

Michael E. Wilson  
Lori M. Rhudy  
Beth A. Ballinger  
Ann N. Tescher  
Brian W. Pickering  
Ognjen Gajic

## Factors that contribute to physician variability in decisions to limit life support in the ICU: a qualitative study

Received: 16 July 2012  
Accepted: 26 February 2013  
Published online: 5 April 2013  
© Springer-Verlag Berlin Heidelberg and ESICM 2013

### Electronic supplementary material

The online version of this article (doi:[10.1007/s00134-013-2896-x](https://doi.org/10.1007/s00134-013-2896-x)) contains supplementary material, which is available to authorized users.

M. E. Wilson (✉)  
Department of Internal Medicine,  
Mayo Clinic, 200 First Street SW,  
Rochester, MN 55905, USA  
e-mail: wilson.michael1@mayo.edu  
Tel.: +1-507-2842511  
Fax: +1-507-2554267

L. M. Rhudy · A. N. Tescher  
Department of Nursing, Mayo Clinic,  
200 First Street SW, Rochester,  
MN 55905, USA

L. M. Rhudy  
University of Minnesota School of Nursing,  
Minneapolis, MN, USA

B. A. Ballinger  
Department of Surgery, Mayo Clinic,  
200 First Street SW, Rochester,  
MN 55905, USA

B. W. Pickering  
Department of Anesthesia and Critical Care  
Medicine, Mayo Clinic, 200 First Street  
SW, Rochester, MN 55905, USA

O. Gajic  
Divisions of Pulmonary and Critical Care  
Medicine, Department of Internal Medicine,  
Mayo Clinic, 200 First Street SW,  
Rochester, MN 55905, USA

**Abstract** *Purpose:* Our aim was to explore reasons for physician variability in decisions to limit life support in the intensive care unit (ICU) utilizing qualitative methodology. *Methods:* Single center study consisting of semi-structured interviews with experienced physicians and nurses. Seventeen intensivists from medical ( $n = 7$ ), surgical ( $n = 5$ ), and anesthesia ( $n = 5$ ) critical care backgrounds, and ten nurses from medical ( $n = 5$ ) and surgical ( $n = 5$ ) ICU backgrounds were interviewed. Principles of grounded theory were used to analyze the interview transcripts. *Results:* Eleven factors within four categories were identified that influenced physician variability in decisions to limit life support: (1) physician work environment—workload and competing priorities, shift changes and handoffs, and incorporation of

nursing input; (2) physician experiences—of unexpected patient survival, and of limiting life support in physician's family; (3) physician attitudes—investment in a good surgical outcome, specialty perspective, values and beliefs; and (4) physician relationship with patient and family—hearing the patient's wishes firsthand, engagement in family communication, and family negotiation.

*Conclusions:* We identified several factors which physicians and nurses perceived were important sources of physician variability in decisions to limit life support. Ways to raise awareness and ameliorate the potentially adverse effects of factors such as workload, competing priorities, shift changes, and handoffs should be explored. Exposing intensivists to long term patient outcomes, formalizing nursing input, providing additional training, and emphasizing firsthand knowledge of patient wishes may improve decision making.

**Keywords** Intensive care · Life support care · Withholding treatment · Decision making · Physician's role · Terminal care

## Introduction

Decisions to limit life support are among the most important clinical decisions encountered by patients, families, and providers. Decisions to limit life support have been associated with high mortality rates, as well as a high degree of psychological distress in families and providers [1–7]. Understanding how life support decisions are made has been identified as a priority by European and American professional societies [8, 9].

Characteristics of the individual intensivist have been associated with varied rates and timing of life support decisions [10]. Physician-level factors influencing decisions to limit life support include geography, gender, religion, personal life support preferences, practice setting, specialty, surgical investment, experience, medical errors, and familiarity with life support [10–19]. While previous studies have focused almost exclusively on survey responses to hypothetical scenarios, we hypothesized that important clinically relevant insights would be gained by approaching the topic utilizing qualitative methods. Our objective was to explore factors that contribute to physician variability in decisions to limit life support.

## Methods

### Participants

We employed a random sampling strategy of 15 physicians and ten nurses. Five physicians were enrolled from each of the following: (1) medical ICU staffed by pulmonary critical care intensivists, (2) surgical ICU staffed by anesthesiologists with critical care training, and (3) surgical ICU staffed by general surgeons with critical care training. In each ICU, pulmonologists, anesthesiologists, and surgeons, respectively, take primary responsibility for patient care and life support decision making. We contacted 25 physicians with at least 10 years ICU experience via email to achieve our goal of 15. After preliminary analysis, data saturation was not achieved, so two additional pulmonary critical care physicians were recruited. We contacted 35 nurses with at least 3 years ICU experience to achieve our goal of ten (five nurses from surgical ICU and five from medical ICU settings). The Mayo Clinic Institutional Review Board approved the protocol.

### Data collection

Interviews were conducted by two interviewers (M.E.W. and L.R.) in private conference rooms while the participants were off-duty. Interviews lasted approximately 1 h and were conducted using an open ended interview guide (see Appendix A). Interview questions were based on

literature review, clinical observations, and expert opinion. The questions were pilot tested and modified using a small group of ICU physicians who were not study participants. Additional questions and probes were used based on participant responses. Interviews were audiotaped, transcribed verbatim, and verified for transcription accuracy.

### Data analysis

Utilizing principles of ground theory, open and selective coding of each transcript was performed to identify categories and factors. Qualitative software was utilized to manage the data (NVivo, QSR International, Doncaster, Victoria, Australia). Two investigators [M.E.W. (physician) and L.R. (nurse)] performed the open coding of the first four interviews and together generated a list of factors. The subsequent transcripts were independently coded and new factors were added if passages did not fit into the existing list. At the end of the coding process, the investigators met to clarify the list of factors, review each coded statement, and select representative statements. Data saturation was achieved when no new factors were identified. Trustworthiness of the analyses was assessed by having an investigator, who was blinded to the coding assignments, independently code 30 % of passages. The average  $\kappa$  statistic was 0.88 (range 0.79–0.97). Excellent interrater reliability is represented by a  $\kappa > 0.8$ .

## Results

Eleven factors within four categories were identified that influenced physician variability in decisions to limit life support (Table 1). Tables 2, 3, 4, 5 show additional quotes for each factor. Electronic supplementary Table 6 shows the demographic characteristics of participants.

### Category 1: physician work environment

#### *Workload and competing priorities*

In a high workload environment, communicating with families about decisions to limit life support may be a lower priority than other competing tasks. Although important, addressing decisions to limit life support was not measured or rewarded. Two physicians explained: “When things are extremely busy, (it) becomes difficult to sit down and have a (family) discussion.” “(Addressing life support decisions) is not something that anyone has ever given me feedback on. (But I do) get metrics on how many operations I do, how much I bill, a wound infection rate, line infection rate, how many papers (I) published last year. It will be noticed if you don’t write the paper, but it won’t be noticed if you don’t talk to the family.”

**Table 1** Frequency of factors that influence the decision to limit or continue life support

Factor	No. physician interviews <i>n</i> (%) ( <i>n</i> = 17)	No. nurse interviews <i>n</i> (%) ( <i>n</i> = 10)	No. total interviews <i>n</i> (%) ( <i>n</i> = 27)
1. Workload and competing priorities	14 (82 %)	6 (60 %)	20 (74 %)
2. Shift changes and handoffs	6 (35 %)	7 (70 %)	13 (48 %)
3. Incorporation of nursing input	13 (76 %)	9 (90 %)	22 (81 %)
4. Experiences of unexpected patient survival	12 (71 %)	2 (20 %)	14 (52 %)
5. Experiences of limiting life support in physician's family	2 (12 %)	4 (40 %)	6 (22 %)
6. Investment in a good surgical outcome	14 (82 %)	2 (20 %)	16 (59 %)
7. Specialty perspective	13 (76 %)	9 (90 %)	22 (81 %)
8. Values and beliefs	11 (65 %)	1 (10 %)	12 (44 %)
9. Hearing the patient's wishes firsthand	14 (82 %)	9 (90 %)	23 (85 %)
10. Engagement in family communication	10 (59 %)	9 (90 %)	19 (70 %)
11. Family negotiation	8 (47 %)	5 (50 %)	13 (48 %)

**Table 2** "Physician work environment" factors and illustrative quotes

Factor	Quotes
Workload and competing priorities	<p>"(Talking with families depends on the) workload in the ICU. If I have 20 patients requiring a heavy degree of intervention and huge need for my attention... having time to sit down and have an hour long conversation with the family, you can't wedge all that in." <i>Physician</i></p> <p>"All the other critical care patients have to be cared for. Sometimes you're engaged in a procedure and you can't get to the other person's bedside. It is the time spent at end-of-life decision-making versus the procedure or something that must be done." <i>Physician</i></p> <p>"Often, (intensivists) are too busy to sit down and have a half an hour conversation. And that sounds terrible, but it is the reality. (Family conversations) don't always become the number one priority. It gets placed at the bottom of the list sometimes." <i>Nurse</i></p>
Shift changes and handoffs	<p>"We change staff positions once a week so that nobody ever gets enough longitudinal involvement to be able to make a decision. It takes several days to establish (a sense of where the patient is), and then you start talking about (life support preferences) and then (a new physician) comes in and the cycle repeats itself. All of a sudden, 3 days turns into 3 months." <i>Physician</i></p> <p>"I think you do reinvent the wheel every Monday (first day on service). When you walk in on Monday, it doesn't matter how much of a Gestalt somebody else gives you, you kind of need to make your own decision and get a feel for things and usually that case is so complex it takes a couple of days to get your brain around it." <i>Physician</i></p> <p>"A patient comes in on a Friday, and (the attending) said, by Monday we are really going to have to re-evaluate the patient. Then on Monday a new (attending) comes on and says have we tried this, this and this? And, so then (the new attending says) let's give it 3 more days. So, I think that (it really prolonged a patient's care) that could have been made comfort cares long before." <i>Nurse</i></p> <p>"The way we transfer care (during handoffs) is such that (patient preferences) get lost. (A new physician coming onto service) didn't know the (patient's preferences)... and without knowing that piece of the puzzle... it was impossible to (make the right decision)." <i>Physician</i></p>
Incorporation of nursing input	<p>"Whether or not the intensivists will ask for your (nursing) input is physician dependent. Not all of them are as good, but I do really feel, that I have been very included. 'How do you feel about this? Have you been observing these certain trends? Do you see these certain things with this patient that would indicate we should either withdraw or continue on?' So, I really feel like our input is valued. And I think it is definitely an important aspect to the whole decision". <i>Nurse</i></p> <p>"I have had physicians ask me if I'm comfortable with the decision that has been made—my opinion on the comfort level and if we feel that we are doing the right thing for the patient. (But) not (all physicians) will ask you that." <i>Nurse</i></p> <p>"The majority of (physicians) are open to your (nursing) opinion and we can talk about it." <i>Nurse</i></p>

### *Shift changes and handoffs*

Physician shift changes delayed addressing life support decisions by disrupting continuity of care. Because it took time for each physician to personally assess the patient and family prior to reaching a life support decision, in some instances there was not enough physician continuity

of care to reach a decision prior to rotating off service. One physician noted, "We change staff positions once a week so that sometimes nobody ever gets enough longitudinal involvement to be able to make a decision on the patient."

Additionally, physician approaches to handoffs regarding life support decisions varied. One physician

**Table 3** “Physician experiences” factors and illustrative quotes

Factor	Quotes
Experiences of unexpected patient survival	<p>“There was a patient with acute leukemia (in the ICU) for longer than a month on a ventilator with multiple organ failure. (The patient’s wife) had a very strong and fervent belief (in divine intervention) that the patient was going to survive. I felt compelled to take the opposite position. So, I went so far in multiple family discussions to actually pull articles from the literature... and highlight where it would say things like “survival is unprecedented.” I rotated off service... About 6 months later, there was a knock on my office door. (The patient) was standing there with his wife... He gave me a big hug and said, “I forgive you.” And I mean, who could forget that? So every patient, thereafter, that I have ever been faced with where there was not necessarily ambiguity about what the patient is going to be, but ambiguity with family members and I don’t press that. I work through the pace with the families and where they can go. And there are some of them that are very unreasonable.” <i>Physician</i></p> <p>“(A patient was admitted with severe necrotizing pancreatitis and had an emergent operation for abdominal compartment syndrome. After many weeks in the ICU, she was not improving or waking up. Evaluation by neurology consultation suggested brain injury because of shock with a very low likelihood of full neurologic recovery. The intensivist recommended withdrawing life support. But the family wished to continue for 2 more weeks. Two weeks later the patient woke up and gained full functionality). The intensivist stated: Now, even if I’m on the less optimistic side on a certain case, I am very much in favor of going with what the family wants. Things looked about as futile as they could get and there was a positive outcome which makes me very much convinced that we never know 100 %. As you get more and more experience you realize you have to tailor everything to the patient.” <i>Physician</i></p>
Experiences of limiting life support in physician’s family	<p>“Four days after (my daughter) graduated from college someone ran a red light and broadsided her. I sat in the ICU and watched her die from her brain injuries for the next 30 h. That has had a very, very profound impact on me and how I make these decisions and how I talk to people, from having been on the other side of the bed. I have the ability and an insight and I talk to families in ways that others generally cannot because they haven’t been on the other side of the bed.” <i>Physician</i></p> <p>“(I have nursing and physician colleagues) who have gone through very unfortunate situations with family members (with whom) they have had to withdraw life support. (Having this experience) really opens (these providers) up to approaching things differently—just being more honest and open and connecting with (patients and families) on a personal level.” <i>Nurse</i></p> <p>“(One thing that influences variability in end-of-life decisions) is your own life experience—having seen family members, parents, who suffered end-of-life complications.” <i>Physician</i></p>

noted that he routinely conducted handoffs “at the bedside,” while another physician noted that handoffs occurred via “telephone” or “email.” Sometimes key information about patient wishes was not effectively communicated during handoffs. In one example, an intensivist discussed the plan of care to continue life support during a handoff to a nighttime intensivist, but did not discuss the specific patient wishes to continue life support nor the family dynamics. That evening, multiple family members unexpectedly desired to withdraw life support, and without contrary information about the patient’s wishes, the evening intensivist withdrew life support. The daytime intensivist felt this could have been avoided with a more complete handoff.

#### *Incorporation of nursing input*

Both nurses and physicians felt that nurses offered a unique perspective on the assessment of patient and surrogate wishes and wellbeing. The degree to which physicians sought out and incorporated the nursing perspective was variable. One nurse noted, “(Some intensivists) deal with the family, and we (nurses do) our thing and there is no cross communication between us.

And then, we (nurses) don’t offer anything. Even if we do, it is not acknowledged. You learn just kind of by knowing who the (intensivist) is and where they kind of see (your role in decision making).” One physician offered a differing viewpoint: “Nurses have much more insight (into the patient and family). (When) the nurses have had a conversation with the patient or the family that offers valuable insight and information, I’d be wise to think about that.”

#### Category 2: physician experiences

##### *Experiences of unexpected patient survival*

Some patients survived and recovered despite physician recommendation to limit life support. These outcomes of surprising survival influenced future decisions such that most intensivists perceived more uncertainty in communicating prognosis and were more open to families who wished to continue life support. Seven out of the 17 physicians noted that a single surprising outcome was a significant turning point in their decision making. One physician recounted, “This patient surprised all of us by

**Table 4** “Physician attitudes” factors and illustrative quotes

Factor	Quotes
Investment in a good surgical outcome	<p>“Some patients linger in a surgical intensive care unit for a very long time because the surgeon really makes a very, very strong commitment to the patient when the patient goes to the operating room. And it tends to be very hard for the surgeon to let go. (Additionally), it is a black mark on the surgeon’s scorecard if a patient dies before day 30 because it is a surgical death. So the combination between that and the humanistic commitment that the surgeon has made... sets up conflict. That was a reason for some surgeons to never send patients to the (chronic ventilator unit) because they felt that they lost control of end-of-life decisions if they did that.” <i>Physician</i></p> <p>“In surgery there is an investment in the good outcome. The good outcome it is part of who you are. One of the hardest things is for surgeons to recognize their own complications. It is much easier to recognize (the poor prognosis) of someone else’s (patient) than your own. It is hard to admit that, my gosh, I’m part of this (patient’s poor outcome).” <i>Physician</i></p> <p>“Failure to approach families about end-of-life issues after a surgical complication—I think that guilt is exactly what drives that reluctance.” <i>Physician</i></p>
Specialty perspective	<p>An elderly patient was found to have advanced cancer. Her oncology team wanted to continue aggressive cares even though the patient had clearly stated she did not wish to do so if the cancer advanced. Her intensivist noted, “Eventually, after multiple conference calls, her (oncology) team decided to agree with the patient’s wishes. They wanted to pursue (aggressive) care. It was a different perspective. Rather than us looking at patients as a whole, they were looking at the cancer only.” <i>Physician</i></p> <p>“An oncologist said that the (the patient) has a 90 % cure rate, but then de-emphasized the fact that the patient had a multi-organ system situation that includes acute respiratory failure, kidney injury, multi-resistant infection.” <i>Physician</i></p> <p>“Many times, the orthopedic specialists say this (bone fracture) is something you can fix and the bones will heal. But the (primary ICU team) is looking at the overall picture of the patient’s health and saying, Yah, the bone will heal but the quality of life will be a lot less, you are going to be in the hospital for 2 weeks, you will be in the nursing home for 3 months, you may never walk again.” <i>Nurse</i></p>
Values and beliefs	<p>One physician described why he disagreed with another provider about withdrawing life support. “I think it was a personal philosophy of the other provider that they simply don’t withdraw—a religious, a little more broadly defined, a set of (ethical) beliefs that (the decision to withdraw life support) is not a decision we should be making.” <i>Physician</i></p> <p>“(Physicians) have different approaches about the relative value or sanctity of life. Everybody views that differently. (Physicians) still make those determinations and everybody puts that bar in a little bit different place.” Another physician noted that in one instance, such fundamental differences of beliefs caused physicians to give “completely different messages to the family.” <i>Physician</i></p> <p>“There (are) personal biases that differ in one’s own belief about what it means to be on artificial support for weeks or months—and how we interpret (poor outcomes and life support) or present it to a family is then colored by our own perceptions and bias.” <i>Physician</i></p>

having a perfectly acceptable quality of life when we had all given up on him. Now I think I’m much more circumspect and I don’t deal in absolutes. I was embarrassed that I had been so certain when the patient’s mother, who I considered an ignorant, unrealistic person—she was absolutely right!”

Many intensivists also noted that a lack of exposure to the long term expected or unexpected outcomes of their ICU patients was a barrier to counseling patients. One physician noted, “I don’t see these patients post ICU stay. So my world view is skewed by this. The only patients (I) see are doing poorly and come back to the ICU.” Other intensivists noted that their “work in the chronic ventilator unit” provided them exposure to long term outcomes of critically ill patients. This exposure enabled them to better counsel patients regarding chronic critical illness.

#### *Experiences of limiting life support in physician’s family*

Intensivists who experienced decisions to withdraw life support for their own family members could better understand, empathize with, or provide support to patients

and families during future life support decisions. One intensivist noted, “4 days after (my daughter) graduated from college someone ran a red light and broadsided her. I sat in the ICU and watched her die from her brain injuries for the next 30 h. That has had a very, very profound impact on me and how I make these decisions and how I talk to people, from having been on the other side of the bed. I have the ability and an insight and I talk to families in ways that others generally cannot because they haven’t been on the other side of the bed.”

#### Category 3: physician attitudes

##### *Investment in a good surgical outcome*

Surgeon and non-surgeon intensivists, as well as nurses, observed that when a physician was personally invested in a good surgical outcome, there was less inclination for that surgeon to address life support decisions, limit life support, or recognize a poor prognosis. For example, one surgeon intensivist noted, “(When a surgeon) has

**Table 5** “Physician relationship with patient and family” factors and illustrative quotes

Factor	Quotes
Hearing the patient’s wishes firsthand	<p>“(When I was a fellow in training), I met the patient when (she was) awake and still able to talk. She was very clear about (wanting to continue with full medical care). And when the family began to question (the utility of life support), and by the second day, they said eh, enough. And I talked with my (attending physician) about the fact that I was there that night when she came in and she said that (she would have wanted to continue). And he said, well, this is what the family wants and we are not going to disagree with them. (Not hearing the patient’s wishes really led my attending to go along with the family).” <i>Physician</i></p> <p>“(A patient was in acute respiratory failure and declined mechanical ventilation and desired comfort care.) And so, we treated the shortness of breath with morphine. But if you combine this event with a different care team who is not as (directly) familiar with (the patient’s wishes)—and there is a lot of hearsay (about patient wishes)—then very few (physicians) under those circumstances are comfortable of going with the patient’s wishes and giving morphine—until the decision can be revisited (in person with the patient or family).” <i>Physician</i></p> <p>Following an episode of life support, a patient expressed clear wishes to her intensivist that she never wanted life support again. Later, the patient was readmitted to the ICU coincidentally with the same provider and the patient’s family demanded to use life support. Because of a firsthand knowledge of the patient wishes, the intensivist went to great lengths to help the patient explain her wishes to her family. “This was highly uncomfortable (confronting the family), but one of the better things that I accomplished that month.” <i>Physician</i></p>
Engagement in family communication	<p>“I have seen certain (attending intensivists) that are very good at dealing with (decision making) and are very upfront and forward with families versus other (intensivists) that are not comfortable with dealing with that situation—and so they don’t address it and put it by the wayside, and the care gets prolonged because of that.” <i>Nurse</i></p> <p>“I know in my head (which physicians) I can expect not to have conversations (with the family) and (which physicians) I can expect to have that conversation.” <i>Nurse</i></p> <p>“My mentors had an intense interest in end-of-life issues. So I had a lot of training. So when I started my practice I felt very comfortable with that. I have seen some of my other partners who come in who just haven’t had a lot of experience and it is daunting because it is complicated—(being so inexperienced and uncomfortable with decision making makes some providers say) ‘Well, maybe I can just get through these next couple days and the next partner can do it.’” <i>Physician</i></p>
Family negotiation	<p>“Earlier in my career I just sort of deferred to what I perceived as autonomy pretty easily. (I anticipated that a patient would fully recover from critical illness requiring a few days of life support). His family said (life support) is inappropriate. And I guess I agreed very easily with that. Nowadays, I would have said “You are the decision-maker, I will respect what you say, but I want you to listen to me for a minute—and I would have had a little bit of push back.” <i>Physician</i></p> <p>“(Some physicians) are not comfortable guiding (families to) withdraw (life support). (There is) a failure... to relieve the family of some of the burden of the decision. Sometimes I perceive that a caregiver, often an elderly spouse, is presented with a shopping list of resuscitation items and is paralyzed and distraught... and cannot make that decision to withdraw an active support. (And in that case sometimes I guide the) outcome. The family member will say, ‘Well doctor, if you say so’ and I say, ‘I’m saying so’ This is not the textbook (example of) withdrawal of support or autonomy. But I guided that outcome and I do not apologize for it because I think it is the right thing to do. <i>Physician</i></p> <p>“You can’t push it on folks, but we (as physicians) should make a recommendation.” <i>Physician</i></p>

performed an elective surgery (and) there have been complications, I find tremendous reluctance for the surgeon to approach the family about end-of-life issues. People feel guilty that their surgery went bad. It is extremely uncomfortable to have contributed to a patient’s poor outcome.”

### *Specialty perspective*

Compared to specialists, intensivists were described as more likely to have a comprehensive, big-picture view of the patient’s clinical situation. Many participants perceived that specialists focused on prolonging life by curing disease at the expense of other aspects such as

prognosis, long term functional status, and quality of life. One intensivist noted, “One of the things that is brought to the table by an intensivist is a broader view of a patient’s condition—an incorporation of various subspecialty assessments. With oncology, it may be that the cancer is entirely curable; however, when bringing in the other aspects, the overall prognosis is different than that of the specific organ system.”

### *Values and beliefs*

A physician’s ethical and religious beliefs regarding life support were observed to be reasons for variability. One intensivist noted, “Some physicians just simply do not

believe that withdrawal of life support is appropriate in any circumstance—that it is a disrespect of life. (A while ago, I remember one cardiologist who) believed it was killing someone to deprogram their pacemaker. (These) kinds of beliefs are not easily modifiable.”

#### Category 4: physician relationship with patient and family

##### *Hearing the patient's wishes firsthand*

Intensivists who reported having heard the patient's wishes firsthand, rather than summarized by another provider, surrogate decision maker, or advance directive, more strongly advocated for those wishes than other providers who did not have a firsthand account. In describing one difficult decision, an experienced nurse commented, “It is a little easier to accept when you have somebody face-to-face, (the patient) telling you this is what I want, please honor my wishes (rather than looking at the advance directive where) the wishes are spelled out.” An intensivist commented that without a firsthand knowledge of patient wishes, “You cannot really assert against 15 family members who have made up their mind (to withdraw support). It is very difficult to explain (the rationale for continuing life support).”

##### *Engagement in family communication*

When faced with life support decisions, some intensivists readily engaged (prioritized or devoted time to) decision making, and other intensivists disengaged (avoided or delayed) decision making. While factors (such as workload) influenced physician engagement for a particular encounter, participants also noted that some physicians, regardless of such circumstances, were routinely and predictably more engaged than their colleagues in approaching life support decisions. Reasons cited for this engaged approach included interest, training, comfort, and general experience with providing end-of-life care. One nurse noted, “I know one physician who is very, very good with (life support decisions) and he tends to talk about them right away with the family. He is extremely interested in end-of-life care (and) really (approaches) it differently than other (physicians).” An intensivist described, “I know some (physicians) who don't have that much interest in (end-of-life care), so they just go with the flow. (They) want to avoid complex decisions with a difficult family or patient.”

##### *Family negotiation*

When disagreement arose between physicians and families regarding life support, some intensivists willingly

accepted the family wishes (deferred to their substituted judgment) and other intensivists pushed back against the family wishes, attempting to negotiate with families to make a different decision. Some physicians were more likely to offer a specific recommendation to limit or continue life support. The following experience highlights both approaches, first a physician who pushed back against family wishes to withdraw support and an incoming physician who did not push back, but accepted the family wishes. An intensivist recounted, “(The patient's) wife said (the patient) didn't want life support. (But) I said, ‘No, this is imminently reversible. We can get past this.’ I resisted (the wife) strongly because (the patient) was getting better. A new (intensivist) came in on Monday, (the wife) gave the same drill all over again and they withdrew life support and (the patient) died that day. And he was going to survive with minimal to no impairment. But, (the wife) said stop, they stopped, and he died.” Another physician noted that when he recommended life support withdrawal, but the family wished to continue, he would readily try to persuade the family by “keep engaging (the family) in discussion for a long time—as long as it takes.” Another intensivist offered an alternative approach, believing that he was “sophisticated enough not to demand that the patient's family withdraw.”

## Discussion

We identified eleven factors that ICU providers perceived are important sources of physician variability in decisions to limit life support. While some of these factors have previously been described [10–13, 18–20], other factors such as workload and competing priorities, shift changes and handoffs, experiences of unexpected patient recovery, limiting life support in one's own family, and firsthand knowledge of patient's wishes have not previously been well described.

Physician level variability has both advantages and disadvantages in life support decision making. One advantage is the ability to adapt decision making to a diversity of countries, cultures, religions, resource utilization, and patient and family involvement [11, 14, 21–23]. Presenting a variety of provider viewpoints (such as a long term specialist who knows the patient well versus a short term intensivist) may improve decision making. But, if the conflicting messages are not coordinated, confusion and mistrust may ensue among patients and family members. Physician variability can also lead to differences in timing, frequency, prioritization, and quality of decisions to limit life support [11], which were perceived to be possible negative consequences of many factors identified in our study. Nurse participants provided a



unique perspective regarding the impact of physician variability on patient and family-centered factors. Furthermore, both medical and surgical intensivists confirmed previously described findings that surgical investment may lead to an over emphasis on continuing life support [15–17, 24].

The environment in which a physician approaches life support decisions is an important source of physician variability. While some aspects of the decision environment are not easily modifiable (such as academic versus community practice setting, hospital culture, and ICU size), [10, 11, 21, 25–27] other factors such as handoffs, staffing models, and workload may represent opportunities for improvement [28–30]. Workload has been associated with numerous poor ICU outcomes [31–36], and we identified that increased workload may be associated with delayed decisions to limit life support because of competing priorities. Offloading the time consuming task of in-depth family communication may explain why the addition of palliative care consultation improves some end-of-life outcomes [37]. As has been documented with other clinical information [38, 39], key information regarding life support decisions may not be adequately communicated during handoffs. Including information regarding patient and family preferences during handoffs is the focus of quality improvement efforts in our institution. Physician experiences and training also contribute to physician variability [11, 13, 26]. Providing end-of-life care, especially family communication, is a skill that intensivists should master [40]. The variability in how and to what level physicians master this skill highlights the importance of teaching end-of-life care and life support decision making. We identified that exposure to long term patient outcomes after an ICU stay, as well as surprising outcomes influenced decisions. Just as physicians are unlikely to forget instances of missed diagnoses [41], experiences with unexpected patient survival seemed to be associated with high emotional attachment and vivid remembrance and were perceived to change providers' attitudes and approaches.

Our study has several limitations. It was conducted in a single tertiary care academic institution in the Midwest United States, and thus without further exploration, the results may not generalize to other settings. Additionally, we explored providers' perceptions and there may be a discrepancy between the providers' perceptions, surrogates' perceptions, and what actually happens. It is possible that participants misinterpreted their own experiences and the experiences and intentions of their colleagues. Moderate physician and nurse response rates of 60 and 29 % may have limited the number, variety, and depth of factors that were identified, as well as biased the results towards the viewpoint of providers who have an interest in end-of-life decision making. Additionally, most physician participants were male and all participants were Caucasian. While the overall number of participants was not large, we reached data saturation.

Our findings have several implications. First, providers should be aware that physician-level variability exists and which factors contribute to such variability. Second, further investigation is needed to examine ways to address the potentially adverse effects of factors such as workload, competing priorities, shift changes, and handoffs. Formally incorporating nursing input into decision making and handoffs should be prioritized. Third, efforts should continue to develop standards for approaching life support decisions so that intensivist effort can be measured and recognized [42]. Fourth, training should focus on providing the skill set and team leadership necessary to provide high quality decisions [43]. Incorporating exposure to long term outcomes of critically ill patients should be explored. Fifth, means to objectively assess, document, and perhaps display patient wishes should be further investigated, especially because firsthand knowledge in the ICU is so valuable.

**Acknowledgments** The authors would like to thank J. Randall Curtis MD, MPH for his thoughtful guidance and manuscript review. Financial/non financial disclosures: Financial Support was provided by Mayo Clinic Sponsorship Board and Mayo Foundation.

**Conflicts of interest** The authors have no conflicts of interest to disclose.

---

## Appendix: interview guide questions

For physicians:

1. How do you (or intensivists) make decisions to limit or continue life support?
  - a. What factors influence decisions to limit or continue life support?

For nurses:

1. How do physicians make decisions to limit or continue life support?
  - a. What factors influence decisions to limit or continue life support?
  - b. What is your role as a nurse in making/contributing to decisions about continuing or limiting life support?

For physicians and nurses:

2. Prior research has established that both patient preference and patient prognosis are strong influences in the decision to limit life support. Aside from the patient's life support preferences and aside from the



- patient's prognosis, which other factors influence the decision to limit life support?
3. Why do physicians make varying decisions to limit or continue life support?
    - a. Suppose two different physicians were treating the same patient, what factors would lead different decisions being made?
    - b. Can you give an example?
  4. What does it mean to withdraw life support prematurely?
    - a. Can you give an example of when life support was withdrawn prematurely?
    - b. Which factors led to premature withdrawal of life support?
  5. What does it mean to continue life support unnecessarily?
    - a. Can you give an example of when life support was continued unnecessarily?
    - b. Which factors led to life support being continued unnecessarily?
  6. Have you ever disagreed with another provider about the decision to limit life support?
    - a. Can you give an example of when life support was withdrawn and you disagreed?
    - b. Why did you disagree?
    - c. Can you give an example of when life support was continued and you disagreed?
    - d. Why did you disagree?
  7. Have you ever felt regret regarding a decision to limit or continue life support?
  8. Describe a situation in which a decision was made to limit life support and the end result was what you believed to be a good outcome.
    - a. What made it a good outcome?
  9. Describe a situation in which a decision was made to limit life support and the end result was what you believed to be a poor outcome.
    - a. What made it a poor outcome?
  10. What interventions would you propose that could improve life support decision making?
  11. Is there anything else you would like to share about this topic?

## References

1. Cook D, Rucker G, Marshall J, Sjøkvist P, Dodek P, Griffith L, Freitag A, Varon J, Bradley C, Levy M, Finfer S, Hamielec C, McMullin J, Weaver B, Walter S, Guyatt G (2003) Withdrawal of mechanical ventilation in anticipation of death in the intensive care unit. *N Engl J Med* 349:1123–1132
2. Azoulay E, Pochard F, Garrouste-Orgeas M, Moreau D, Montesino L, Adrie C, de Lassence A, Cohen Y, Timsit JF (2003) Decisions to forgo life-sustaining therapy in ICU patients independently predict hospital death. *Intensive Care Med* 29:1895–1901
3. Chen YY, Connors AF Jr, Garland A (2008) Effect of decisions to withhold life support on prolonged survival. *Chest* 133:1312–1318
4. Azoulay E, Pochard F, Kentish-Barnes N, Chevret S, Aboab J, Adrie C, Annane D, Bleichner G, Bollaert PE, Darmon M, Fassier T, Galliot R, Garrouste-Orgeas M, Goulenok C, Goldgran-Toledano D, Hayon J, Jourdain M, Kaidomar M, Laplace C, Larche J, Liotier J, Papazian L, Poisson C, Reignier J, Saidi F, Schlemmer B (2005) Risk of post-traumatic stress symptoms in family members of intensive care unit patients. *Am J Respir Crit Care Med* 171:987–994
5. Poncet MC, Toullic P, Papazian L, Kentish-Barnes N, Timsit JF, Pochard F, Chevret S, Schlemmer B, Azoulay E (2007) Burnout syndrome in critical care nursing staff. *Am J Respir Crit Care Med* 175:698–704
6. Mealer M, Jones J, Moss M (2012) A qualitative study of resilience and posttraumatic stress disorder in United States ICU nurses. *Intensive Care Med* 38:1445–1451
7. Quenot JP, Rigaud JP, Prin S, Barbar S, Pavon A, Hamet M, Jacquot N, Blettery B, Herve C, Charles PE, Moutel G (2012) Suffering among carers working in critical care can be reduced by an intensive communication strategy on end-of-life practices. *Intensive Care Med* 38:55–61
8. Carlet J, Thijs LG, Antonelli M, Cassell J, Cox P, Hill N, Hinds C, Pimentel JM, Reinhart K, Thompson BT (2004) Challenges in end-of-life care in the ICU. Statement of the 5th international consensus conference in critical care: Brussels, Belgium, April 2003. *Intensive Care Med* 30:770–784
9. Truog RD, Campbell ML, Curtis JR, Haas CE, Luce JM, Rubenfeld GD, Rushton CH, Kaufman DC (2008) Recommendations for end-of-life care in the intensive care unit: a consensus statement by the American College of critical care medicine. *Crit Care Med* 36:953–963

10. Garland A, Connors AF (2007) Physicians' influence over decisions to forego life support. *J Palliat Med* 10:1298–1305
11. Frost DW, Cook DJ, Heyland DK, Fowler RA (2011) Patient and healthcare professional factors influencing end-of-life decision-making during critical illness: a systematic review. *Crit Care Med* 39:1174–1189
12. Christakis NA, Asch DA (1993) Biases in how physicians choose to withdraw life support. *Lancet* 342:624–626
13. Christakis NA, Asch DA (1995) Medical specialists prefer to withdraw familiar technologies when discontinuing life support. *J Gen Intern Med* 10:491–494
14. Sprung CL, Cohen SL, Sjkovist P, Baras M, Bulow HH, Hovilehto S, Ledoux D, Lippert A, Maia P, Phelan D, Schobersberger W, Wennberg E, Woodcock T (2003) End-of-life practices in European intensive care units: the ethicus study. *JAMA* 290:790–797
15. Schwarze ML, Bradley CT, Brasel KJ (2010) Surgical “buy-in”: the contractual relationship between surgeons and patients that influences decisions regarding life-supporting therapy. *Crit Care Med* 38:843–848
16. Schwarze ML, Redmann AJ, Alexander GC, Brasel KJ (2013) Surgeons expect patients to buy-into postoperative life support preoperatively: results of a national survey. *Crit Care Med* 41:1–8
17. Schwarze ML, Redmann AJ, Brasel KJ, Alexander GC (2012) The role of surgeon error in withdrawal of postoperative life support. *Ann Surg* 256:10–15
18. Schenker Y, Tiver GA, Hong SY, White DB (2012) Association between physicians' beliefs and the option of comfort care for critically ill patients. *Intensive Care Med* 38:1607–1615
19. Bulow HH, Sprung CL, Baras M, Carmel S, Svantesson M, Benbenishty J, Maia PA, Beishuizen A, Cohen S, Nalos D (2012) Are religion and religiosity important to end-of-life decisions and patient autonomy in the ICU? The ethicatt study. *Intensive Care Med* 38:1126–1133
20. Buchman TG, Cassell J, Ray SE, Wax ML (2002) Who should manage the dying patient?: rescue, shame, and the surgical ICU dilemma. *J Am Coll Surg* 194:665–673
21. Barnato AE, Tate JA, Rodriguez KL, Zickmund SL, Arnold RM (2012) Norms of decision making in the ICU: a case study of two academic medical centers at the extremes of end-of-life treatment intensity. *Intensive Care Med* 38:1886–1896
22. Cohen S, Sprung C, Sjkovist P, Lippert A, Ricou B, Baras M, Hovilehto S, Maia P, Phelan D, Reinhart K, Werdan K, Bulow HH, Woodcock T (2005) Communication of end-of-life decisions in European intensive care units. *Intensive Care Med* 31:1215–1221
23. Levinson W, Kao A, Kuby A, Thisted RA (2005) Not all patients want to participate in decision making. A national study of public preferences. *J Gen Intern Med* 20:531–535
24. Redmann AJ, Brasel KJ, Alexander CG, Schwarze ML (2012) Use of advance directives for high-risk operations: a national survey of surgeons. *Ann Surg* 255:418–423
25. Keenan SP, Busche KD, Chen LM, Esmail R, Inman KJ, Sibbald WJ (1998) Withdrawal and withholding of life support in the intensive care unit: a comparison of teaching and community hospitals. The Southwestern Ontario critical care research network. *Crit Care Med* 26:245–251
26. Cook DJ, Guyatt GH, Jaeschke R, Reeve J, Spanier A, King D, Molloy DW, Willan A, Streiner DL (1995) Determinants in Canadian health care workers of the decision to withdraw life support from the critically ill. Canadian critical care trials group. *JAMA* 273:703–708
27. Bewley JSBF, Waters K, Manara AR (2000) The influence of intensive care unit (ICU) workload on decisions to withdraw treatment. *Br J Anaesth* 84:661–662
28. Wilson ME, Samirat R, Yilmaz M, Gajic O, Iyer VN (2013) Physician staffing models impact the timing of decisions to limit life support in the intensive care unit. *Chest* 143:656–663
29. Baggs JG, Norton SA, Schmitt MH, Dombek MT, Sellers CR, Quinn JR (2007) Intensive care unit cultures and end-of-life decision making. *J Crit Care* 22:159–168
30. Rhodes A, Moreno RP, Azoulay E, Capuzzo M, Chiche JD, Eddleston J, Endacott R, Ferdinande P, Flaatten H, Guidet B, Kuhlen R, Leon-Gil C, Martin Delgado MC, Metnitz PG, Soares M, Sprung CL, Timsit JF, Valentin A (2012) Prospectively defined indicators to improve the safety and quality of care for critically ill patients: a report from the task force on safety and quality of the European society of intensive care medicine (ESICM). *Intensive Care Med* 38:598–605
31. Landrigan CP, Rothschild JM, Cronin JW, Kaushal R, Burdick E, Katz JT, Lilly CM, Stone PH, Lockley SW, Bates DW, Czeisler CA (2004) Effect of reducing interns' work hours on serious medical errors in intensive care units. *N Engl J Med* 351:1838–1848
32. Tarnow-Mordi WO, Hau C, Warden A, Shearer AJ (2000) Hospital mortality in relation to staff workload: a 4-year study in an adult intensive-care unit. *Lancet* 356:185–189
33. Tucker J (2002) Patient volume, staffing, and workload in relation to risk-adjusted outcomes in a random stratified sample of UK neonatal intensive care units: a prospective evaluation. *Lancet* 359:99–107
34. Dimick JB, Pronovost PJ, Heitmiller RF, Lipsett PA (2001) Intensive care unit physician staffing is associated with decreased length of stay, hospital cost, and complications after esophageal resection. *Crit Care Med* 29:753–758
35. Hugonnet S, Chevolet JC, Pittet D (2007) The effect of workload on infection risk in critically ill patients. *Crit Care Med* 35:76–81
36. Baker DR, Pronovost PJ, Morlock LL, Geocadin RG, Holzmuller CG (2009) Patient flow variability and unplanned readmissions to an intensive care unit. *Crit Care Med* 37:2882–2887
37. Nelson JE, Bassett R, Boss RD, Brasel KJ, Campbell ML, Cortez TB, Curtis JR, Lustbader DR, Mulkerin C, Puntillo KA, Ray DE, Weissman DE (2010) Models for structuring a clinical initiative to enhance palliative care in the intensive care unit: a report from the IPAL-ICU project (improving palliative care in the ICU). *Crit Care Med* 38:1765–1772
38. Maughan BC, Lei L, Cydulka RK (2011) ED handoffs: observed practices and communication errors. *Am J Emerg Med* 29:502–511
39. Sri D (2012) A telephone survey of intensive care unit handover practices in the UK. *Intensive Care Med* 38:2080
40. Shanawani H, Wenrich MD, Tonelli MR, Curtis JR (2008) Meeting physicians' responsibilities in providing end-of-life care. *Chest* 133:775–786
41. Croskerry P (2005) Diagnostic failure: a cognitive and affective approach. In: Henriksen K BJ, Marks ES, et al. (eds) *Advances in patient safety: from research to implementation (volume 2: concepts and methodology)*. Rockville (MD): Agency for healthcare research and quality, US
42. Nelson JE, Mulkerin CM, Adams LL, Pronovost PJ (2006) Improving comfort and communication in the ICU: a practical new tool for palliative care performance measurement and feedback. *Qual Saf Health Care* 15:264–271
43. Soares M, Piva JP (2012) Physicians just need to be better trained to provide the best care at the end-of-life. *Intensive Care Med* 38:342–344