here who is going to do X Y or Z or even do surgery on this guy. You know I don’t know, it seems like he probably had pretty wide spread disease just a couple of months ago. So I think comparing this family they might be a little bit more reasonable or a little bit more conservative.”—Subject 21, HI-AMC</p>
	<p>“I think [at this AMC patients] come with the idea that we can heal all and actually had very difficult encounters with patients and mostly patients’ families who bring patients there after they’ve failed multiple hospitals and come in and want everything done even though there’s clearly nothing that we can do.”—Subject 22, HI-AMC</p>

AMC physicians, despite prevailing norms that led them to expect that the patient would choose life-sustaining treatment, were able to treat the patient with palliative intent upon eliciting his preference against intubation.

Prior studies have demonstrated that heuristics influence physician decision making in a variety of clinical contexts, including the triage of trauma patients,^{13,14} the evaluation of patients with chest pain,¹⁵ and the evaluation of patients with carotid

Table 5 Interview Quotes: Advance Care Planning Norms and Influences on Intuitive Judgments

Low-Intensity Academic Medical Center (LI-AMC)	High-Intensity Academic Medical Center (HI-AMC)
<p>“In our institution if someone is DNR or DNI, in this kind of situation, that is usually very apparent, very clear . . . no one has said anything, so I was under the impression that he’s a full-code, but I did not have that discussion with him. . . . There’s some reason that they [call me to] move [the patient] into the ICU that makes sense, whereas if they were truly DNR, DNI, they likely would not be moved because I wouldn’t [give] the pressors and I couldn’t intubate him and what would I do? I think the assumption is full code, and if that is not the case, they are usually pretty good about the, the medicine team for instance, they are usually very good about telling me, okay, Mr. Smith is DNI and he is DNR, but pressors are okay. We are going to move him to a unit for some pressors and antibiotic therapy, noninvasive ventilation, that kind of situation.”—Subject 3, LI-AMC</p>	<p>“Reviewing the record that I had to review, it seemed like that was the predominant problem was his metastatic cancer and that there was not going to be anything that was remotely reversible.”—Subject 4, HI-AMC</p>
<p>“We always assume in the emergency department setting that they are full-code unless it is very clear that they stated it somewhere. We don’t sit and pull our hair out ‘is he DNR or DNI?’ unless it is really clearly stated.”—Subject 4, LI-AMC</p>	<p>“Sometimes people involved in a patient’s care had different ideas of what they thought the best plan for the patient should be. . . . There have been times where there have been maybe two consultants on a patient, usually the oncologist would tend to be more optimistic about what the patient’s prognosis was and what they may have to offer them versus say a pulmonary doctor who’s already following the patient on the case and knowing that they had the metastases already, tend to be a little more guarded in terms of what they thought would happen and feeling even offering these treatments to the patient may do more harm than good overall for the patient.”—Subject 15, HI-AMC</p>
<p>“When [the nurse] first told me he has got widely metastatic cancer, the first thing I asked her in the hallway was if there was any DNR orders with this patient . . . at [this AMC] goals of care are discussed at the time of admission . . . but she told me there were no DNR orders on the chart.”—Subject 6, LI-AMC</p>	<p>“I don’t want this guy to be intubated. Because it would be a mess to intubate this guy and the prognosis wouldn’t be changed. I think it’s a good thing that this guy is DNR/DNI, so that is why I just wanted to keep it that way by reinforcing that their decision is a good thing.”—Subject 17, HI-AMC</p>
<p>[Re: looking in the chart during the encounter]: “I was just making sure that [there wasn’t] something in the chart I was missing . . . something important there, you know, goals of care.”—Subject 6, LI-AMC</p>	<p>“I think one of the biggest things that we face as physicians is that they are, oncologists for example, especially the cancer patients haven’t necessarily discussed code status or what other treatments are available.”—Subject 18, HI-AMC</p>
<p>[Re: looking at the chart during the encounter]: “I was looking for his past medical history and I really was kind of going for . . . the assessment and plan by the admitting physician and that would also include code status which at the very bottom there was like no mention, . . . no plan in place for the code. . . . It is unusual not to have any mention of code status.”—Subject 7, LI-AMC</p>	<p>“Just in my experience most of the time it is the minority of patients who have actually had the DNR discussion. . . . [Families] are completely unprepared for this discussion and I have to really ease into his case/condition is terminal, ‘Do you understand his condition is terminal, do you understand his cancer is in his lung? Most likely that is why he is short of breath and is having this situation. He is failing to breathe adequately, I am going to need to intubate him in order to maintain his oxygenation; however, he stands an extremely good chance of never coming off of the ventilator.’”—Subject 20, HI-AMC</p>
<p>“I have already made the decision at this point that he needs to be intubated; there is no question about it. Really in my mind I think he should be intubated in this bed or in the ICU do we have time for transfer and then when I thought that I thought well he has metastatic gastric cancer so he may not want to be intubated and that would really change kind of my plan for him if that is something that he had discussed or had goals of care, directive. What I realized I think right after this is that I was handed the chart as I walked in, I had to run through his chart but if maybe like a golden rod or a DNR/DNI was already signed in the chart which would have really sealed the deal and made this an easier decision to make right now.”—Subject 12, LI-AMC</p>	<p>“Patients that are very, very ill very advanced disease. I mean I know oncologists but my gosh these patients have, their bodies are riddled with cancer and they are treating as if, to see how sick we can make them, to see how much longer we can. I don’t know what their endpoint is, but it obviously isn’t to, it is not curative. So I would say nine times out of ten that’s the case. There is no advanced care plan, there is no, a lot of times they never even discuss, so thank goodness you know they were saying no tube, no tube and he immediately knew where I was going with that. So that was really reassuring.”—Subject 21, HI-AMC</p>

(continued)

Table 5 (continued)

Low-Intensity Academic Medical Center (LI-AMC)	High-Intensity Academic Medical Center (HI-AMC)
<p>“If I had not discussed it [intubation preferences] then that would have been very much, I think, looked down upon. I think there is a real culture here at [this AMC]; there is a big comfort care movement there. There is a big comfort care influence with our palliative care service. . . . I think people would have thought like ‘this something with metastatic gastric cancer and really is this really what people in keeping with his goals of care?’ so . . . it is incumbent to find out what his wishes are ahead of time before we make the decision.”—Subject 12, LI-AMC</p> <p>[Re: looking in the chart during the encounter]: “I guess if we weren’t going to intubate him, I wanted to see if I could get more information from the chart that would support that as a good decision . . . prognostic information, if there was a note from an oncologist . . . perhaps I had passed over a CPR resuscitation form that indicated that someone had the discussion about this topic with him . . . ” [and, later in the debriefing interview]: “At this point I am still sort of furiously, . . . hopefully, flipping through the chart trying to find some indication of his code status, but it was not there.”—Subject 13, LI-AMC</p> <p>“I guess I wasn’t ready to go through the comfort care route yet with him. I felt that we still need to try to find out what was going on exactly. . . . I guess it would be easier to stop to go the comfort care route if you have a clear understanding of what is causing the organ failure. It is a little unsatisfying to go comfort care if you don’t fully understand the pathophysiology of what is causing it. . . . I think if there had been clearly documented discussion regarding code status and goals of care I could have perhaps maybe have made that decision right there to not admit him to the ICU and go comfort care. But since it was a bit hurried and no clear underlying diagnosis, I don’t think my colleagues would have supported me in that decision.”—Subject 13, LI-AMC</p> <p>[Re: asking nurse about documentation of code status on the chart]: “Any physician that saw him before could assess that his shortness of breath is likely due to lymphatic spread and the interventions are limited, so if there is clear DNR/DNI status at the nursing facility, it helps me be more confident that somebody, some physician, or somebody has taken the time and effort to really thoroughly discuss this with the patient and the wife, that I’m not making assumptions of what he would want or I’m not jumping the gun on moving to comfort care. Just I think that was what I was thinking. If there was documentation, it’s hopefully his primary care doctor and his oncologist has a discussion before this acute confrontation, so it makes it [making him CMO] easier.”—Subject 14, LI-AMC</p>	<p>“I think some of the specialists [at this AMC] don’t ever discuss these issues with the patients even though their patients are very, very sick. And so when [the hospitalist] comes in, they don’t want to hear from us, they want to hear from their specialist and the specialist doesn’t want to come in and spend an hour going over end-of-life stuff. Specialists run the show here.”—Subject 22, HI-AMC</p> <p>“Clearly, from what the nurse told me, this gentleman is in serious condition, probably will not survive this hospitalization, and given his disease state he is not going to do well no matter what we do, and really trying to avoid ICU level of care because it wouldn’t really change the outcome in this case.”—Subject 22, HI-AMC</p>

(continued)

Table 5 (continued)

Low-Intensity Academic Medical Center (LI-AMC)	High-Intensity Academic Medical Center (HI-AMC)
<p>“I am thinking it is time to intubate the patient, his respiratory rate is steadily upper 40s, hypoxemic, we are adding pressors and antibiotics and I still have not clarified the, his code status and I think that is what happens next. I think that is when I look in the chart but still never, like I do not recall seeing anything that tells me whether or not this is something that is in accordance with his wishes.”—Subject 16, LI-AMC</p>	
<p>“I am looking at his chart and I am thinking maybe he shouldn’t be intubated. So part of me that is saying this is actually a very rational decision, but I do feel that it is my job to try and give him everything, particularly since they haven’t discussed this with this doctor.”—Subject 25, LI-AMC</p>	
<p>“The admitting team is required to establish the code status. I think the nurses follow up on that in terms of the checks and balances in making sure that is appropriately documented, so you don’t get into this situation of knowing or not knowing what it is in an emergency situation.”—Subject 31, LI-AMC</p>	

Note: CMO = comfort measures only; CPR = cardiopulmonary resuscitation; DNI = do not intubate; DNR = do not resuscitate; ICU = intensive care unit.

artery stenosis.¹⁶ Physicians may similarly have pre-existing intuitions about how patients appear when they are “at the end of life.” When patients meet those intuitions, physicians may elicit preferences and initiate palliation. When they do not, physicians may instead focus on diagnosing the cause of decompensation and stabilizing the patient’s condition. Decision scientists agree that task environment (i.e., the contextual features in which the decision occurs) plays a significant role in the development of heuristics.¹⁷ We hypothesize that advance care planning norms are strong enough to influence the physicians’ intuitive judgments about the patient. At the low-intensity AMC, the absence of the DNR order on the chart appeared to trigger a “diagnose and stabilize” intuition (and a focus on the potentially reversible causes of deterioration). At the high-intensity AMC, the absence of a DNR order provided no such cue; instead, the diagnosis of widely metastatic gastric cancer appeared to trigger an “end-of-life” intuition (and a focus on the cancer as the cause of deterioration). Physicians’ ingrained expectations based upon prior experiences due to prevailing advance care planning norms, and attendant expectations of patients/families, could explain the observation, made in our companion observation study of ICU decision making, of a “spillover” of aggressive

treatment from referral transplant patients to frail elders admitted from local nursing homes.⁶

Although the simulation study was underpowered to test the hypothesis regarding sample differences in ICU admission rates, sampling variability is probably not the only explanation for the finding that observed ICU admission decisions did not line up with those seen in Medicare claims. Most notably, as our qualitative findings reveal, the cases were not “representative” of the cases seen at the institutions—such as the lack of a DNR order on the chart given the patient’s treatment preferences at the low-intensity-AMC and the oncologist’s not offering further chemotherapy and the patient/family not wanting life-sustaining treatment at the high-intensity AMC.

This simulation study has several strengths. We used high-fidelity simulation instead of paper-and-pencil vignettes.¹⁸ The clinical elements of the case were representative of the AMCs’ case-mix (75% of Medicare decedents at both AMCs are 75 and older and 40% have cancer; personal communication, J. Skinner, March 2, 2009). We triangulated data from encounters, survey responses, and debriefing interviews, strengthening the validity of the hypothesized relationships.^{19,20} The study also has several threats to internal and external validity. Selection bias is possible; only 52% of the low-intensity and 68% of the

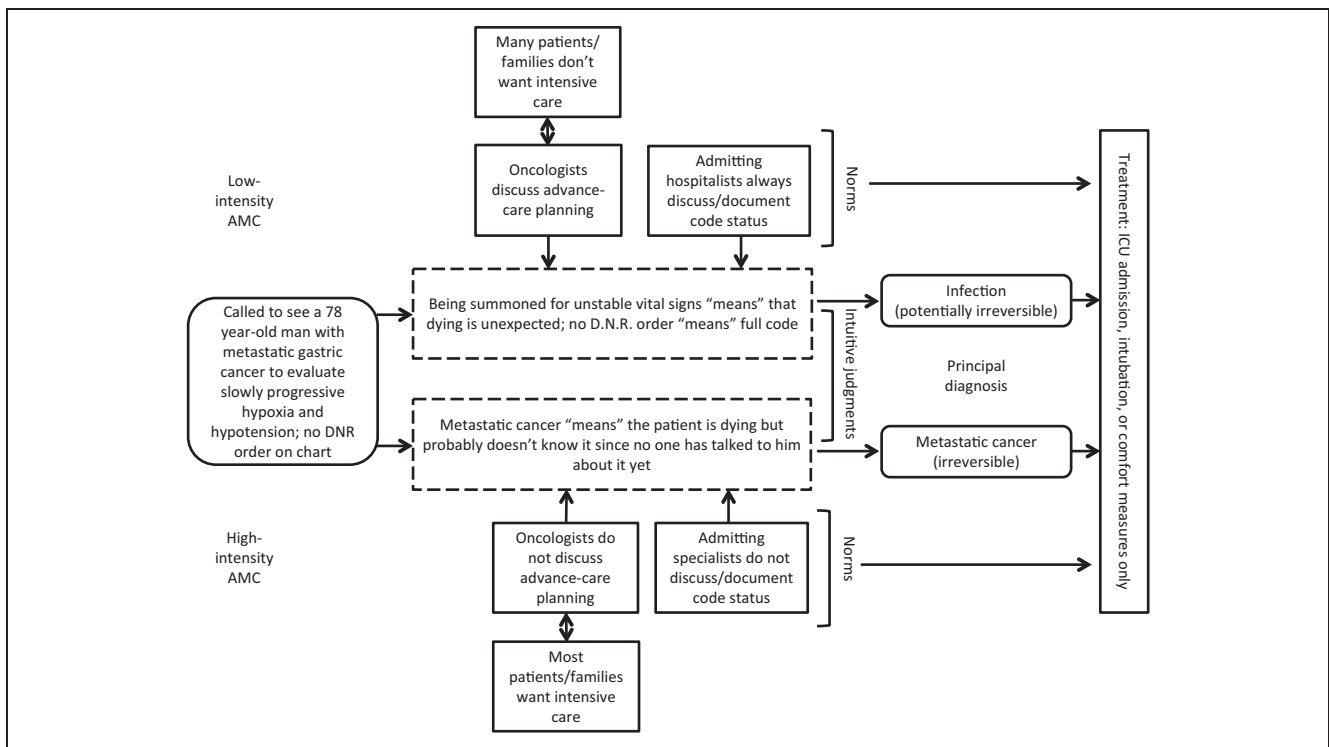


Figure 3 Hypothesized mechanism underlying variation in end-of-life intensive care unit (ICU) use. We hypothesize that norms related to referring oncologists' use of nonstandard therapies and willingness to broach end-of-life issues, patient expectations, and norms of code status assessment and documentation by admitting physicians contribute to differences in ICU admission rates. Norms at high-intensity academic medical centers (AMCs) favor ICU admission, whereas norms at low-intensity AMCs favor ICU nonadmission. The power of these norms was revealed by their apparent influence on subject physicians' intuitive judgments (e.g., heuristics), diagnoses, and subsequent treatment decisions.

high-intensity physicians known to be eligible for the study agreed to participate, and the actual participation rate was lower—36% and 56%—due to the 8 days' scheduling constraint at each site. Additionally, there was an imbalance in the representation of critical care physicians, whose mental models of “reversibility” may differ systematically from those of ED or hospitalist physicians. Reanalysis of the quantitative data regarding “cause of deterioration” without critical care physicians did not change the direction of the observed effect, but the difference was no longer statistically significant. Nonetheless, the qualitative reports regarding institutional norms were highly consistent across physicians, were corroborated by member checking and independent qualitative analysis of non-critical care transcripts by a blinded investigator, and were consistent with our observations from ethnographic case study.⁶ Therefore, we believe them to be robust and not due to selection bias or confounding. Naturally, there

are many other differences in structural factors and norms between AMCs that may contribute to differences in ICU use in addition to those we hypothesize herein, some of which we have previously described.⁶ Another limitation is that findings are limited to these 2 AMCs; we cannot assume that they generalize to all US hospitals, which have wide variations in end-of-life ICU use. Ultimately, our study is only hypothesis-generating; confirmation will require additional study.

In conclusion, we hypothesize that differences in local advance care planning norms between 2 AMCs at opposite extremes of end-of-life intensity may have influenced the decision-making heuristics of hospital-based physicians, resulting in differing perceptions of an identical case. Prevailing treatment norms may influence physicians' expectations and clinical reasoning and may be one of the mechanisms underlying differences between these AMCs in their end-of-life ICU use.

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