Association of an Advance Care Planning Video and Communication Intervention With Documentation of Advance Care Planning Among Older Adults A Nonrandomized Controlled Trial

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Abstract

IMPORTANCE COVID-19 has disproportionately killed older adults and racial and ethnic minority individuals, raising questions about the relevance of advance care planning (ACP) in this population. Video decision aids and communication skills training offer scalable delivery models.

OBJECTIVE To assess whether ACP video decision aids and a clinician communication intervention improved the rate of ACP documentation during an evolving pandemic, with a focus on African American and Hispanic patients.

DESIGN, SETTING, AND PARTICIPANTS The Advance Care Planning: Communicating With Outpatients for Vital Informed Decisions trial was a pre-post, open-cohort nonrandomized controlled trial that compared ACP documentation across the baseline pre–COVID-19 period (September 15, 2019, to March 14, 2020), the COVID-19 wave 1 period (March 15, 2020, to September 14, 2020), and an intervention period (December 15, 2020, to June 14, 2021) at a New York metropolitan area ambulatory network of 22 clinics. All patients 65 years or older who had at least 1 clinic or telehealth visit during any of the 3 study periods were included.

MAIN OUTCOMES AND MEASURES The primary outcome was ACP documentation.

RESULTS A total of 14 107 patients (mean [SD] age, 81.0 [8.4] years; 8856 [62.8%] female; and 2248 [15.9%] African American or Hispanic) interacted with clinicians during the pre–COVID-19 period; 12 806 (mean [SD] age, 81.2 [8.5] years; 8047 [62.8%] female; and 1992 [15.6%] African American or Hispanic), during wave 1; and 15 106 (mean [SD] age, 80.9 [8.3] years; 9543 [63.2%] female; and 2535 [16.8%] African American or Hispanic), during the intervention period. Clinicians documented ACP in 3587 patients (23.8%) during the intervention period compared with 2525 (17.9%) during the pre–COVID-19 period (rate difference [RD], 5.8%; 95% CI, 1.0%-9.7%; P = .01) and 1598 (12.5%) during wave 1 (RD, 11.3%; 95% CI, 6.3%-16.3%; P < .001). Advance care planning was documented for 447 African American patients (30.0%) during the intervention period compared with 2525 (17.9%) during the pre–COVID-19 period (rate difference [RD], 5.8%; 95% CI, 0.9%-7.7%; P = .01) and 1598 (12.5%) during wave 1 (RD, 11.3%; 95% CI, 6.3%-12.1%; P < .001). Advance care planning was documented for 222 Hispanic patients (21.2%) during the intervention period compared with 127 (13.2%) during the pre–COVID-19 period (RD, 8.0%; 95% CI, 2.1%-10.9%; P = .04) and 82 (10.2%) during wave 1 (RD, 11.1%; 95% CI, 5.5%-14.5%; P < .001).

Key Points

Question Can an advance care planning (ACP) video and communication intervention promote ACP for elderly patients during the ongoing COVID-19 pandemic?

Findings This pre-post, open-cohort nonrandomized controlled trial compared ACP documentation during three 6-month periods: pre–COVID-19 (14 107 patients), COVID-19 wave 1 (12 806 patients), and an intervention period (15 106 patients). The ACP documentation rates were 17.9% in the pre–COVID-19 period, 12.5% in the COVID-19 wave 1 period, and 23.7% in the intervention period; ACP rates during the intervention period were highest compared with the 2 other periods.

Meaning The use of an ACP video and communication intervention may promote ACP for elderly adults during the evolving COVID-19 pandemic.

(continued)
CONCLUSIONS AND RELEVANCE  This intervention, implemented during the evolving COVID-19 pandemic, was associated with higher rates of ACP documentation, especially for African American and Hispanic patients.

TRIAL REGISTRATION  ClinicalTrials.gov Identifier: NCT04660422

Methods

Trial Design and Oversight
The ACP-COVID study was a pre-post, open-cohort nonrandomized controlled trial that aimed to evaluate an ACP intervention in older patients during an evolving pandemic. Three prespecified periods were chosen to compare ACP documentation: a baseline period before COVID-19 (pre–COVID-19; September 15, 2019, to March 14, 2020), the first wave of COVID-19 cases in New York City (wave 1; March 15, 2020, to September 14, 2020), and the intervention period (December 15, 2020, to June 14, 2021) (Figure 1). Our primary comparison was between the intervention period and the first wave.
and the wave 1 period (see Supplement 1 for the trial protocol). The trial was approved by the Dana-
Farber Cancer Institute Institutional Review Board, and informed consent was waived because this
was deemed a minimal risk trial. This study followed the Transparent Reporting of Evaluations With
Nonrandomized Designs (TREND) reporting guideline.

**Patients and Clinicians**

All patients 65 years or older who had at least 1 in-person or telehealth visit to a participating clinic
during any of the 3 periods were included in the study. Patients were recruited from 22 outpatient
clinics of Northwell Health, the largest health care organization in New York. All clinicians affiliated
with these clinics were invited to participate in the intervention. Training sessions were held during
the planning and training period (Figure 1).

**Intervention**

The ACP intervention consisted of video decision aids for patients and communication skills training
for clinicians. Video decision aids included ACP-related videos and videos on COVID-19 and
vaccinations because of the salience of these topics. The ACP Decisions video decision aids were
disseminated to all patients 65 years or older 1 to 2 weeks before a clinic or telehealth appointment
through links sent via text message, email, or mail, whichever means was available. The videos were
also available to patients in person before or during their clinic visit. Patients chose which videos
they wished to view from the following options: Choosing a Health Care Proxy, Having an ACP
Conversation, What Is COVID-19, and COVID-19 Vaccinations (see the eMethods in Supplement 2 for
video descriptions). We included COVID-19 videos for adults, teens, and children to engage patients
and their families. All videos were designed for a health literacy level of less than sixth grade, and
video images of patients and clinicians were diverse, reflecting the community being served. Videos were available in English and Spanish. Clinic-level data on video use were monitored weekly,
and dissemination efforts regarding modality (ie, texting, email, or mailings) were modulated weekly
based on video use data.

Clinician communication skills training was offered to all clinicians affiliated with the practices.
Clinicians participated in a remote, 4-hour, VitalTalk-designed interactive training via Zoom in which
they practiced introducing the concept of ACP, discussing prognosis, exploring cultural concerns
unique to minority communities, and addressing common COVID-19 ACP scenarios. VitalTalk
facilitators used a standardized teaching method that included clinician observation of exemplar
communication behaviors, practice with live actor patients, and immediate focused feedback.

**Figure 1. Study Timeline With Overlay of COVID-19 Cases in New York City**

![Study Timeline With Overlay of COVID-19 Cases in New York City](https://jamanetwork.com/)

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Outcomes and Assessment
Our primary outcome was the documentation of ACP in a clinician’s electronic health record (EHR) note. This documentation included any notation of a discussion about goals of care and preferences for future medical care, palliative care, hospice, or a health care proxy, each of which was evaluated independently as well. These preferences were identified using human-assisted natural language processing (NLP) as described in earlier studies. Prior work found that an NLP search of clinician notes was more accurate in finding these outcomes than extracting structured data elements (eg, uploaded ACP documents) from the EHR (additional details about the study NLP methods are provided in eTable 1 in Supplement 2). Our secondary outcome was ACP rates in prespecified racial and ethnic subgroups.

Statistical Analysis
The primary analysis included all eligible patients in the 3 prespecified periods. We compared the outcome measures mentioned above between the intervention and the 2 control periods, adjusting for patient characteristics (age, sex, race and ethnicity, marital status, location, and number of encounters during each 6-month period). The primary comparison was between the intervention and wave 1 periods. Rate differences (RDs) were estimated using Poisson models with identity link functions. We used the generalized estimating equations approach to account for patients within clinic practice clustering and the repeated measures over time from the same individuals. As a sensitivity analysis, we limited the cohort to those who appeared in all 3 comparison periods. We conducted prespecified subgroup analyses (with individuals of any non-White racial minority and Hispanic ethnicity combined and with individuals of each racial and ethnic minority separately). A 2-sided \( P < .05 \) was considered to be statistically significant.

We conservatively estimated that approximately 7800 patients from 150 clinicians would be eligible for the study at each period and 85% of patients would overlap from one period to the next. With 3 periods, we anticipated including a total of 10 139 unique patients in the study. In the most conservative scenario, with each clinician contributing a mean of 44 patients, the design effect was estimated as 3.2, assuming an intracluster correlation of 0.05, which corresponds to an effective sample size of 2098 appearing in both periods. Preliminary estimates indicated the rate for ACP documentation (primary outcome) would be approximately 10% in the pre–COVID-19 period and 20% during wave 1. The study was designed with more than 95% power to detect a 5% absolute increase in outcome, with a 2-sided \( P < .05 \) considered to be statistically significant.

For the subgroup analysis, preliminary estimates suggested that 30% of the population would be non-White. When limited to the non-White subgroups, we expected 2340 patients in each of the 2 periods. In the most conservative scenario, with each clinician contributing a mean of 13 patients, the design effect was estimated to be 1.6, assuming an intracluster correlation of 0.05, which corresponds to an effective sample size of 1233 appearing in both periods. The study would have more than 95% power to detect a 5% absolute increase in outcome, with a 2-sided \( P < .05 \) considered to be statistically significant. All statistical analyses were conducted using SAS software, version 9.4 (SAS Institute Inc).

Results
Patients and Clinicians
A total of 14 107 patients (mean [SD] age, 81.0 [8.4] years; 8856 [62.8%] female; and 2248 [15.9%] African American or Hispanic) interacted with clinicians during the pre–COVID-19 period, 12 806 (mean [SD] age, 81.2 [8.5] years; 8047 [62.8%] female; and 1992 [15.6%] African American or Hispanic) during wave 1, and 15 106 (mean [SD] 80.9 [8.3] years; 9543 [63.2%] female; and 2535 [16.8%] African American or Hispanic) during the intervention period. Patient characteristics were similar across the 3 study periods (Table 1). Race or ethnicity data were missing for 891 patients (6.3%) in the pre–COVID-19 period, 883 patients (6.9%) in the wave 1 period, and 1143 patients

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(7.6%) in the intervention period. Of the 219 clinicians affiliated with the participating outpatient clinics, 185 (84.5%) underwent the intervention communication training.

**Video Decision Aid Use**
A total of 5302 videos were viewed during the intervention period, including 4023 (75.9%) in English and 1279 (24.1%) in Spanish. A total of 4163 videos (78.5%) were viewed in person during a clinic visit, and 1139 (21.5%) were viewed via a web link. Of the 5302 videos viewed, 3587 (67.7%) contained ACP-related content, whereas 1715 (32.3%) were related to COVID-19. Of the 5302 videos viewed, 4752 (89.6%) had a watch percentage of 50% or greater, and 550 (10.4%) had a watch percentage of less than 50% (Figure 2; eTables 2 and 3 in Supplement 2).

**Primary Outcome**
Advance care planning documentation was identified in 3587 patients (23.8%) during the intervention period compared with 2525 patients (17.9%) during the pre–COVID-19 period (RD, 5.8%; 95% CI, 0.9%-7.9%; P = .01) and 1598 (12.5%) during wave 1 (RD, 11.3%; 95% CI, 6.3%-12.1%; P < .001) (Figure 3). The results were similar in the sensitivity analysis limited to the 7180 patients who appeared in all 3 comparison periods (18.5% in the pre–COVID-19 period, 11.4% in wave 1, and 21.8% in the intervention period) (eTables 4 and 5 in Supplement 2).

**Secondary Outcomes**
All 5 elements of ACP documentation (discussions about goals of care and preferences for medical care, palliative care, hospice, and health care proxy) were greatest during the intervention period (Table 2). Goals of care were identified for 3506 patients (23.2%) during the intervention period compared with 2383 patients (16.9%) during the pre–COVID-19 period (RD, 6.3%; 95% CI, Table 1. Characteristics of the Study Population

| Characteristic             | Pre–COVID-19 (n = 14 107) | COVID-19 wave 1 (n = 12 806) | Intervention period (n = 15 106) |
|---------------------------|---------------------------|-----------------------------|-----------------------------------|
| Age, mean (SD), y         | 81.0 (8.4)                | 81.2 (8.5)                  | 80.9 (8.3)                        |
| Sex                       |                           |                             |                                   |
| Female                    | 8856 (62.8)               | 8047 (62.8)                 | 9543 (63.2)                       |
| Male                      | 5251 (37.2)               | 4759 (37.2)                 | 5563 (36.8)                       |
| Race and ethnicity        |                           |                             |                                   |
| Hispanic                  | 961 (6.8)                 | 806 (6.3)                   | 1046 (6.9)                        |
| Non-Hispanic              |                           |                             |                                   |
| Asian                     | 665 (4.7)                 | 568 (4.4)                   | 742 (4.9)                         |
| Black                     | 1287 (9.1)                | 1186 (9.3)                  | 1489 (9.9)                        |
| White                     | 9600 (68.1)               | 8717 (68.1)                 | 9904 (65.6)                       |
| Otherab                   | 703 (5.0)                 | 646 (5.0)                   | 782 (5.2)                         |
| Unknown                   | 891 (6.3)                 | 883 (6.9)                   | 1143 (7.6)                        |
| Marital status            |                           |                             |                                   |
| Married                   | 7996 (56.7)               | 7124 (55.6)                 | 8370 (55.4)                       |
| Widowed                   | 2232 (15.8)               | 2097 (16.4)                 | 2236 (14.8)                       |
| Divorced or separated     | 1014 (7.2)                | 944 (7.4)                   | 1103 (7.3)                        |
| Single                    | 1815 (12.9)               | 1610 (12.6)                 | 1973 (13.1)                       |
| Other                     | 68 (0.5)                  | 60 (0.5)                    | 74 (0.5)                          |
| Unknown                   | 982 (7.0)                 | 971 (7.6)                   | 1350 (8.9)                        |
| Clinic visits             |                           |                             |                                   |
| 1                         | 5984 (42.2)               | 5655 (44.2)                 | 6112 (40.5)                       |
| 2                         | 3047 (21.6)               | 2528 (19.7)                 | 3239 (21.4)                       |
| 3-4                       | 2340 (16.6)               | 2122 (16.6)                 | 2714 (18.0)                       |
| ≥5                        | 2736 (19.4)               | 2501 (19.5)                 | 3041 (20.1)                       |
| Patients with telehealth encounters | 523 (3.7) | 3228 (25.2) | 2262 (15.0) |

* Data are presented as number (percentage) of patients unless otherwise indicated.

a The other category encompasses all individuals who were not Native Hawaiian, Hispanic, non-Hispanic White, non-Hispanic African American, or non-Hispanic Asian or those who had missing, declined/not reported, or unknown for their race and ethnicity data.
A health care proxy was identified for 2670 patients (17.7%) during the intervention period compared with 1637 patients (11.6%) during the pre–COVID-19 period (RD, 6.1%; 95% CI, 1.5%-8.0%; \( P = .004 \)) and 1024 (8.0%) during wave 1 (RD, 9.7%; 95% CI, 5.5%-11.2%; \( P < .001 \)).

**Subgroup Analysis**

The presence of ACP documentation among all patients of a racial minority was 26.1% (n = 1059) during the intervention period compared with 16.5% (n = 598) during the pre–COVID-19 period (RD, 9.6%; 95% CI, 3.5%-11.7%; \( P < .001 \)) and 10.9% (n = 348) during wave 1 (RD, 15.2%; 95% CI, 9.2%-16.7%; \( P < .001 \)).

The presence of ACP documentation among African American patients was 30.0% (n = 447) during the intervention period compared with 18.1% (n = 233) during the pre–COVID-19 period (RD, 11.9%; 95% CI, 4.1%-15.9%; \( P < .001 \)) and 11.0% (n = 130) during wave 1 (RD, 19.1%; 95% CI, 11.7%-21.2%; \( P < .001 \)).

The presence of ACP documentation among Hispanic patients was 21.2% (n = 222) during the intervention period compared with 13.2% (n = 127) during the pre–COVID-19 period (RD, 8.0%; 95% CI, 2.1%-10.9%; \( P = .004 \)) and 10.2% (n = 82) during wave 1 (RD, 11.1%; 95% CI, 5.5%-14.5%; \( P < .001 \)) (Table 2 and Figure 3).
**Discussion**

In this large, pragmatic, ambulatory care intervention in a diverse population affected by the COVID-19 pandemic, patients in the intervention period had an opportunity to watch video ACP decision aids and interact with clinicians trained in tailored communication skills. Video use was robust, and penetration of communication skills training was high, demonstrating successful intervention implementation. Documentation of ACP discussion was much greater during the intervention period compared with the pre–COVID-19 or COVID-19 wave 1 periods. The intervention was also associated with increased ACP documentation for African Americans and Hispanic patients.

Advance care planning interventions have had mixed results in prior trials,\(^6\,16\,33\) and the study of ACP during an evolving pandemic is unprecedented. The COVID-19 pandemic increased the relevance of ACP because patients were asked to consider potential scenarios that were familiar, highly relevant, and emotionally charged. The intervention period was associated with increased goals-of-care and health care proxy discussions, as the relevance and importance of ACP likely increased during the unfolding pandemic. Advance care planning may be more urgent now than ever before because of the COVID-19 pandemic.

The unequal impact of COVID-19 may explain why communities disproportionately affected by the pandemic had higher rates of ACP documentation. Specifically, African American and Hispanic patients were more likely to have ACP documentation during the intervention period compared with non-Hispanic White patients. Intervention benefit for African American and Hispanic patients was a goal of the project as reflected in the design of the videos and clinician training. However, it is possible that this effect also was due to higher exposure to serious COVID-19 illness in the families of African American and Hispanic patients.

Prior clinician incentives intended to promote ACP, such as Medicare ACP billing codes, have been suboptimal in encouraging ACP.\(^34\) Clinicians’ first-hand experience caring for patients with COVID-19 and graphic media images of overflowing intensive care units and mobile morgue units may have changed clinician attitudes to ACP. The 2022 ACP Healthcare Effectiveness Data and Information Set measure\(^35\) may also further boost ACP. The pandemic has raised the relevance of ACP for patients and clinicians, especially for people with direct exposure to death and dying, and has

| Outcome | Intervention (n = 15 106), No. (%) | Pre-COVID-19 (n = 14 107) | COVID-19 wave 1 (n = 12 806) | P value\(a\) | RD (95% CI)\(^a\) | P value\(a\) |
|---------|----------------------------------|--------------------------|-----------------------------|-------------|-----------------|-------------|
| Primary outcome | ACP documentation | Overall 3587 (23.8) 2525 (17.9) 5.8 (0.9 to 7.9) .01 1598 (12.5) 11.3 (6.3 to 12.1) <.001 | | |
| Subgroups | Non-Hispanic White | 2192 (22.1) 1791 (18.7) 3.5 (~1.4 to 6.4) .21 1105 (12.7) 9.5 (4.9 to 11.1) <.001 | | |
| | Unknown | 336 (29.4) 136 (15.3) NA NA 145 (16.4) NA NA | | |
| | Minority\(^b\) | 1059 (26.1) 598 (16.5) 9.6 (3.5 to 11.7) <.001 348 (10.9) 15.2 (9.2 to 16.7) <.001 | | |
| | Hispanic | 222 (21.2) 127 (13.2) 8.0 (2.1 to 10.9) .004 82 (10.2) 11.1 (5.5 to 14.5) <.001 | | |
| | Non-Hispanic Asian | 200 (27.0) 118 (17.7) 9.2 (3.8 to 13.1) <.001 60 (10.6) 16.4 (10.6 to 19.7) <.001 | | |
| | Non-Hispanic Black | 447 (30.0) 233 (18.1) 11.9 (4.1 to 15.9) <.001 130 (11.0) 19.1 (11.7 to 21.2) <.001 | | |
| Secondary outcomes | Goals of care | 3506 (23.2) 2381 (16.9) 6.3 (1.0 to 8.0) .01 1512 (11.8) 11.4 (6.0 to 11.9) <.001 | | |
| | Palliative care | 61 (0.4) 29 (0.2) 0.2 (0.0 to 0.4) .03 20 (0.2) 0.2 (0.0 to 0.4) .02 | | |
| | Hospice | 164 (1.1) 96 (0.7) 0.4 (~0.2 to 1.0) .16 74 (0.6) 0.5 (0.2 to 0.9) .001 | | |
| | Limitations on life-sustaining treatment | 464 (3.1) 335 (2.4) 0.7 (~0.3 to 1.4) .21 212 (1.7) 1.4 (0.8 to 2.2) <.001 | | |
| | Surrogate decision maker | 2670 (17.7) 1637 (11.6) 6.1 (1.5 to 8.0) .004 1024 (8.0) 9.7 (5.5 to 11.2) <.001 | | |

Abbreviations: ACP, advance care planning; NA, not applicable; RD, rate difference.\(^a\) Model adjusted for age, sex, marital status, location, number of encounters, and race and ethnicity.\(^b\) All individuals who did not have a race or ethnicity value of non-Hispanic White.
presented an opportunity to encourage more widespread use of ACP, an elusive goal for most health care systems during the last 3 decades. Previous trials of ACP interventions have often fallen short because of suboptimal implementation. In this study, we were able to monitor fidelity to the intervention in real time. Video viewings were monitored weekly, and implementation strategies shifted to meet patients’ needs (eg, texting, in-person viewings, and mailings). Patients’ increased use of telehealth services and smartphone technology played an important role in exposure to the videos. Remote clinician training allowed for faster dissemination of the program and yielded nearly complete participation of clinicians in the training. We capitalized on expanded technology access for patients and the possibility of remote interactive trainings for clinicians; future interventions may benefit from such opportunities as well. Analysis is ongoing looking at the association of this intervention on COVID-19 vaccination rates and goal-concordant care.

Limitations

Our findings must be considered in the context of several limitations. First, the intervention took place in an outpatient setting in a region with one of the worst death rates during the pandemic. Studying the intervention in other geographic locations and in the inpatient and emergency department settings would be of great interest.

Second, we looked at ACP documentation rates in the EHR during a 6-month intervention period. Long-term studies looking at care delivery and concordance with patient goals are ongoing, but because these may take years to complete, the knowledge generated will not be available to direct care during a developing pandemic. Assessment of ACP documentation allowed for rapid results with immediate application to the delivery of medical care.

Third, missing data present another limitation. Specifically, in our 3 study periods, race or ethnicity data were missing for 6.3% of patients in the pre–COVID-19 period, 6.9% in the wave 1 period, and 7.6% in the intervention period. Although these rates are within recommended guidelines for identifying hospitals with potentially unreliable race and ethnicity data, this level of missingness decreases the precision of our analyses.

Fourth, potential unmeasured confounders may influence this trial because it was not randomized. For example, patients with worse health status are more likely to be approached by clinicians for ACP. Similarly, patients and clinicians exposed to death in the context of the pandemic may have an augmented interest in ACP.

Fifth, we were not able to track video use at the patient level in a manner that allowed direct linkage to EHR-based outcomes. Future work should follow patient viewing and direct causal linkage of video viewing with the outcomes of interest.

Sixth, our system for generating invitations for remote viewing was initially implemented in English. We expanded to Spanish late in the trial period. This delayed introduction certainly contributed to low remote video use among Spanish speakers.

Seventh, any pragmatic trial is subject to secular trends in potentially relevant phenomena, which is certainly the case during an evolving pandemic. Our prespecified intervention period corresponded with a significant second wave in New York City (Figure 1), which may have influenced the outcome.

Conclusions

As one of the first large, descriptive, pragmatic ACP trials to be conducted during the COVID-19 pandemic, the ACP-COVID trial demonstrated a significant and clinically meaningful association of ACP documentation rates in a rapid and scalable manner that could be quickly implemented nationally. In addition, the intervention association was greater among African American and Hispanic patients compared with non-Hispanic White patients. Implications should be considered from the perspectives of numerous key stakeholders. For patients, caregivers, and clinicians, rapidly...
changing information needs to be disseminated in a meaningful way and in a fashion that honors and respects the diverse communities affected. The ACP-COVID intervention leveraged diverse video decision aids and remote clinician training to empower patients and clinicians by addressing urgent informational and emotional needs. For health care systems, corporate leaders, and government officials, the ACP-COVID intervention represents 1 of the first rapidly adoptable programs with significant association in promoting ACP, a widely used quality metric. Finally, for research studies, the use of patient video decision aids, clinician training, and NLP-assessed outcomes offers a powerful way forward to conduct similar large-scale trials in ACP and beyond.

ARTICLE INFORMATION
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SUPPLEMENT 2.

eMethods. Study Organization and Committees
eTable 1. Keyword Library Used for NLP Annotations
eTable 2. Total Number of Video Views by Video Type, Language, and Modality
eTable 3. Video View Watched Percentage
eTable 4. Patient Characteristics Limited to Patients Who Appeared in All Three Periods (Sensitivity Analysis)
eTable 5. NLP ACP Documentation Rates by Domain and Overall Limited to Patients Who Appeared in All Three Periods (Sensitivity Analysis)
eTable 6. Rate Difference Between Intervention and Baseline Periods Using Generalized Linear Regression Models with Generalized Estimating Equations Limited to Patients Who Appeared in All Three Periods (Sensitivity Analysis)
eReferences

SUPPLEMENT 3.

Data Sharing Statement