ORIGINAL ARTICLE

Estimates of the Need for Palliative Care Consultation across United States Intensive Care Units Using a Trigger-based Model

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Abstract

Rationale: Use of triggers for palliative care consultation has been advocated in intensive care units (ICUs) to ensure appropriate specialist involvement for patients at high risk of unmet palliative care needs. The volume of patients meeting these triggers, and thus the potential workload for providers, is unknown.

Objectives: To estimate the prevalence of ICU admissions who met criteria for palliative care consultation using different sets of triggers.

Methods: Retrospective cohort study of ICU admissions from Project IMPACT for 2001–2008. We assessed the prevalence of ICU admissions meeting one or more primary palliative care triggers, and prevalence meeting any of multiple sets of triggers.

Measurements and Main Results: Overall, 53,124 (13.8%) ICU admissions met one or more primary triggers for palliative care consultation. Variation in prevalence was minimal across different types of units (mean 13.3% in medical ICUs to 15.8% in trauma/burn ICUs; P = 0.41) and individual units (mean 13.8%, median 13.0%, interquartile range, 10.2–16.5%). A comprehensive model combining multiple sets of triggers identified a total of 75,923 (19.7%) ICU admissions requiring palliative care consultation; of them, 85.4% were captured by five triggers: (1) ICU admission after hospital stay greater than or equal to 10 days, (2) multisystem organ failure greater than or equal to three systems, (3) stage IV malignancy, (4) status post cardiac arrest, and (5) intracerebral hemorrhage requiring mechanical ventilation.

Conclusions: Approximately one in seven ICU admissions met triggers for palliative care consultation using a single set of triggers, with an upper estimate of one in five patients using multiple sets of triggers; these estimates were consistent across different types of ICUs and individual units. These results may inform staffing requirements for providers to ensure delivery of specialized palliative care to ICU patients nationally.

Keywords: end-of-life care; critical care; palliative medicine

At a Glance Commentary

Scientific Knowledge on the Subject: Screening criteria, or triggers, for palliative care consultation have been advocated in intensive care units to identify patients at high risk for having unmet end-of-life care needs. However, the frequency with which patients meet these triggers is unknown.

What This Study Adds to the Field: Approximately 14% of intensive care unit admissions (with an upper estimate of 20% of admissions) met triggers for specialized palliative care consultation. Given the existing shortage of palliative care providers, these data raise questions about how palliative care can be adequately delivered to critically ill patients.

(Received in original form July 5, 2013; accepted in final form November 18, 2013)

Supported by a Mentored-Training Research Grant from the Foundation in Anesthesia Education and Research (M.S.H.), award number R01AA09963 and R21 DA029670 from the National Institutes of Health (G.L.), and award number K08AG038477 from the National Institute on Aging, the National Center for Research Resources and the National Center for Advancing Translational Sciences, National Institutes of Health, through Grant Number UL1 RR024156 (H.W.).

Author Contributions: M.S.H. helped conceive and design the study, conduct the study, analyze and interpret the data, and draft and critically revise the manuscript. G.L. helped interpret the data and critically revise the manuscript. C.D.B. helped interpret the data and critically revise the manuscript. H.W. helped conceive and design the study, acquire the data, conduct the study, analyze and interpret the data, and draft and critically revise the manuscript.

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This article has an online supplement, which is accessible from this issue's table of contents at www.atsjournals.org

Am J Respir Crit Care Med Vol 189, Iss 4, pp 428–436, Feb 15, 2014

Originally Published in Press as DOI: 10.1164/rccm.201307-1229OC on November 21, 2013
Internet address: www.atsjournals.org

The provision of appropriate, high-quality end-of-life care is an increasing focus of national healthcare initiatives. In the last decade, quality measures for palliative care (PC) were adopted by the National Quality Forum and the National Quality Measures Clearinghouse (1, 2), and both California and New York recently enacted laws requiring that PC information and counseling be offered to patients with terminal illnesses (3–5). One area of significant focus for improving end-of-life care is the intensive care unit (ICU) (6–8), where patients have both high in-hospital mortality and 6-month mortality (9, 10). Furthermore, recent data show that although fewer patients now die in an acute hospital setting, use of intensive care during the last month of life has increased in the last decade (11).

The delivery of PC in the ICU has been associated with increased rates of formalized advanced directives, decreased ICU length of stay, increased use of hospice, and decreased use of nonbeneficial life-sustaining therapies in observational studies (12–14). These outcomes are noteworthy because patients and their families may prefer to avoid aggressive and burdensome care in the setting of a poor long-term prognosis (15, 16). Although many ICU patients may benefit from receiving PC, several barriers prevent timely access to these services. First, physician prognostication may be inaccurate (17), and existing prognostic scoring systems perform well on a population level (18–21), but are limited for the individual patient, greatly undermining their use for clinical decision making (22). This is further complicated by the fact that clinicians in the ICU often may not consider patients' trajectories, or their potential life-expectancy past the acute hospitalization (23). Finally, delivering optimal end-of-life care in the ICU may be insufficiently prioritized (24). This may be caused by the culture of the ICU, where the focus of caregivers and patients is often on "rescuing" the patient and denying death or may be caused by time constraints on caregivers (25). In light of these barriers, it is not surprising that PC is often initiated late in the course of a critical illness or not at all (14, 25, 26).

One promising strategy for implementation of PC in the ICU is to actively screen all ICU patients using predetermined criteria to "trigger" a PC consultation (27). Given the existing shortage of board-certified PC physicians in the United States, information on the prevalence of ICU patients who might require specialized PC services is crucial to determine how these services may be delivered to a population at high risk for unmet PC needs (28). Additionally, such information would aid in the planning at the ICU and hospital level for overall PC staffing. Therefore, the primary aim of this study was to determine the prevalence of ICU patients across a wide range of ICUs who met criteria for PC consultation, using a set of published triggers (14). Secondary aims were to determine an "upper estimate" of PC needs by combining multiple sets of triggers and to assess the potential use of different triggers for capturing the same (or different) patient populations in the ICU. Some of the results of this study have been previously reported in the form of an abstract (29).

Methods

Patients and Data Collection

The study protocol was reviewed and approved by the institutional review board of Columbia University Medical Center (IRB-AAAJ1051, New York, NY). Written informed consent was waived. Data for this study came from Project IMPACT (Cerner Corporation, Kansas City, MO), a database of ICU admissions for the years 2001–2008. Further details about Project IMPACT have been published previously (30).

All ICU admissions in Project IMPACT, including repeat admissions, were included in the study. ICUs outside of the United States, ICUs that contributed less than 50 admissions, and neurologic and neurosurgical ICUs (because of the small number of patients; n = 1,268) were excluded. The primary criteria for PC consultation were based on a published list of triggers for a medical ICU: (*1*) ICU admission following a hospital stay greater than or equal to 10 days; (*2*) age greater than 80 with two or more life-threatening comorbidities (as defined by Acute Physiology and Chronic Health Evaluation II definitions of severe chronic organ insufficiency); (*3*) diagnosis of active stage IV malignancy; (*4*) status post cardiac arrest; or (*5*) diagnosis of intracerebral hemorrhage requiring mechanical ventilation (*see* online supplement for full definitions) (14). These criteria were chosen for the primary analysis because they were specifically designed for use within the first 72 hours of ICU admission, with the need for specialized PC consultation in mind. Furthermore, these criteria were all concrete measures, and their use in the initial evaluation of their implementation was associated with a decreased ICU length of stay (14). An ICU admission was counted as meeting a PC trigger if any of the above criteria were met during an ICU stay.

Because we chose a single set of triggers for PC consultation for primary analysis, we performed a secondary analysis comparing the primary triggers with alternative sets of triggers (Table 1). These additional triggers included a set of triggers developed for use in a surgical ICU, and triggers aimed at identifying patients with a high likelihood of having poor outcomes (global cerebral ischemia, multisystem organ failure, and advanced-stage dementia) (12, 31, 32). We then combined all of the available triggers to obtain an upper estimate of the possible need for PC care consultation. Finally, we sought to determine which of the many triggers available captured the most patients identified as potentially benefitting from a PC consultation to determine the most relevant potential triggers for wide-scale implementation in ICUs.

Statistical Analysis

The primary outcome was the percentage of ICU admissions meeting one or more of the primary triggers for PC consultation. We assessed this outcome for the entire cohort, and after stratification by type of ICU (medical [including coronary care units], surgical, mixed medical-surgical, and trauma and burn), type of hospital (government, community-for-profit, community-not-for-profit, and academic), hospital location (rural, suburban, and urban), and for individual ICUs. Differences between percentages were assessed using logistic regression, accounting for clustering by ICU.

Stratifying by whether or not the admissions met one or more primary triggers for PC consultation, we summarized ICU admission characteristics including age, sex, race, functional status, life support status on ICU, location before ICU admission for all admissions, and ICU length of stay (*see* online supplement). We

Table 1: Clinical Triggers for Palliative Care Consultation

Primary Triggers*	Alternative Triggers (*Surgical*)†	Alternative Triggers (*Campbell*)‡	Alternative Triggers (*Dementia*)§
ICU admission after hospital stay ⩾ 10 d	Family request	**Global cerebral ischemia**†	**Advanced-stage dementia**‡
Age > 80 with two or more life-threatening comorbidities	**Futility considered/declared by medical team**	**Multisystem organ failure of ⩾3 systems**†	
Diagnosis of active stage IV malignancy (metastatic disease)	Presence of advanced directive, family disagreement with each other, or family disagreement with medical team > 7 d		
Status after cardiac arrest	**Death expected during same ICU stay**		
Diagnosis of intracerebral hemorrhage requiring mechanical ventilation	**ICU stay > 1 mo**		
	Diagnosis with median survival < 6 mo		
	>3 ICU admissions during same hospitalization		
	GCS ⩽ 8 for >1 wk in patient > 75 yr		
	GCS = 3		
	Multiorgan system failure of >3 systems (Pa_{O_2}/FI_{O_2} < 300, platelet count < 100,000/mm³, acute increase in creatinine > 2 mg/dl, acute increase in total bilirubin > 2 mg/dl, use of vasopressors, GCS < 13)		

Definition of abbreviations: GCS = Glasgow Coma Scale; ICU = intensive care unit.
Triggers in bold are available within Project IMPACT. For details of the definitions, *see* online supplement.
*Adapted from Reference 14.
†Adapted from Reference 31.
‡Adapted from Reference 12.
§Adapted from Reference 32.

compared differences among groups using chi-square test, *t* test, and Kruskal-Wallis test as appropriate.

As an overall assessment of the "face validity" of the primary triggers, we assessed outcomes for patients (hospital mortality, direct discharges to hospice or a PC unit), stratified by whether or not patients met one or more criteria for PC consultation. For this portion of the analysis, we excluded readmissions. Differences between patients meeting triggers and patients not meeting triggers were assessed using multilevel modeling, adjusting for clustering at an ICU level. We also assessed rates of limitations in treatment for patients meeting primary triggers after stratification by ICU, type of hospital, and hospital location and compared differences among groups using logistic regression, adjusting for clustering at an ICU level.

We then compared the performance of primary triggers with alternative sets of triggers. We assessed the level of agreement between the primary and alternative sets of triggers using the Kappa statistic. To estimate an upper limit of the possible need for PC consultation, we added all other published sets of triggers to the primary triggers to generate a comprehensive model. Finally, we generated an "efficient model" of PC triggers with the aim of capturing the most admissions using the fewest triggers. Triggers were added in a step-wise fashion to allow for assessment of the impact of each additional trigger on the overall prevalence. Because they are more likely to be reliable in the database and in clinical use, concrete triggers were added first, starting with the trigger with highest overall prevalence in the cohort, and subsequently in descending order of prevalence. More subjective triggers were then added in a similar manner. Triggers were added to the model until the incremental addition of triggers yielded less than 5% of the entire population that met any trigger for PC consultation. Using both the comprehensive and the efficient models of PC triggers, we determined the percentage of admissions meeting triggers for PC consultation for the entire cohort, and after stratification by type of ICU, type of hospital, and hospital location, and evaluated differences in percentages using logistic regression, accounting for clustering on an ICU level. Database management and statistical analysis were performed using Stata 11.2 (StataCorp LP, College Station, TX).

Results

Potential Need for PC Consultation in ICUs Using Primary Triggers

There were 385,770 admissions to 179 ICUs. Of these, 53,124 (13.8%) admissions met one or more primary triggers for PC consultation. The prevalence of admissions meeting primary triggers did not vary greatly across different types of ICUs and hospitals (Table 2). Across the individual ICUs, the mean percentage of admissions meeting primary triggers was

Table 2: Prevalence of Admissions Meeting One or More Triggers for Palliative Care Consultation Using the Primary Set of Triggers

	ICUs (*n*)*	Patients (*n*)*	Admissions Meeting One or More Triggers for PC Consultation (*Primary*) [% (SD)]	*P* Value†
All ICUs	179	385,770	13.8 (4.8)	
Type of ICU*				
Medical	36	58,545	13.3 (4.1)	Ref
Surgical	16	31,305	13.9 (5.9)	0.77
Mixed medical-surgical	95	236,428	13.6 (4.7)	0.77
Trauma and burn	28	53,854	14.7 (5.5)	0.41
Type of hospital*				
Government	7	14,485	13.4 (3.3)	0.70
Community for-profit	12	15,890	12.8 (3.5)	Ref
Community nonprofit	119	261,714	13.1 (4.7)	0.78
Academic	41	93,680	15.8 (5.0)	0.06
Hospital location*				
Urban	100	225,799	13.8 (4.8)	0.97
Suburban	60	103,130	13.8 (4.9)	0.98
Rural	18	56,066	13.7 (5.1)	Ref

Definition of abbreviations: ICU = intensive care unit; PC = palliative care; Ref = reference.
*Totals vary because of missing data. For type of ICU, data missing from four ICUs and 5,638 patients. Type of hospital, zero hospitals and one patient. Hospital location, one hospital and 775 patients.
†Results of logistic regression, adjusted for clustering by ICU. No other covariates were included in the model.

13.8%, median 13.0% (interquartile range [IQR], 10.2–16.5%; full range, 0.8–45.5%). Of admissions meeting primary triggers, 93.6% of admissions met only one trigger during the ICU stay, with 6.3% meeting two triggers and 0.2% meeting three triggers. The trigger most frequently met was ICU admission after a hospital stay greater than 10 days (37.1%), followed by a diagnosis of active stage IV malignancy (27.8%) and being cared for in an ICU after a cardiac arrest (27.3%). Very few admissions met the criterion for being age greater than 80 with two or more life-threatening comorbidities (2.1%).

Characteristics and Outcomes of Admissions Meeting Triggers for PC Consultation

Overall, admissions meeting one or more triggers for PC were older (one of the triggers was age > 80), more likely to be male, and more likely to be of black race. They also were less likely to have independent functional status before ICU admission and were more likely to have some treatment restriction in place on ICU admission. Admissions meeting triggers were more likely to be admitted from the floor, another ICU, or a stepdown unit rather than the emergency department or operating room. Admissions meeting triggers who died in the ICU had a significantly shorter length of stay compared with patients not meeting triggers (1.7 d [IQR, 0.6–5.0] vs. 2.6 d [IQR, 0.9–7.1]; P = 0.0001). Those who met triggers who died outside of the ICU or survived to hospital discharge had a longer ICU length of stay compared with admissions not meeting triggers (3.6 d [IQR, 1.7–7.6] vs. 3.1 d [IQR, 1.6–6.9], P = 0.0001; and 2.8 d [IQR, 1.4–6.0] vs. 1.8 d [IQR, 1.0–3.4], P = 0.0001, respectively) (Table 3). Patients meeting triggers had higher combined hospital mortality and discharge to hospice or a PC unit (39.7%) compared with patients who did not meet any trigger (11.1%; $P < 0.001$; 95% confidence interval [CI], 3.4–3.8) (Table E2 in the online supplement). In comparison with patients not meeting any triggers, patients meeting primary triggers had higher rates of limitations in treatment (Table 3).

For patients meeting primary triggers, limitations in treatment did vary significantly between types of ICUs and hospitals. Medical ICUs had the highest rate of having any limitation in treatment, whereas surgical ICUs had the lowest rate (26.0% vs. 13.1%; $P < 0.001$). For hospital characteristics, government and rural hospitals had the highest rates of any limitation in treatment (23.8 and 24.2%, respectively) (*see* Table E3). For patients not meeting triggers, medical ICUs, academic hospitals, and rural hospitals had the highest rates of limitations (data not shown).

Identification of Admissions for PC Consultation Using Alternative Triggers

We assessed three alternative sets of triggers (see Table 1). The alternate surgical triggers had moderate agreement with the primary triggers (Kappa = 0.59 [95% CI, 0.59–0.59]; $P < 0.0001$) (33). The other alternative triggers showed poor to no agreement with the primary triggers (Campbell triggers, Kappa = 0.09 [95% CI, 0.09–0.10]; $P < 0.0001$) and dementia triggers (Kappa = −0.001 [95% CI, −0.001 to −0.000]; P = 1.0) (33). Comparing the alternative triggers with each other, there was fair agreement between the surgical triggers and the Campbell triggers, and less than chance agreement between the others (*see* Table E4).

Upper Estimate of the Need for PC Consultation

We combined all triggers in a comprehensive model to determine the upper limit of need for PC consultation. When the comprehensive model of PC triggers was applied to the cohort, the prevalence of admissions meeting triggers rose to 19.7% (Table 4). Across the individual ICUs, the median percentage of admissions meeting triggers was 19.6% (IQR, 14.9–23.3%; full range, 4.2–47.2%). Only academic hospitals had a significantly increased prevalence of admissions meeting

Table 3: Characteristics and Outcomes of ICU Admissions Meeting One or More Primary Triggers for Palliative Care

	Met One or More Triggers for PC (*n* = *53,124*)	Did Not Meet any Triggers for PC (*n* = *332,646*)	*P* Value
Age, mean (SD)	63.3 (16.2)	60.0 (18.4)	<0.0001
Female, n (%)	24,237 (45.6)	147,520 (44.4)	<0.001
Race, n (%)			<0.001
White	40,820 (78.4)	258,054 (80.1)	
Black/African American	8,072 (15.5)	44,515 (13.8)	
Latin/Hispanic	2,161 (4.2)	13,674 (4.2)	
Asian/Pacific Islander	635 (1.2)	3,512 (1.1)	
American Indian/Alaskan Native	200 (0.4)	1,485 (0.5)	
Other	168 (0.3)	945 (0.3)	
Functional status on hospital admission, n (%)			<0.001
Independent	36,971 (70.4)	261,580 (79.1)	
Partially dependent	11,006 (20.9)	49,284 (14.9)	
Fully dependent	4,582 (8.7)	19,732 (6.0)	
Life support status on ICU admission, n (%)			<0.001
Full code	49,277 (93.3)	316,795 (95.9)	
DNR/no CPR	2,629 (5.0)	10,455 (3.2)	
Withholding or limiting life-sustaining treatments	854 (1.6)	3,034 (0.9)	
Withdrawal of life-sustaining treatments or comfort care	83 (0.2)	157 (0.05)	
Origin before ICU admission, n (%)			<0.001
ICU	3,011 (5.7)	11,345 (3.4)	
Emergency department	14,037 (26.4)	140,875 (42.4)	
Floor	11,012 (20.7)	30,173 (9.1)	
Stepdown unit	7,267 (13.7)	18,509 (5.6)	
Operating room, recovery room, or procedure suite	15,862 (29.9)	115,305 (34.7)	
Other	1,920 (3.6)	16,325 (4.9)	
ICU length of stay, median (IQR) (d)			
All	2.7 (1.2–6.0)	1.9 (1.0–3.7)	0.0001
Died in ICU	1.7 (0.6–5.0)	2.6 (0.9–7.1)	0.0001
Died in hospital after ICU discharge	3.6 (1.7–7.6)	3.1 (1.6–6.9)	0.0001
Survived to hospital discharge	2.8 (1.4–6.0)	1.8 (1.0–3.4)	0.0001
Died in hospital or discharged to hospice/ PC*	39.7	11.1	<0.001
Limitations in treatment			
DNR	12.9	3.0	<0.001
Life-sustaining treatment limited or withheld	2.0	0.8	<0.001
Life-sustaining treatment withdrawn or comfort care	13.7	3.1	<0.001

Definition of abbreviations: CPR = cardiopulmonary resuscitation; DNR = do not resuscitate; ICU = intensive care unit; IQR = interquartile range; PC= palliative care.
*Results of multilevel modeling, accounting for clustering by ICU. No other covariates were included in the model. *See* Table E4 for stratified results across type of ICU, type of hospital, and hospital location.

triggers (22.8% vs. 18.1% for community-for-profit; *P* = 0.04) (*see* Table E5).

Efficient Model of PC Triggers

After stepwise assessment of all triggers, we determined that (*1*) ICU admission after hospital stay greater than or equal to 10 days, (*2*) multisystem organ failure greater than three systems, (*3*) stage IV malignancy, (*4*) status post cardiac arrest, and (*5*) intracerebral hemorrhage requiring mechanical ventilation captured 85.4% of all patients meeting any triggers, with an overall prevalence of 16.8% of all admissions (Table 4). Moreover, triggers based on subjective estimations of mortality were substantially captured by these concrete triggers. Again, academic hospitals had a significant increase in the prevalence of admissions meeting triggers (19.9% vs. 14.6% for community for-profit; *P* = 0.005) (*see* Table E5).

Discussion

Using a database with a broad sample of U.S. ICUs, we found that 13.8% of ICU admissions met one or more triggers for specialized PC consultation using a primary set of published triggers, with an upper estimate of 19.7% of admissions using a comprehensive model of several sets of published triggers. It is unlikely that all hospitals and ICUs would adopt a consistent set of PC triggers, because there may be significant variation of ICU cultures and patient populations. In its recommendations for implementing triggers, the Improving Palliative Care in the ICU Project recommends selecting published triggers, and tailoring them to the specific needs of the individual ICU or hospital (27). Our data provide a range of estimates of the workload for PC consultants if this suggested methodology is used.

Although the published triggers were all designed with the need for specialized

Table 4: Admissions Captured with Stepwise Addition of All Included Published Triggers for Palliative Care Consultation

	Prevalence of Each Trigger among All ICU Admissions	Admissions Meeting Each Trigger (*n = 385,770*) n (%)	Cumulative Percentage of All Admissions Meeting Triggers (*n = 75,923*)
ICU admission after hospital stay ⩾ 10 d	5.1	19,748 (5.1)	26.0
Multisystem organ failure ⩾ 3 systems	4.3	34,800 (9.0)	45.8
Diagnosis of active stage IV malignancy (metastatic disease)	3.8	47,650 (12.4)	62.8
Status post cardiac arrest	3.8	58,972 (15.3)	77.7
Diagnosis of intracerebral hemorrhage requiring mechanical ventilation	1.7	64,829 (16.8)	85.4
ICU stay > 1 mo	0.9	66,765 (17.3)	87.9
Global cerebral ischemia	0.7	67,675 (17.5)	89.1
Age > 80 with two or more life-threatening comorbidities	0.3	68,535 (17.8)	90.3
>3 ICU admissions	0.1	68,544 (17.8)	90.3
Advanced-stage dementia	0.1	68,706 (17.8)	90.5
Diagnosis with median survival < 6 mo	8.0	70,510 (18.3)	92.9
Death expected during ICU stay	4.1	75,923 (19.7)	100.0
Futility considered/declared by medical team	0.9	75,923 (19.7)	100.0

Triggers in bold were retained in the efficient model of triggers.

PC in mind and were similar in their identification of patients with poor outcomes, there are important differences between them. Certain triggers were concrete (e.g., ICU admission after a hospital stay ⩾ 10 d) and others were more subjective (e.g., death expected during ICU stay). Given the limitations of physician prognostication, subjective triggers may be more difficult to use in practice. However, in our sensitivity analysis, we were able to determine that the primary triggers (all of which were concrete) had a substantial level of agreement with the more subjective set of surgical triggers. Furthermore, the efficient model, which contained only concrete triggers, was able to capture 85% of all admissions meeting triggers. This suggests that concrete triggers may be an adequate substitute for subjective estimations of mortality and morbidity.

Most studies examining patient case-mix and practice across ICUs document large ICU-level variation in practice and the delivery of care (34, 35). Our findings demonstrate an unusual level of consistency regarding the estimate of patients meeting PC triggers across a range of different types of ICUs and hospitals in different care settings. However, it is notable that there were significant differences in rates of limitations of treatment, suggesting less variation in patient mix, and more in practice patterns. These data may be used to aid resource planning for ICU and PC services within individual hospitals and at the regional and national levels to estimate the potential need for PC consultations in ICUs. This information is essential, because appropriate and timely delivery of PC has become a greater priority within the healthcare system.

Currently, the two models of providing PC in the ICU are the integrative model, where PC principles are woven into routine care, and the consultative model, where PC, particularly for high-risk patients, is provided by a consult service (36). These two models may and often do coexist, and reflect the difference between generalist and specialist PC, where generalists provide basic symptom management and discussions regarding goals of care, and specialists may be helpful for managing cases with refractory symptomatology, existential distress, or significant conflict in decision making (27, 37). Although consultative interventions for PC in the ICU have been associated mostly with improved outcomes, a nonconsultative quality improvement PC intervention did not improve outcomes (38).

Moreover, the consultative model may benefit intensivists by reducing their workload. A survey found that intensivists, particularly those working in larger ICUs, frequently perceived themselves as being overburdened and suffering from time constraints (39). These perceptions may decrease the time that intensivists spend delivering PC, because competing demands for clinicians' time has been reported to be a moderate barrier to the delivery of PC (24). There is some empirical evidence for this effect, because patients in ICUs experiencing higher levels of strain were less likely to have limitations in care placed (40). Also, physician education in PC is variable (41, 42), and this has been associated with variation in end-of-life care practices (43). In addition to educational disparities in PC, there may be disparities in practical experience for providers caring for critically ill patients. Although many intensivists may have sufficient experience in delivering high-quality generalist PC, most ICU patients in the United States are not necessarily cared for by an intensivist (44, 45). Thus, specialized PC may help to reduce variation in delivery of PC in the ICU. Another potential benefit of specialized PC is that it may provide continuity of care and PC beyond the ICU stay. Generalist PC provided by intensivists usually ends when a patient is discharged from the ICU. Given that many ICU survivors have a high prevalence of PC needs and are at significantly increased risk for morbidity and mortality (10, 46), these patients may gain benefit from continued PC services throughout their stay and after hospital discharge. Although there are several potential benefits to specialized PC, it is important to note that its success in an ICU is dependent on having adequate staffing and a collaborative ICU, and that this approach to delivering PC may not be appropriate for all ICUs (27).

Although the delivery of PC in the ICU may be improved by using a specialized consultative PC model, with approximately 8 million patients admitted to U.S. ICUs annually (47), this would translate into 1.1 million patients (with an upper estimate of 1.5 million patients) who may require PC consultations using the trigger model. According to the 2006 American Hospital Association survey, only 53% of hospitals had PC services, with large variation among states (48). Although these triggers were developed to identify patients requiring specialized PC consultation, 1.1 million patients nationwide per year presents a need that is unlikely to be met by the existing workforce of specialized PC providers (37). Our results suggest that the allocation of specialized PC, as a scarce resource, may need to be better delineated. Some patients identified by these triggers may benefit mostly from a PC needs assessment, whereas others may require ongoing specialized PC management. In the study by Norton and coworkers (14), although all patients received a basic PC consultation, which amounted to a specialist PC needs assessment, only 25% required ongoing PC management and further assessments of unmet PC needs. Furthermore, although many triggers have been proposed, which triggers are most likely to lead to improved outcomes with regards to patient and family ratings of quality or resource use has not yet been studied (27). Thus, our data raise further questions about how PC should be routinely operationalized in an ICU setting.

Our study has a number of limitations. Certain alternative triggers were not available in the Project IMPACT database because of their subjective nature, which would lead to an underestimation of the need for PC consultation using these criteria. However, the four triggers that occurred most commonly in the original study (surgical ICU stay > 1 mo, >3 surgical ICU admissions, multisystem organ failure > 3 systems, death expected during same ICU stay) were available either directly or by a proxy measure (31).

Although we report the percentage of patients meeting various triggers, this cannot be equated to an absolute estimate of the PC needs of ICU patients for several reasons. First, there are still patients at high risk of hospital death who may benefit from specialized PC but are not captured by these triggers. Second, these triggers do not assess whether patients have refractory pain or other symptoms related to chronic or terminal illness that may also be appropriate reasons for PC involvement. They also do not capture patients for whom PC consults are appropriate for other reasons, such as psychological, emotional, or spiritual support, family request, and mediation between family and the care team. ICU survivors have been shown to have a significant prevalence of functional disability, sleep disorders, post-traumatic stress disorder, and decreased health-related quality of life, and increased long-term mortality (10, 49–53). Because of the limitations of the dataset, we cannot explore whether or not these triggers identified patients who suffer substantial morbidity and mortality after hospital discharge who would likely benefit from specialized PC consultation during their ICU stay. PC may be delivered not only to patients who are likely to die within a short period of time, but is appropriate for seriously ill patients at any stage of their illness (54).

PC is highly desired by patients and is associated with improved quality of life, cost savings, and even improved survival (55–59). Finding systematic methods to introduce PC in a timely fashion for seriously ill patients is an urgent concern. Although there are increasing mandates to provide appropriate end-of-life care, they underscore an unresolved challenge to the delivery of PC: the difficulty of identifying which patients are appropriate for PC services, and how to implement PC in a timely fashion after identification (60). The use of automatic triggers for PC consultation may provide a method, particularly in ICUs where there may be resistance to end-of-life discussions, to identify patients who have a high likelihood of gaining physical and psychological benefit from such consultation. We demonstrate that published triggers were able to identify a group of patients with high rates of hospital mortality and discharge to hospice and that the prevalence of patients meeting these triggers was relatively stable across a national sample. These findings lend support to the plausibility of using such triggers to deliver PC to critically ill patients in clinical practice. ■

Author disclosures are available with the text of this article at www.atsjournals.org.

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