

## Deficits in Identification of Goals and Goal-Concordant Care After Sepsis Hospitalization

Stephanie Parks Taylor, MD, MS<sup>1\*</sup>, Marc A Kowalkowski, PhD<sup>2</sup>, Katherine R Courtright, MD, MSHP<sup>3,4</sup>, Henry L Burke, MD<sup>1,5</sup>, Sangnya Patel, MD<sup>1,5</sup>, Samantha Hicks, ARNP<sup>1,6</sup>, Cristina Hurley, MD<sup>1</sup>, Stephen Mitchell, DO<sup>1</sup>, Scott D Halpern, MD, PhD<sup>3,4</sup>

<sup>1</sup>Department of Internal Medicine, Atrium Health, Charlotte, North Carolina; <sup>2</sup>Center for Outcomes Research and Evaluation, Atrium Health, Charlotte, North Carolina; <sup>3</sup>Palliative and Advanced Illness Research Center, University of Pennsylvania, Philadelphia, Pennsylvania; <sup>4</sup>Department of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania; <sup>5</sup>Atrium Health, Division of Palliative Care, Charlotte, North Carolina; <sup>6</sup>Atrium Health, Division of Pulmonary and Critical Care, Charlotte, North Carolina.

In a recent study, identifying and supporting patients' care goals was named the highest priority in hospital medicine. Although sepsis is one of the leading causes of death and postdischarge morbidity among hospitalized patients, little is known about how frequently care goals are assessed prior to discharge and adhered to in the 90 days after sepsis hospitalization. Evaluating a cohort of 679 high-risk sepsis survivors enrolled in a clinical trial, we found that care goals were documented explicitly in a standardized tool in 130 patients; an additional 139 patients were identified using all available clinical documentation, resulting in only 269 (40%) patients with goals that could be ascertained from the electronic health record (EHR).

Among those categorized, goals were classified as prioritizing longevity (35%), function (52%), and comfort (12%). Based on expert review of the care provided during the 90 days subsequent to discharge, goal-concordant care was identified in 184 (68%) cases for which goals were specified. Documentation of goals in a standardized EHR tool was associated with increased likelihood of receiving goal-concordant care (odds ratio, 3.6; 95% CI, 2.4-5.5). Hospitalization and peridischarge time points represent important opportunities to address deficits in the documentation of goals and provision of goal-concordant care for sepsis survivors. *Journal of Hospital Medicine* 2021;16:667-670. © 2021 Society of Hospital Medicine

Identifying and supporting patients' care goals through shared decision-making was named the highest priority in the Improving Hospital Outcomes through Patient Engagement (i-HOPE) study.<sup>1</sup> Ensuring that seriously ill patients' goals for their future care are understood and honored is particularly important for patients hospitalized with conditions known to be associated with high near-term mortality or functional disability, such as sepsis. It is increasingly recognized that a hospital admission for sepsis is associated with poor outcomes, including high rates of readmission and postdischarge mortality,<sup>2-5</sup> yet little is known about the assessment, status, and stability of patient care goals after discharge for sepsis. Using a cohort of high-risk sepsis survivors enrolled in a clinical trial, we aimed to determine how frequently care goals were documented, describe patterns in care goals, and evaluate how frequently care goals changed over 90 days after sepsis discharge. We also used expert reviewers to assess care de-

livered in the 90 days after hospitalization and determine the proportion of patients who received goal-concordant care.<sup>6,7</sup>

### METHODS

#### Design, Setting, Participants

We conducted a secondary analysis using data from the Improving Morbidity During Post-Acute Care Transitions for Sepsis (IMPACTS) study,<sup>8</sup> a pragmatic randomized trial evaluating the effectiveness of a multicomponent transition program to reduce mortality and rehospitalization after sepsis among patients enrolled from three hospitals between January 2019 and March 2020 (NCT03865602). The study intervention emphasized preference-sensitive care for patients but did not specifically require documentation of care goals in the electronic health record (EHR).

#### Data Collection

Clinical and outcomes data were collected from the EHR and enterprise data warehouse. We included data collected as part of routine care at IMPACTS trial enrollment (ie, age at admission, gender, race, marital status, coexisting conditions) and during index hospitalization (ie, organ failures, hospital length of stay, discharge disposition). The Charlson Comorbidity Index score was calculated from diagnosis codes captured during both inpatient and outpatient healthcare encounters in the 12 months prior to trial enrollment. The Centers for Disease Control and Prevention Adult Sepsis Event definitions<sup>9</sup> were applied to measure organ failures.

**\*Corresponding Author:** Stephanie Parks Taylor, MD, MS;  
Email: Stephanie.P.Taylor@AtriumHealth.org; Telephone: 813-340-8816;  
Twitter: @stephtaylorCLT.

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Two palliative care physicians, three internal medicine physicians, and one critical care clinician retrospectively reviewed the EHR of study patients to: (1) identify whether patient care goals were documented in a standardized care alignment tool at discharge or in the subsequent 90 days; (2) categorize each patient's care goals as focused on longevity, function, or comfort<sup>6</sup> using either standardized documentation or unstructured information from the EHR; and (3) determine whether care goals changed over the first 90 days after discharge. Reviewers also classified care received over the 90-day postdischarge period as focused on longevity, function, or comfort. A random sample of 75 cases was selected for double review by a palliative care reviewer to assess interrater agreement in these assessments. Reviewers indicated whether the goal changed and, if so, what the new goal was. The data collection form is provided in the Appendix. The study was approved by the Atrium Health Institutional Review Board.

### Outcomes

The primary outcome was the proportion of cases with care goals documented in the standardized care alignment tool, an EHR-embedded tool prompting questions about goals for future health states, including choices among longevity-, function-, and comfort-focused goals. A secondary outcome was the proportion of cases for which a goal could be determined using all information available in the EHR, such as family meeting notes, discharge summaries, and inpatient or outpatient visit notes. We also measured the proportion of patients who received goal-concordant care, defined as agreement between reviewers' categorizations of patients' goals and the primary focus of the care delivered, using a well-defined approach.<sup>6</sup> In this approach, reviewers first categorized the care delivered during the 90 days after hospital discharge as focused on longevity, function, or comfort using clinical documentation in each patient's medical record. To enhance transparency of this decision process, reviewers indicated which specific treatments (eg, new medications, hospital admission, hospice enrollment) supported their categorization. Reviewers then separately categorized the patient's primary goal over the same period. Reviewer training emphasized that classifications of goals and care delivered should be independent. Patients were considered to have received goal-concordant care if the category of care delivered matched the category of the primary care goal. For patients with changing goals, care delivered was compared with the most recent documented goal.

### Analyses

We characterized distributions of care goals and care delivered and reported rates of goal-concordant care overall and by care goals. We calculated weighted kappa statistics to assess interrater reliability. We conducted a multivariable logistic regression analysis in the full cohort to evaluate the association of standardized care goal documentation in the EHR with the dependent outcome of goal-concordant care, adjusting for other risk factors (ie, gender, race, marital status, coexisting chronic conditions, organ failures, and hospital length of stay).

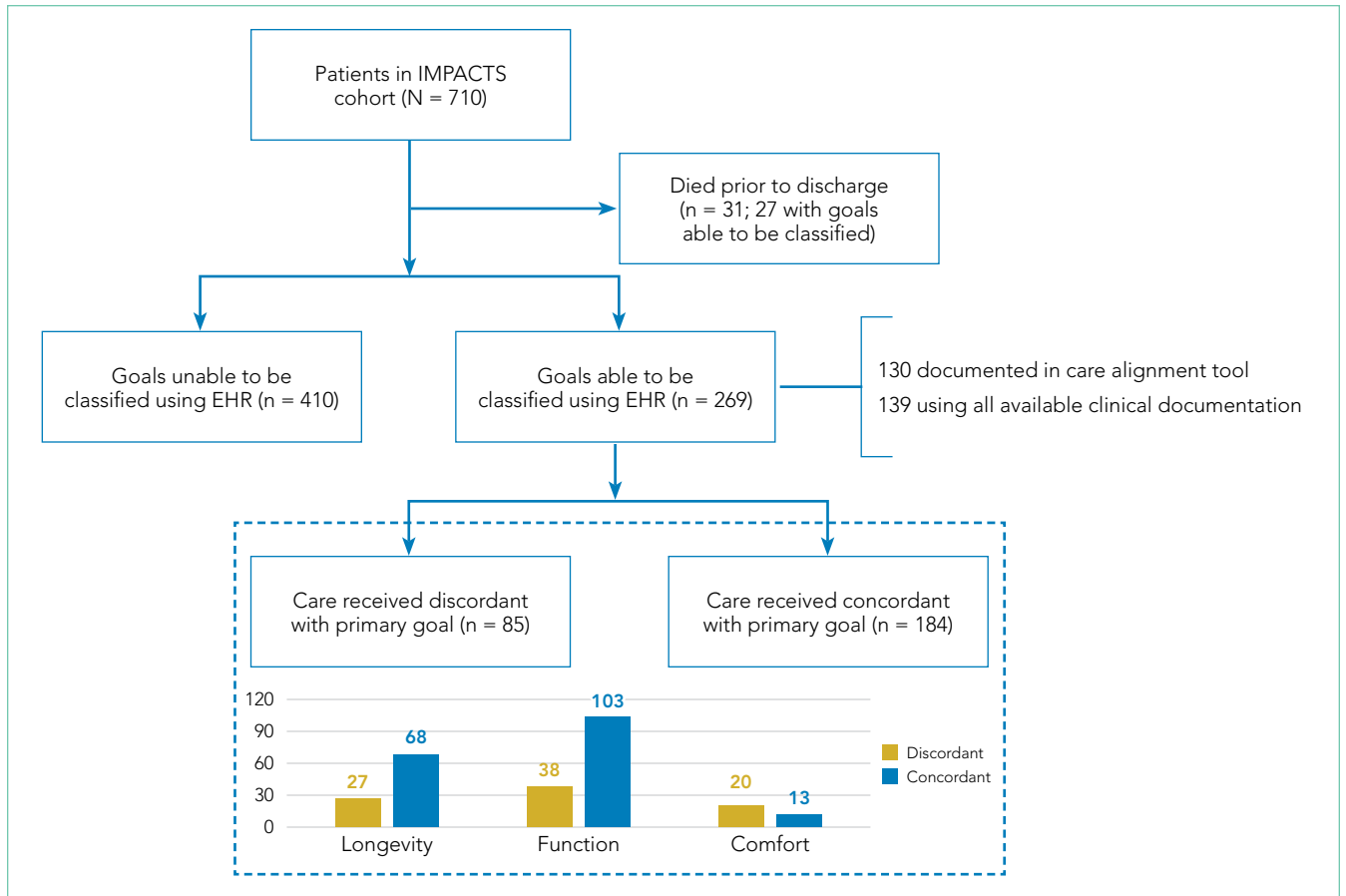
TABLE. Characteristics of Sepsis Survivors by Goal Documentation Status in the Electronic Health Record (N = 679)

	Goals not documented (n = 410)	Goals documented (n = 269)
Age at admission, y		
Mean (SD)	62 (15)	66 (15)
Median (IQR)	64 (54-73)	68 (57-76)
Female, No. (%)	208 (51)	145 (54)
Race, No. (%)	114 (28)	84 (31)
Black	274 (67)	172 (64)
White	22 (5)	13 (5)
Other		
Married, No. (%)	154 (38)	121 (45)
Charlson Comorbidity Index score		
Mean (SD)	4 (3)	5 (3)
Median (IQR)	4 (2-6)	5 (3-7)
Number of failed organs		
Mean (SD)	2 (1)	2 (1)
Median (IQR)	2 (1-2)	2 (1-3)
Hospital length of stay, d		
Mean (SD)	8 (10)	10 (9)
Median (IQR)	5 (3-8)	7 (4-11)
Index discharge disposition, No. (%)		
Home with self-care	229 (56)	80 (30)
Home with health services	91 (22)	69 (26)
Skilled nursing facility	69 (17)	76 (28)
Long-term acute care facility	17 (4)	17 (6)
Other acute care hospital	4 (1)	6 (2)
Hospice	0 (0)	21 (8)

Abbreviation: IQR, interquartile range.

## RESULTS

Six hundred seventy-nine patients who survived to hospital discharge were included in the study; 52% of these patients were female, and 29% were Black. Median age of the cohort was 65 years (interquartile range [IQR], 55-74) and median Charlson Comorbidity Index score was 4 (IQR, 2-7). Study patients had a median two (IQR, 1-3) organ failures at admission and median hospital length of stay of 6 days (IQR, 4-10). One-hundred-sixty (24%) were discharged to home with health services, 145 (21%) to a skilled nursing facility, 44 (6%) to long-term acute care or other acute care hospital, and 21 (3%) to hospice. The Table shows characteristics of patients with goals documented and those without goals documented. Sepsis survivors with goals documented were older; had higher comorbidity scores, greater number of failed organs, and longer hospital length of stay; and were more frequently discharged to hospice or facility-based care settings compared with individuals without goals documented (all  $P < .05$ ).



**FIG.** Frequency of Documentation of Goals and Provision of Goal-Concordant Care Among 679 Sepsis Survivors

Abbreviations: EHR, electronic health record; IMPACTS: Improving Morbidity During Post-Acute Care Transitions for Sepsis (NCT03865602).

### Characterization of Sepsis Survivors' Goals

The Figure shows patterns of goal documentation and goal-concordant care in the study cohort. Care goals for sepsis survivors were documented in the standardized EHR care alignment tool at discharge for 130 (19%) patients. When reviewers used all information available in the EHR to categorize goals (73% interrater agreement; interrater reliability by weighted  $\kappa$ , 0.71; 95% CI, 0.58-0.83), reviewers were able to categorize patients' goals in 269 (40%) cases. Among those categorized, goals were classified as prioritizing longevity in 95 (35%), function in 141 (52%), and comfort in 33 (12%) cases.

Goals changed over the 90-day observation period for 41 (6%) patients. Of patients whose goals changed, 15 (37%) initially had a goal focused on longevity, 24 (59%) had a goal focused on function, and 2 (5%) had a goal focused on comfort. Of goals that changed, the most frequent new goal was comfort, which was documented in 33 (80%) patients.

### Characterization of Goal-Concordant Care

Interrater reliability was moderate for reviewer-based determination of care delivered (73% interrater agreement; weighted  $\kappa$ , 0.60; 95% CI, 0.43-0.78). Reviewers categorized care delivered as focused on longevity in 374 (55%), function in 290 (43%), and comfort in 13 (2%) patients, with <1% unable to be

determined. Care elements most frequently cited for longevity-focused classification included intensive care unit (ICU) stay (39%) and new medications for nonsymptom benefit (29%). Care elements most frequently cited for function-focused classification included new medications for nonsymptom benefit (50%) and new medication for symptom benefit (41%). Care elements most frequently cited for comfort-focused classification included hospice enrollment (50%) and new medications for symptom benefit (48%). The rate of goal-concordant care was 68% among those with care goals determined and 27% when cases with unknown goals were classified as not concordant. Concordance was highest among those with longevity-focused (72%) and function-focused (73%) care goals compared with comfort-focused (39%) care goals ( $P < .01$ ). Adjusting for other potential risk factors, completion of the standardized EHR care alignment tool was associated with higher odds of receiving goal-concordant care (OR, 3.6; 95% CI, 2.4-5.5).

### DISCUSSION

Our study identified deficits in the current delivery of goal-concordant care in the first 90 days after sepsis hospitalization. First, goals were only documented in the standardized EHR care alignment tool in one-fifth of cases. Otherwise, information about goals, values, and treatment preferences of

sepsis patients was documented idiosyncratically in progress notes, which may not be apparent to clinicians involved in patients' future care. Lack of clinician attention to documenting the goals of sepsis patients post discharge may reflect suboptimal awareness of the lasting health consequences of sepsis, including persistently elevated risk of mortality up to 2 years following the index hospitalization.<sup>2-5</sup> Second, even when goals could be classified by reviewers, the focus of care delivered did not match patients' goals in nearly one-third of cases.

Our findings inspire several considerations for postsepsis care during hospitalization or in the peridischarge period. First, efforts should focus on increasing assessment and documentation of sepsis survivors' goals—this might begin with enhanced education about the lasting health consequences after sepsis and communication skills training. Importantly, sepsis survivors' goals were relatively stable over 90 days after discharge, suggesting that hospitalization for sepsis represents an important opportunity to assess and document patients' goals. Improving documentation of care goals explicitly in a standardized EHR tool may be an important target for quality-improvement initiatives, as this practice was associated with higher odds of receiving goal-concordant care in our cohort. Second, our findings that one-third of patients received care that was not consistent with their goals is worrisome. Concordance was lowest among comfort-focused care goals, suggesting that some of the high rates of healthcare utilization after sepsis may be unwanted.<sup>10-12</sup> For example, ICU stay and new medication for nonsymptom benefit were commonly cited as indications of longevity-focused care among patients with comfort-focused goals. Thus, improving the alignment between sepsis survivors' goals and subsequent care received is an important target from both a patient-centered and value perspective. Consistent with the recommendations of the i-HOPE study,<sup>1</sup> future interventions designed to improve posthospitalization care of sepsis patients should aim to capture goal-concordant care as a patient-centered outcome, if possible.

Our examination of goals and goal-concordant care after sepsis hospitalization advances the goal of enhancing understanding of survivorship in this population.<sup>4</sup> Strengths of this study include the large, real-world sample and use of expert palliative care physicians conducting granular EHR review to assess goal-concordant care. Our utilization of this methodology to evaluate goal-concordant care provides information to refine efforts toward developing reliable measures of this important outcome—for example, interrater reliability was similar among reviewers in our study compared with studies assessing goal-concordant care using similar methodology.<sup>13</sup>

Limitations include potential generalizability challenges for goal and goal-concordant care assessments in other health systems with different EHR platforms or local documentation practices, although deficits in EHR documentation of care goals have been reported in other settings.<sup>14,15</sup> We double-reviewed a sample of cases to evaluate interrater reliability, but double-review of all cases with a discussion and adjudication approach may have increased the number of goals that could ultimately be classified. However, this might overestimate the

number of goals that are identifiable in real-world practice by a treating clinician. Finally, reviewers may have been challenged to select one goal when two or more competing goals existed. Future refinements of goal-concordant care measurement will need to define methods for handling tradeoffs and prioritization associated with competing goals.

## CONCLUSION

The hospitalization and peridischarge periods represent an important opportunity to address deficits in the documentation of goals and provision of goal-concordant care for sepsis survivors. Doing so may improve patient-centered care and reduce the high rates of healthcare utilization after sepsis.

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## References

- Harrison JD, Archuleta M, Avitia E, et al. Developing a patient- and family-centered research agenda for hospital medicine: the Improving Hospital Outcomes through Patient Engagement (i-HOPE) study. *J Hosp Med.* 2020;15(6):331-337. <https://doi.org/10.12788/jhm.3386>
- Courtright KR, Jordan L, Murtaugh CM, et al. Risk factors for long-term mortality and patterns of end-of-life care among Medicare sepsis survivors discharged to home health care. *JAMA Netw Open.* 2020;3(2):e200038. <https://doi.org/10.1001/jamanetworkopen.2020.0038>
- Prescott HC, Angus DC. Enhancing recovery from sepsis: a review. *JAMA.* 2018;319(1):62-75. <https://doi.org/10.1001/jama.2017.17687>
- Prescott HC, Iwashyna TJ, Blackwood B, et al. Understanding and enhancing sepsis survivorship. Priorities for research and practice. *Am J Respir Crit Care Med.* 2019;200(8):972-981. <https://doi.org/10.1164/rccm.201812-2383CP>
- Prescott HC, Osterholzer JJ, Langa KM, Angus DC, Iwashyna TJ. Late mortality after sepsis: propensity matched cohort study. *BMJ.* 2016;353:i2375. <https://doi.org/10.1136/bmj.i2375>
- Halpern SD. Goal-concordant care - searching for the Holy Grail. *N Engl J Med.* 2019;381(17):1603-1606. <https://doi.org/10.1056/NEJMp1908153>
- Ernecoff NC, Wessell KL, Bennett AV, Hanson LC. Measuring goal-concordant care in palliative care research. *J Pain Symptom Manage.* 2021;62(3):e305-e314. <https://doi.org/10.1016/j.jpainsymman.2021.02.030>
- Kowalkowski M, Chou SH, McWilliams A, et al. Structured, proactive care coordination versus usual care for Improving Morbidity during Post-Acute Care Transitions for Sepsis (IMPACTS): a pragmatic, randomized controlled trial. *Trials.* 2019;20(1):660. <https://doi.org/10.1186/s13063-019-3792-7>
- Centers for Disease Control and Prevention. Hospital Toolkit for Adult Sepsis Surveillance. March 2018. Accessed September 20, 2021. [https://www.cdc.gov/sepsis/pdfs/Sepsis-Surveillance-Toolkit-Mar-2018\\_508.pdf](https://www.cdc.gov/sepsis/pdfs/Sepsis-Surveillance-Toolkit-Mar-2018_508.pdf)
- Liu V, Lei X, Prescott HC, Kipnis P, Iwashyna TJ, Escobar GJ. Hospital readmission and healthcare utilization following sepsis in community settings. *J Hosp Med.* 2014;9(8):502-507. <https://doi.org/10.1002/jhm.2197>
- DeMerle KM, Vincent BM, Iwashyna TJ, Prescott HC. Increased healthcare facility use in veterans surviving sepsis hospitalization. *J Crit Care.* 2017;42:59-64. <https://doi.org/10.1016/j.jccr.2017.06.026>
- Shankar-Hari M, Saha R, Wilson J, et al. Rate and risk factors for rehospitalisation in sepsis survivors: systematic review and meta-analysis. *Intensive Care Med.* 2020;46(4):619-636. <https://doi.org/10.1007/s00134-019-05908-3>
- Turnbull AE, Sahetya SK, Colantuoni E, Kweku J, Nikoioe R, Curtis JR. Inter-rater agreement of intensivists evaluating the goal concordance of preference-sensitive ICU interventions. *J Pain Symptom Manage.* 2018;56(3):406-413.e3. <https://doi.org/10.1016/j.jpainsymman.2018.06.003>
- Wilson CJ, Newman J, Tapper S, et al. Multiple locations of advance care planning documentation in an electronic health record: are they easy to find? *J Palliat Med.* 2013;16(9):1089-1094. <https://doi.org/10.1089/jpm.2012.0472>
- Buck K, Detering KM, Pollard A, et al. Concordance between self-reported completion of advance care planning documentation and availability of documentation in Australian health and residential aged care services. *J Pain Symptom Manage.* 2019;58(2):264-274. <https://doi.org/10.1016/j.jpainsymman.2019.04.026>