

End-of-Life Care in the Intensive Care Unit Can We Simultaneously Increase Quality and Reduce Costs?

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The incidence and costs of critical illness are increasing in the United States at a time when there is a focus both on limiting the rising costs of healthcare and improving the quality of end-of-life care. More than 25% of healthcare costs are spent in the last year of life, and approximately 20% of deaths occur in the intensive care unit (ICU). Consequently, there has been speculation that end-of-life care in the ICU represents an important target for cost savings. It is unclear whether efforts to improve end-of-life care in the ICU could significantly reduce healthcare costs. Here, we summarize recent studies suggesting that important opportunities may exist to improve quality and reduce costs through two mechanisms: advance care planning for patients with life-limiting illness and use of time-limited trials of ICU care for critically ill patients. The goal of these approaches is to ensure patients receive the intensity of care that they would choose at the end of life, given the opportunity to make an informed decision. Although these mechanisms hold promise for increasing quality and reducing costs, there are few clearly described, effective methods to implement these mechanisms in routine clinical practice. We believe basic science in communication and decision making, implementation research, and demonstration projects are critically important if we are to translate these approaches into practice and, in so doing, provide high-quality and patient-centered care while limiting rising healthcare costs.

As a result of our aging population, as well as advances in the effectiveness and availability of critical care, the incidence, prevalence, and costs of critical illness in the United States have increased dramatically (1, 2). Intensive care unit (ICU) beds account for approximately 10% of hospital beds and 20% of all healthcare costs (2). In addition, nearly 25% of our healthcare resources are spent on the 6% of people who die in a given year (3–5). Because approximately 20% of deaths in the United States occur during or shortly after a stay in the ICU, critical care represents an important and expensive setting for end-of-life care (3, 6). Consequently, ICU-based end-of-life care presents an attractive target for reducing healthcare costs.

When considering ways to reduce expenditures for end-of-life care in the ICU, two questions arise: (1) are there patients currently dying in the ICU who, given the opportunity to make informed choices, would have preferred end-of-life care that did not involve ICU admission? and (2) for those who die in

the ICU, might a focus on improving palliative care earlier in the ICU stay increase quality while reducing costs? Four decades of research on end-of-life care suggests that people who are dying often spend their final days with a significant burden of pain and other symptoms and that many receive care they would not choose (7, 8). Communication among clinicians, patients, and their families about the goals of care are infrequent, often occurring late in the course of illness (9, 10). Furthermore, studies of ICU clinicians suggest that a substantial proportion of ICU care is more resource intensive than warranted and is therefore considered “inappropriate.” (11) This has caused speculation that resources are being “wasted” on end-of-life care in the ICU (12).

Despite these sobering statistics, and the apparently common-sense suggestion that reducing end-of-life care in the ICU will reduce healthcare costs, Luce and Rubenfeld have argued persuasively that, despite the importance of improving end-of-life care in the ICU, significant cost savings will not be achieved by focusing on reducing ineffective ICU care at the end of life (13). This argument is based on four important considerations. First, the most expensive patients are often those who have long ICU stays and an intermediate risk of death at ICU admission. For these individuals, it is difficult to predict the outcome of ICU care. Second, although the most extreme “cost-ineffective” critical care is provided to patients who have a very low likelihood of survival, oftentimes they (or their surrogates) believe that life should be prolonged at all costs despite small chance for success. This represents a small number of patients, and stopping this care is often difficult, requiring overriding strongly held patient or family preferences. Third, shortening stays in the ICU may not reduce costs as much as expected, because a large proportion of ICU costs are fixed, such as capital expenditures and building maintenance. As such, these costs are unlikely to be saved by shortening ICU lengths of stay unless the number of ICU beds is reduced. Finally, early high-profile interventions to reduce intensive care at the end of life (through advance directives before hospitalization and facilitated communication during hospitalization) were ineffective, raising questions about the utility of such efforts (14, 15). In this commentary, we argue that recent studies and a heightened public awareness of the risks of high-intensity care at the end of life, as well as the benefits of palliative care, have altered the landscape enough to warrant a reexamination of these issues, especially for those patients with preexisting life-limiting illness.

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REEXAMINING ARGUMENTS SUGGESTING LIMITED COST-SAVINGS POTENTIAL

We Cannot Identify, *A Priori* and with Certainty, the Critically Ill Patients Who Will Die and Therefore Cannot Target Them for Reduced ICU Care

Only a small minority of the most expensive patients present with exceedingly high risks of mortality such that they would

fit in a category of medical futility (13). Although there has been some improvement in prognostic scoring systems for critically ill patients, we are rarely able to predict, with certainty, which individual critically ill patients will not survive the ICU, and this is unlikely to change in the foreseeable future (16). However, two approaches may allow us to identify patients for whom critical care is not in their best interests, as defined by the individual patient. First, it is possible to identify patients who are unlikely to achieve their own goals of care even with an ICU admission. These may be patients with an expected quality of life after critical illness that the informed patient would find unacceptable or for whom the ICU would represent a burden of care that they would not choose to endure. For these patients, patient-centered advance care planning may prevent an unwanted and unwarranted ICU admission altogether (17). Advance care planning has successfully reduced ICU admissions in a randomized trial of elderly hospitalized patients (18) and in an observational study on a community level (19). Second, even with effective advance care planning, some patients with life-limiting illness may choose a trial of intensive care if there is a reasonable chance (from the patient's perspective) that the ICU may help them achieve their goals of care. For these patients, early communication in the ICU among clinicians, patients, and patients' families can help clarify the goals of care and lay the groundwork for reexamining whether those goals are likely to be achieved as the ICU course unfolds. Such time-limited trials of ICU care may ultimately result in survival or may entail a transition toward a focus on palliative care (20). Certainly, challenges exist to the implementation of time-limited trials that include determining how long a trial should be as well as how much improvement is needed to guide decisions. Nonetheless, because studies of advance planning and communication have resulted in improved patient and family outcomes, this is a promising approach that requires additional evaluation (18, 21).

Thus, the primary focus of cost savings in the ICU shifts from predicting which patients will die in the ICU at great cost to one that identifies the intensity of care that informed patients and families desire. This approach targets discussions both before and shortly after ICU admission and the savings (humanistic and economic) that could ensue. This approach is especially relevant for patients with a life-limiting or terminal illness.

Savings Are Difficult to Achieve by Unilaterally Refusing or Withdrawing ICU Care That Clinicians Believe Is Futile

True medical futility is rare and represents some of the most difficult situations that ICU clinicians address. Critical care clinicians are often powerfully distressed by caring for these patients, and many believe this "futile care" represents an important focus for cost savings (22). Here we agree with Luce and Rubenfeld (13). These patients represent the tip of the iceberg for ICU costs because they are relatively rare. For example, in the SUPPORT study, investigators enrolled patients with advanced chronic, life-limiting disease who were admitted to the hospital with a serious acute illness. Less than 3% of these patients met a definition of futility (i.e., <1% chance of 2-month survival) (23). In addition, they found that 86% of these patients died within 5 days of a futility diagnosis. Refusing or stopping treatment based on strict futility criteria would not save weeks or months of ICU-level treatment for most of these patients (23). Refusing or withdrawing such futile treatments over patient or family objections is difficult, requires a fair process, and may have adverse consequences for family members. Such approaches may have value (24, 25), but they are unlikely to result in significant cost savings because only a small minority of

patients, if they are informed about their prognosis and the burdens of treatment, choose such resource-intensive care in the face of such low chances of survival (18, 26). Nonetheless, even if significant cost savings are unlikely in these cases, it is important to ensure that good quality communication addresses conflict, builds trust, and strives toward consensus and the best possible care for the patient.

Savings Are Difficult to Achieve Due to Fixed Costs of ICU Care

Obtaining cost savings in the context of critical care can only be achieved in one of three ways; (1) reducing the daily cost of ICU care, (2) reducing the number of people who receive intensive care (assuming they receive less costly care instead), and (3) reducing the number of days in the ICU (replacing these days with less costly care).

There may be ways of using expensive ICU diagnostics tests and treatments more efficiently, thus reducing the daily cost of ICU care. The recent focus on stewardship of healthcare resources makes these issues particularly timely for critical care (27) but beyond the scope of the current discussion. Instead, we focus on patient-centered advance care planning to prevent unwanted and unwarranted ICU admissions altogether and time-limited trials of ICU care that may reduce ICU length of stay.

An important argument against realizing substantial savings from advance care planning and time-limited trials has been the high fixed costs of providing critical care (13, 28, 29). Fixed costs are those that are not considered to vary with patient volume (30), such as property, plant, and equipment (31), a designation that is sometimes extended to contracted staff (13). High fixed costs, relative to variable costs, make hospitals sensitive to changes in patient volume (32), because the additional cost to provide actual patient care is small. For example, if staff costs are included as a fixed cost, the additional costs to provide patient care would only include direct medical supply costs (33). When patient volume is decreased, the hospital saves on the cost of supplies but loses 100% of the revenue for patient care. Indeed, those responsible for the financial management of hospitals are often resistant to efforts to moderate patient volume for fear that lowering revenue will threaten the ability to cover large fixed costs (34).

What proportion of the total cost of ICU care is fixed costs? A study from Cook County categorized fixed costs as 84% of the total costs of critical care (35). Luce and Rubenfeld argue correctly that for an institution to recoup these fixed costs in the short term would require firing staff and closing ICU beds (13). However, given the aging of the population and the anticipated rise in the incidence of critical illness, there has been speculation that the United States will see increasing demand for, and limited potential for equivalent expansion of supply in, critical care resources (1, 36, 37). Reducing unwanted and unwarranted ICU admission may present an important, long-term opportunity for minimizing growth in costs.

All costs can be categorized as variable (that is, dependent on volume) if the time horizon is long enough. This can be seen historically: in the face of increasing demands, new and larger ICU units are constructed and staffed to meet this demand (2). Thus, from a long-term perspective, even costs for construction can be categorized as variable costs, making them responsive to shifts in volume. If reducing the provision of unwanted or unwarranted ICU care reduces the demand for ICU resources enough to impact supply, the long-term response would most likely be a reallocation of scarce healthcare resources or, at a minimum, a reduction in the rate of increase in ICU beds that would otherwise be seen. Even though this could reduce the expansion

of the field of critical care, it would be an acceptable and even desirable outcome given rising demand for healthcare and other public services that compete for resources at the societal level.

Advance Directives and End-of-Life Care Discussions Do Not Result in Improved Quality or Reduced Costs

Early negative studies of advance directives and end-of-life care discussions raised concerns that interventions to improve communication about end-of-life care may be doomed to failure (14, 15, 38). However, recent studies have shown that communication about end-of-life care among patients with cancer is associated with increased quality of life, reduced use of intensive life-sustaining treatments, and reduced healthcare costs at the end of life (39, 40). A recent randomized trial from Australia targeting hospitalized patients over age 80 years showed that communication—in the form of advance care planning—was associated with improved quality of life, reduced ICU use at the end of life, and reduced psychological symptoms among family members (18). These studies suggest promise for such interventions to improve quality of life and quality of care while simultaneously reducing healthcare costs. For this promise to be realized, we need to advance the application of basic research in communication and decision making to the clinical setting and develop feasible ways to translate effective communication about end-of-life care into clinical practice.

Despite the importance of communication about end-of-life care, numerous studies suggest that the quality of clinician communication about end-of-life care remains poor, including discussions about prognosis (41, 42), advance care planning (43), and shared decision making (44). Although average family satisfaction with end-of-life care in the ICU tends to be relatively high, satisfaction with clinician communication is often lower, and families report that they experience distress as a result of poor clinician communication (45, 46). Physicians appear to be unaware of their failure to meet patients' communication needs, reporting satisfaction with their own communication that is unrelated to patient and family evaluations (47).

Some evidence suggests that the US public has become increasingly aware of the importance of advance care planning. Recent studies reported that approximately 70% of Americans for whom decisions about end-of-life care were made had advance directives in place (48, 49). A public survey found that over 95% of Americans believed that patients should be offered palliative care at the end of life and that palliative care should be a top priority in our healthcare system (50). Despite the "death panel" rhetoric of 2008 (51), these findings suggest that our culture may be moving toward a greater acceptance of advance care planning and palliative care; efforts to incorporate routine advance care planning or ICU-based time-limited trials may, therefore, be met by a more receptive general public.

RECENT EVIDENCE THAT PALLIATIVE CARE IN THE ICU MAY RESULT IN COST SAVINGS

A recent review proposed three models for integrating palliative care into the ICU (52): (1) the consultative model, in which this care is provided by palliative care specialists; (2) the integrative model, in which ICU clinicians are trained to provide palliative care; and (3) a mixed model incorporating both of these approaches. These categories are useful in summarizing recent studies examining efforts to reduce costs by improving palliative care in the ICU.

Before–after studies using early palliative care consultation report reduced ICU lengths of stay for patients who die by allowing patients and families to make decisions that limit use

of expensive life-sustaining treatment at the end of life (53, 54). These studies provide some evidence that palliative care consultation in the ICU may reduce healthcare costs while maintaining or increasing quality of care. Similarly, two randomized trials of ethics consultation in the ICU for patients for whom value-related treatment conflicts arose reported fewer ICU days before death without increased mortality, supporting the concept that a focus on communication and conflict resolution can reduce ICU length of stay before death (55, 56). Finally, observational studies of palliative care consultation in acute care have suggested reduced healthcare costs and increased quality associated with palliative care consultation (57–61). However, it is important to acknowledge that the strength of evidence is limited, and further studies are needed to confirm and define the benefits.

Studies testing integrative models have been mixed. In a before–after study focusing on improving communication by ICU clinicians in family conferences, patients who died had shorter lengths of stay, whereas overall mortality for the ICU improved (62). However, a follow-up study of this intervention showed no benefit (63). A before–after study of an integrative intervention that used a multifaceted quality improvement approach showed reduced ICU lengths of stay for patients who died, increased nurse ratings of end-of-life care, and a trend toward improved family ratings (64). However, a subsequent cluster-randomized trial of the same intervention showed no changes in the care delivered or patient or family outcomes (65). A recent systematic review supports the hypothesis that consultative interventions may be more effective than integrative interventions (66). Unfortunately, there are no published studies evaluating mixed models that incorporate the strengths of both consultative and integrative approaches. The failure to confirm before–after studies suggest either insufficient interventions or lack of success in implementing interventions in other settings.

IF A PROPORTION OF CARE IN THE ICU WAS SHIFTED TO ANOTHER CARE SETTING, WHAT COST SAVINGS COULD BE REALIZED?

Even if costs of ICU care can be reduced, estimating the practical result of those savings is problematic. Exactly how provider organizations will respond to reductions in long-term costs, and whether this will result in lower overall expenditures, is uncertain. Some might realize any gain in efficiency as higher operating margins and invest in more infrastructure. If outcomes-focused accountable care becomes the new maxim, others might translate efficiency gains into reduced costs to gain competitive advantage. Rather than attempt to address these uncertainties, we focus on potential savings through a simple example from the health system perspective.

A study published in 2006 estimated that there were 5,980 noncoronary ICUs in the United States in 1997 (67). The total number of ICU beds was 72,000, with a daily census of around 55,000 ICU patients (based on an estimated occupancy rate of 76%). That equates to 19.97 million bed-days of ICU care per year. In describing the characteristics of patients, this study found that 6% were older than 85 years of age. If we extrapolate these figures as being roughly representative (if not a conservative underestimation) of current ICU resources, we can estimate the savings that would result if only a proportion of care for patients more than 85 years old was shifted from the ICU.

Let us assume, as has been argued elsewhere (13, 28, 29, 68), that the short-term, direct variable cost to provide one additional day of ICU care is the relevant value to use. Based on previous research, let us also assume that the difference in direct variable cost (excluding staff salary and equipment costs)

between a day of care at the end of an ICU stay versus a day in an alternative care setting, such as acute care, is around \$140 (2011 inflation-adjusted US dollars) (68). Based on these assumptions, if 25% of ICU bed-days for patients over the age of 85 years were shifted to the alternative location of care outside the ICU, a saving of \$41.9 million (2011 US dollars) would result. Even with the conservative assumptions used, this example suggests that savings associated with reducing unwanted and unwarranted care in the ICU could be realized.

Admittedly, savings of \$41.9 million are modest in comparison with current healthcare costs. However, numerous unknown factors in these calculations suggest that this may be a small fraction of potential savings. For instance, the full extent of unwanted ICU care is unknown. The Australian trial of advance care planning for hospitalized patients over age 80 years suggested that as much as 100% of patients may opt not to have ICU care (albeit with wide confidence intervals) (18). In addition, we focus on patients over age 85 years of age only because data are available to guide estimates; there is likely a much larger number of younger patients with severe, chronic, life-limiting illness who are admitted to the ICU who would also opt not to have intensive care. Importantly, in using this difference in marginal, direct variable costs, savings could be achieved by reducing ICU length of stay alone. Avoiding some admissions altogether, thus avoiding days that cost more than the last day of ICU care, would most likely result in even greater savings.

These calculations are intended as only one example of the type of data and analyses that might help answer the question of whether there are significant cost savings to be had. Future studies are needed to estimate a range of parameters, including the proportion of patients who would opt not to receive ICU care if they had effective advance care planning and the potential to reduce days in the ICU through effective communication and time-limited trials. Other factors that are unknown include the full societal costs associated with providing care in alternative settings outside the ICU and the resources required to implement patient-centered advance care planning effectively. There will be a balance between the cost to effectively reduce unwanted and unwarranted ICU care through different advance care planning models and any potential savings that may result. Future studies are needed to develop a more complete understanding of the complex and multifaceted issues involved.

CONCLUSIONS

Healthcare costs are one of the major economic problems facing developed nations. No single approach will remedy this. However, identifying opportunities to limit healthcare costs while simultaneously maintaining or improving quality and access to care will be essential. One important opportunity is to identify effective ways to help patients with chronic life-limiting illness decide whether a course of intensive care is likely to achieve their personal goals of care and whether they are willing to accept the burdens of such treatment. For those who decide they want to undergo such treatment, we have an opportunity to view this treatment as a time-limited trial and to prospectively consider the circumstances under which we should consider such a trial a failure—resulting in a transition to a focus on palliation. These approaches are important to improve quality independent of their effect on costs but may also offer opportunities to reduce costs. To better understand the most effective and cost-effective ways to implement these approaches, we need basic research on communication and decision making, implementation research, and demonstration projects. Even with such efforts, some patients will choose life-sustaining treatments in all circumstances. Although this creates difficult situations for ICU clinicians as

well as our society, studies suggest that this will be a small minority of patients. Regardless, we have an obligation to identify and implement methods to help patients and their families make informed choices. If such methods can be proven effective and successfully implemented, we have the potential to improve the quality of care and simultaneously contribute to efforts to reduce healthcare costs.

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