American Journal of Hospice & Palliative Medicine®
2022, Vol. 39(11) 1358–1363

DOI: 10.1177/10499091211072850
journals.sagepub.com/home/ajh
SAGE

Advance Care Planning for Emergency Department Patients With COVID-19 Infection: An Assessment of a Physician Training Program

Martin F. Casey, MD, MPH[1,†], Laiken Price, MS[1,†], Daniel Markwalter, MD[1], Tommy Bohrmann, PhD[2], Tamy Moraes Tsujimoto, MS[3], Kyle Lavin, MD, MPH[4], Laura C. Hanson, MD, MPH[5], Feng-Chang Lin, PhD[3] and Timothy F. Platts-Mills, MD, MSc[6]

Abstract

Objective: Coronavirus Disease 2019 (COVID-19) has heightened the importance of advance care planning (ACP), particularly in the emergency department (ED). The objective of this study was to determine the effect of an educational program for emergency physicians on ACP conversations in the ED during the COVID-19 pandemic. **Design:** This was an observational pre-/post-interventional study. **Setting:** This study was conducted at a Southeastern U.S. academic ED. **Participants:** 143 patients with confirmed COVID-19 infection in the 2 weeks up to and including the ED encounter of interest (between March 26 and May 25, 2020) were included. **Interventions:** The primary intervention was an ACP training toolkit with three components: (1) an evidence-based guide to COVID-19 risk stratification, (2) education on language to initiate ACP conversations, and (3) modification of the electronic health record (EHR) to facilitate ACP documentation. Palliative care physicians also delivered a 60-minute ACP educational session for emergency medicine physicians. **Outcome measures:** The primary outcome was a composite of ACP activities including: (1) identification of a healthcare decision-maker (HCDM), (2) an order for a code status, or (3) a documented goals of care conversation. **Results:** There was a 25.4% (95% CI: 7.0-43.9) increase in the composite outcome of ED-based ACP. After adjustment for patient demographics and triage score, there was a non-statistically significant increase in ACP activity (OR = 2.71, 95% CI: 0.93-8.64; P = .08). **Conclusion:** A rapid and simple physician-facing educational intervention demonstrated a trend, though lacking in statistical significance, towards increased ED-based ACP activities for patients with COVID-19.

Keywords

advance care planning, goals of care, prognosis, COVID-19, geriatrics, emergency medicine

Introduction

Coronavirus Disease 2019 (COVID-19) has highlighted the importance of understanding patients' personal values, life goals, and preferences regarding future medical care. Patient communication on these topics, commonly referred to as advance care planning (ACP),[1] enhances goal-concordant and patient-centered health care and helps optimize the use of limited healthcare resources.[2,3] For these reasons, there has been increased interest in expanding implementation of ACP in the emergency department (ED), though the literature has yielded little consensus on the optimal role of emergency physicians in initiating ACP.[2,4,5] Numerous studies have demonstrated the feasibility of increasing availability of subspecialty palliative care physicians to carry out ED-based ACP conversations.[6-8] Unfortunately, these strategies are

[1]Department of Emergency Medicine, University of North Carolina School of Medicine, Chapel Hill, NC, USA
[2]Analytical Partners Consulting, LLC, Raleigh, NC, USA
[3]Department of Biostatistics, University of North Carolina at Chapel Hill Gillings School of Public Health, Chapel Hill, NC, USA
[4]Department of Psychiatry and UNC Palliative Care Program, University of North Carolina School of Medicine, Chapel Hill, NC, USA
[5]Division of Geriatric Medicine and UNC Palliative Care Program, Department of Medicine, University of North Carolina School of Medicine, Chapel Hill, NC, USA
[6]Quantworks, Inc, Carrboro, NC, USA

[†]These authors contributed equally to this work.

Corresponding Author:
Martin F. Casey, MD, MPH, Department of Emergency Medicine, University of North Carolina School of Medicine, 170 Manning Dr, CB# 7594, Chapel Hill, NC 27599-7594, USA.
Email: martin_casey@med.unc.edu

often not scalable, given limited availability of palliative care physicians at many community and rural hospitals. In response to this gap in the research, we sought to examine the efficacy of an emergency physician-facing educational intervention, led by palliative care physicians, on the initiation of ED-based ACP for patients with COVID-19.

Methods

We conducted this study at an academic emergency department (ED) in the southeastern United States. We used a pre-/post-intervention design to estimate the effect of a training program jointly developed by emergency and palliative care physicians to assist with ACP conversations. The study cohort included all adult patients (≥18 years old) with a confirmed diagnosis of COVID-19 based on a positive polymerase chain reaction test in the 2 weeks up to and including the ED encounter of interest. This study was reviewed by the University of North Carolina Institutional Review Board and was deemed exempt as a low-risk activity.

We describe our intervention as an ACP training toolkit with three primary components: (1) an evidence-based guide to COVID-19 risk stratification, (2) education on language to initiate ACP conversations, and (3) modification of the electronic health record (EHR) to facilitate ACP documentation. Based on COVID-19 literature from studies conducted in Wuhan, China, a guide to prognosis was developed as demonstrated in Figure 1.[9-12] The guide to COVID-19 prognosis included suggested clinical risk categories of patients' illness severity based on vital signs, age, and complicating pre-existing conditions.[13] Patients' prognoses could be designated as Low, Moderate, or Critical risk. Of note, there was no validated tool to determine COVID-19 prognosis at the time of this study. For this reason, the guide represented a reasonable standard and was to be used in addition to physicians' overall impression of patients. Updated guidelines on COVID-19 risk stratification from the National Institute of Health use comparable categorizations, though implement a more conservative threshold (namely, oxygen saturation <94%) to identify severe COVID.[14]

The level of risk was then used to guide specific ACP practices, from designating a healthcare proxy, to documenting code status, and guiding more robust goals of care (GOC) discussion. To encourage these activities, physicians were supplied scripted language for the discussion of COVID-19, prognosis, and value of documenting ACP. Finally, adjustments were made to the EHR to augment physicians' ability to engage in and document ACP. First, templated "Smart Phrases" were created to allow physicians to readily access the COVID-19 prognosis guide and to document ACP conversations. These were made available to physicians by April 10, 2020. Physicians were made aware of these tools during departmental meetings, via an online database of department resources, and by email. Further, ED physicians were instructed in modifying an existing ACP tab in the EHR to highlight documentation of a healthcare decision-maker (HCDM).

To educate physicians on the ACP toolkit, a 60-minute virtual educational session was held on April 1, 2020 during a routine departmental meeting available to residents and attendings. This educational session was a traditional, slide-based lecture format with regards to presentation of existing data on COVID-19 prognosis, motivations for ED-based ACP, and the COVID-19 prognostic guide with clinical risk categories. The second portion

Clinical Characteristics	Goals of Care Priorities Based on Anticipated Course/Risk of Death (Risk Based on Clinician Judgment Considering these Factors)		
	Critical	Moderate	Low
Level of Care Intensity	Likely to Need ICU	Hospitalization	Discharged
O2 REQUIREMENTS and VITAL SIGNS	<88% on 5 L NC; OR tachypnea and signs of respiratory fatigue	88-93% on <5L NC, OR tachypnea	>93% on RA and normal respiratory rate
AGE	≥80	60-79	18-59
COMORBIDITY	Advanced illness or multiple chronic conditions **AND** significant deterioration in clinical status	Advanced illness or multiple chronic conditions	No advanced illness and no more than one chronic condition
FRAILTY	Mildly frail* or worse, needs help with ADLs	Some functional impairment, "slow"	Minimal or no functional impairment
LAB VALUES	Worsening leukopenia, acute renal failure	Mild lab abnormalities	Normal laboratory values
qSOFA (GCS <15, RR ≥22, SBP ≤100)	>1	1	0
Goals of Care Discussion	1. Document proxy 2. Document code status 3. Document ACP as scenario allows	1. Document proxy 2. Document code status 3. Initiate ACP conversation; may defer to admitting team	1. Document proxy 2. Initiate ACP conversation and consideration of code status 3. Review return criteria

Figure 1. Guide to COVID-19 prognosis with suggested level of advance care planning activities.

of the education session involved palliative care physicians demonstrating examples of effective communication and language pertaining to prognosis and ACP. Recommended communication methods were based on existing resources available through VitalTalk, the National Hospice and Palliative Care Organization, and the Center to Advance Palliative Care. Content included breaking bad news, discussing prognosis, and making treatment recommendations based on patient values. The communication techniques and scripting were made available to the department via an online database on April 10, 2020 (Supplemental Figure 1). In the final portion of the session, an example ED patient chart was displayed in order to teach ED physicians how to appropriately document ACP activities in the EHR. Additional educational offerings and recordings of the educational sessions were provided in the following weeks to all attendings and residents who were unable to attend the original educational session. For this reason, the post-intervention period is designated as beginning April 14, 2020.

As ACP broadly refers to any type of planning or preparation for future health events, we used a composite measure of specific activities to identify the occurrence of ACP including: (1) specification of a HCDM, (2) placement of code status orders, and (3) free text description of GOC conversations in the ED setting (as identified by use of ACP Smart Phrases or overt descriptions of end-of-life preferences). Data were collected via chart abstraction by a medical student reviewer (LP). The reviewer was trained on extraction of each ACP activity by an ED physician (TPM). All charts with unclear documentation surrounding ACP activities were referred for further adjudication by shared consensus between an ED physician (TPM) and licensed social worker. Additional variables were collected on patient demographics and clinical characteristics including: age, sex, race, ethnicity, presenting complaint, Emergency Severity Index (ESI) triage score, and ED disposition. Further, we collected demographic data on physicians receiving the educational toolkit.

Pre- and post-intervention outcomes were compared using Student's t-test for continuous variables and chi-square test for categorical variables. Pre- and post-intervention outcomes were compared using risk difference (RD) with 95% CI. A logistic regression model was used to evaluate the association between intervention and primary outcome of any ACP activity, adjusting for patient age, sex, race, ethnicity, and ESI score. A post hoc power analysis was done to assess if a larger sample should be obtained. All statistical analyses were performed in either R version 4.0.2 or G*Power version 3.1.9.7.

Patient and Public Involvement

No patients were involved in determining the research question, outcome measures, design, or implementation of the study.

Results

The study included a total of 143 patients with confirmed COVID-19 (28 subjects in the pre-intervention period from March 26 to April 13, 2020 and 115 subjects in the post-intervention period from April 14 to May 25, 2020). Most patients were female (58%), and the mean age was 50 years (SD 16.8 years; Table 1). There was a statistically significant difference in the proportion of Hispanic patients in the pre- and post-intervention groups (pre = 11% Hispanic; post = 58% Hispanic; $P < .001$), which resulted from a cluster of COVID-19 cases that occurred in the Hispanic community associated with employment at a large meat-processing factory during the post-intervention period.[15] The most common chief complaint for all groups was shortness of breath (42%), followed by fever (15%) and cough (11%). The estimated disease severity at triage was similar between the 2 groups, with 89% and 92% of subjects having an ESI triage score 1, 2, or 3 for pre- and post-intervention groups, respectively. The admission rate was similar in the pre- and post-intervention periods (43% vs 49%, respectively). The educational toolkit was distributed to 72 physicians (37 attendings and 35 residents; Supplemental Table 1). The physicians were predominantly male (63%) and under the age of 35 years (63%).

There was a statistically significant impact on the composite outcome of ACP activities, including documentation of a HCDM, ED placement of code status order, and free text description of GOC conversations. ED-based ACP activities were identified in 7/28 (25%) of the pre-intervention patients and 58/115 (50.4%) of the post-intervention patients (effect size [ES] 25.4%, 95% CI: 7.0–43.9%; Table 2). This difference was largely driven by an increase in the identification of a HCDM in the ED (25% vs 44.3% in the pre- and post-intervention groups, respectively; ES 19.3%, 95% CI: 0.9–37.8%). Similar, but smaller, increases were seen in ED code status orders (7.1% vs 14.8%; ES 7.6%, 95% CI: −3.8 to 19.2%) and free text descriptions of ED-based GOC conversations (7.1% vs 11.3%; ES 4.2%, 95% CI: −7.0 to 15.3%). Adjusting for patient characteristics in a logistic regression model, we still observed a non-statistically significant increase in the rate of ED-based ACP activities across the pre- and post-intervention groups (OR 2.71, 95% CI: 0.93–8.64, $P = .08$). Exploratory analyses, stratified by ED disposition (discharge or admission), demonstrated an increase of 33.8% (95% CI: 16.6–50.9%) in ED-based ACP activities among patients with COVID-19 who were stable for discharge home (Table 3). A smaller increase was observed among patients with COVID-19 requiring hospital admission (ES 10.0%, 95% CI: −21.1 to 41.1%).

With the sample obtained, the post hoc power analysis of the unadjusted analyses demonstrated that our study had 64% power. Review of an additional 100 charts (to be added to the post-intervention group) would yield 73% power.

Discussion

In this single site, before-and-after comparison, we observed a clinically meaningful increase in ED-based ACP activities in 25.4% of subjects across the pre- and post-intervention groups. The difference was largely driven by increases in patient identification of a

Table 1. Characteristics of the Study Sample.

Variable	Overall (N = 143)	Pre-intervention (N = 28)	Post-intervention (N = 115)	*P*-value
Age (years)				.9
Mean (SD)	50 (17)	50 (20)	51 (16)	
Median (range)	50 (21, 96)	49 (22, 87)	50 (21, 96)	
Age group				.5
[20, 40]	46 (32%)	9 (32%)	37 (32%)	
[41, 60]	51 (36%)	7 (25%)	44 (38%)	
[61, 80]	40 (28%)	10 (36%)	30 (26%)	
[81, 96]	6 (4.2%)	2 (7.1%)	4 (3.5%)	
Sex				>.9
Female	83 (58%)	16 (57%)	67 (58%)	
Male	60 (42%)	12 (43%)	48 (42%)	
Race				.021
Asian	3 (2.1%)	0 (0%)	3 (2.6%)	
Black/African American	42 (29%)	14 (50%)	28 (24%)	
Unknown	5 (3.5%)	2 (7.1%)	3 (2.6%)	
White/Caucasian	93 (65%)	12 (43%)	81 (70%)	
Ethnicity				<.001
Hispanic/Latino	70 (49%)	3 (11%)	67 (58%)	
Not Hispanic/Latino	68 (48%)	23 (82%)	45 (39%)	
Unknown	5 (3.5%)	2 (7.1%)	3 (2.6%)	
Chief complaint				.7
Altered mental status	3 (2.1%)	1 (3.6%)	2 (1.7%)	
Cough	16 (11%)	5 (18%)	11 (9.6%)	
Fever	21 (15%)	4 (14%)	17 (15%)	
Other	43 (30%)	7 (25%)	36 (31%)	
Shortness of breath	60 (42%)	11 (39%)	49 (43%)	
ED disposition				.6
Admit	68 (48%)	12 (43%)	55 (48%)	
Discharge	75 (52%)	16 (57%)	60 (52%)	
ESI triage score				.6
1	3 (2.1%)	0 (0%)	3 (2.6%)	
2	19 (13%)	5 (18%)	14 (12%)	
3	108 (76%)	20 (71%)	88 (77%)	
4	11 (7.7%)	2 (7.1%)	9 (7.8%)	
5	2 (1.4%)	1 (3.6%)	1 (.9%)	

HCDM, but also included increased documentation of code status and GOC decision-making conversations. Given that patients with COVID-19 are prone to rapid decompensation (often mediated through a precipitous deterioration in pulmonary function), early identification of an HCDM in the electronic medical record is of significant value in ensuring that patients' care is consistent with their values. Though lacking in statistical significance, the adjusted analyses similarly demonstrated a large effect size (OR = 2.71), supporting the notion that loss of significance was driven by lack of power (predominantly in the small pre-intervention study arm) rather than loss of clinical significance.

Our study also demonstrates the limitations that emergency physicians have in completion of ACP activities, as demonstrated by smaller increases in the rates of ED code status orders and documentation of GOC conversations. ED physicians carry many additional responsibilities, including diagnosis, resuscitation, and triage within the hospital, and thus aspects of some ACP activities remain outside the scope of routine emergency medicine practice.[16,17] Conversely, the significant uptake in ED documentation of HCDM demonstrates that there are aspects of ACP that can easily and reliably be incorporated into an ED physician workflow. Further, the increase in uptake of ED-based ACP among patients stable for discharge demonstrates that emergency physicians can have a role in defining care preferences outside of time-sensitive decisions confronted in the management of critical illness.

This study has several limitations. First, a small sample size in the pre-intervention period results in imprecise estimates during that time and subsequently an underpowered study. The post hoc

Table 2. Bivariate Analysis of ED-Based ACP Activities, Pre-/Post-Intervention.

Variable	Overall (N = 143)	Pre-intervention (N = 28)	Post-intervention (N = 115)	Effect Size % (95% CI)
Documentation of HCDM				
None	85 (59.4%)	21 (75.0%)	64 (55.7%)	
HCDM	58 (40.6%)	7 (25.0%)	51 (44.3%)	19.3 (.9, 37.8)
ED code status order				
No	124 (86.7%)	26 (92.9%)	98 (85.2%)	
Yes	19 (13.3%)	2 (7.1%)	17 (14.8%)	7.6 (−3.9, 19.2)
Free text description on GOC conversation				
No	128 (89.5%)	26 (92.9%)	102 (88.7%)	
Yes	15 (10.5%)	2 (7.1%)	13 (11.3%)	4.2 (−7.0, 15.3)
Any ACP activity[a]				
No	78 (54.5%)	21 (75.0%)	57 (49.6%)	
Yes	65 (45.5%)	7 (25.0%)	58 (50.4%)	25.4 (7.0, 43.9)

ACP = advance care planning; HCDM = healthcare decision-maker; GOC = goals of care; ED = emergency department.
[a]ACP activity was a composite outcome of ED documentation of HCDM, ED code status orders, and ED GOC conversations.

Table 3. Exploratory Analysis of ED-Based ACP Stratified by ED Disposition.

	Discharge			Admit		
	Pre	Post	Effect Size	Pre	Post	Effect Size
Any ACP Activity[a]	N (%)	N (%)	% (95% CI)	N (%)	N (%)	% (95% CI)
No	15 (93.8)	35 (58.3)		6 (50.0)	22 (40.0)	
Yes	1 (6.2)	25 (41.7)	33.8 (16.6, 50.9)	6 (50.0)	33 (60.0)	10.0 (−21.1, 41.1)

Pre = pre-intervention, post = post-intervention.
[a]ACP activity was a composite outcome of ED documentation of healthcare decision-maker, ED code status orders, and ED goals of care conversations.

power analysis demonstrated that expanding the post-intervention group was not a viable solution to improving the study power. However, we could not ethically justify delaying the distribution of the educational toolkit to expand the pre-intervention sample. For similar reasons, we could not randomize which physicians were exposed to our educational intervention. Second, we launched multiple interventions at the same time, including both physician-facing education and a modification of the EHR environment, and we cannot identify which component had the most impact. As above, we were ethically motivated to not withhold any interventions that we thought may improve the care of patients with COVID-19. Further, the study took place at a single academic center in North Carolina, and thus our findings do not necessarily generalize to other settings. We also did not capture use of interpreter services and could not control for the impact of language barriers on ED-based ACP. Moreover, we were unable to assess potential adverse effects of our intervention, including inappropriately applied clinical risk stratification and subsequent effects on ACP as well as poorly performed prognostic and ACP communication impacting patient care trajectories or coping. Finally, it is possible that the increase in ACP activities during the post-intervention period was the result of secular trends unrelated to the intervention.

In conclusion, we present evidence that a simple and easy to implement, physician-facing educational intervention can increase ED-based ACP activities for patients infected with COVID-19. Further work is needed to confirm these findings and understand the impact of these activities on healthcare utilization and the quality of care experienced by patients.

Article Summary—Strengths and Limitations of the Study

- This study demonstrates the ability of ED physicians to be rapidly trained to perform ACP activities for patients with COVID-19.
- An increase in uptake of ED-based ACP among patients stable for discharge demonstrates that emergency physicians can have a role in defining care preferences outside of time-sensitive decisions confronted in the management of critical illness.
- A small sample size in the pre-intervention period resulted in imprecise estimates during that time and subsequently an underpowered study.
- Multiple components to the intervention limit the ability to understand the individual impact of any one component.

Acknowledgments

We appreciate the assistance provided by Matthew Scholer, Aileen Aylward, Rayad Shams, and Srihari Chari in completion of this work.

Author Contributions

Conceived the work … TPM, KL, AE
Designed study … TPM, KL, DM, LCH
Implementation of the study … MFC, LP, AE, KL, DM, TPM
Acquired the data … MFC, LP, AE, TB, TPM
Data analysis … MFC, LP, TB, TMT, FCL
Manuscript writing … ALL.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Laiken Price received support from the Medical Student Training in Aging Research (MSTAR) Program, National Institutes of Health, through Grant Award Number T35-HL134624. Further, the project described was supported by the National Center for Advancing Translational Sciences (NCATS), National Institutes of Health, through Grant Award Number UL1TR002489. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Data Sharing

Extra data is available by emailing martin_casey@unc.med.edu.

Supplemental Material

Supplemental material for this article is available online.

References

1. Sudore RL, Lum HD, You JJ, et al. Defining advance care planning for adults: a consensus definition from a multidisciplinary delphi panel. *J Pain Symptom Manag*. 2017;53(5):821-832e1.
2. George NR, Kryworuchko J, Hunold KM, et al. Shared decision making to support the provision of palliative and end-of-life care in the emergency department: a consensus statement and research agenda. *Acad Emerg Med: Off J Soc Acad Emerg Med*. 2016;23(12):1394-1402.
3. Casey MF, Markwalter DW. Incorporating end-of-life care into the management of dead on arrival patients in the emergency department: invited commentary. *J Emerg Nurs*. 2021;47(4):521-523.
4. Hanning J, Walker KJ, Horrigan D, Levinson M, Mills A. Review article: goals-of-care discussions for adult patients nearing end of life in emergency departments: A systematic review. *Emerg Med Australasia (EMA)*. 2019;31(4):525-532.
5. Grudzen CR, Stone SC, Morrison RS. The palliative care model for emergency department patients with advanced illness. *J Palliat Med*. 2011;14(8):945-950.
6. Aaronson EL, Daubman BR, Petrillo L, et al. Emerging palliative care innovations in the ED: a qualitative analysis of programmatic elements during the COVID-19 pandemic. *J Pain Symptom Manag*. 2020;62(1):117-124.
7. Aaronson EL, Petrillo L, Stoltenberg M, et al. The experience of emergency department providers with embedded palliative care during COVID. *J Pain Symptom Manag*. 2020;60(5):e35-e43.
8. Stoltenberg M, Jacobsen J, Wilson E, et al. Emergency department-based palliative care during COVID. *J Palliat Med*. 2020;23(9):1151-1152.
9. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497-506.
10. Wang D, Hu B, Hu C, et al. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020;323(11):1061-1069.
11. Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *Lancet*. 2020;395(10229):1054-1062.
12. WHO. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). 2020. https://www.who.int/publications/i/item/report-of-the-who-china-joint-mission-on-coronavirus-disease-2019-(covid-19). (Accessed March 2021).
13. Rockwood K, Song X, MacKnight C, et al. A global clinical measure of fitness and frailty in elderly people. *CMAJ (Can Med Assoc J)*. 2005;173(5):489-495.
14. NIH. COVID-19 Treatment Guidelines. Clinical Spectrum of SARS-CoV-2 Infection 2021. https://www.covid19treatmentguidelines.nih.gov/overview/clinical-spectrum/. (Accessed December 2021).
15. Kendall L. *Revealed: Covid-19 Outbreaks at Meat-Processing Plants in US Being Kept Quiet*. https://www.theguardian.com/environment/2020/jul/01/revealed-covid-19-outbreaks-meat-processing-plants-north-carolina. (Accessed Mar 2021). The Guardian; 2020.
16. Eygnor JK, Rosenau AM, Burmeister DB, et al. Palliative care in the emergency department during a COVID-19 pandemic. *Am J Emerg Med*. 2020;45:516-518.
17. Huber MT, Highland JD, Krishnamoorthi VR, Tang JW. Utilizing the electronic health record to improve advance care planning: a systematic review. *Am J Hosp Palliat Care*. 2018;35(3):532-541.