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## Effect of a Patient-Centered Communication Intervention on Oncologist-Patient Communication, Quality of Life, and Health Care Utilization in Advanced Cancer:

### The VOICE Randomized Clinical Trial

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## Abstract

**IMPORTANCE**—Observational studies demonstrate links between patient-centered communication, quality of life (QOL), and aggressive treatments in advanced cancer, yet few randomized clinical trials (RCTs) of communication interventions have been reported.

**OBJECTIVE**—To determine whether a combined intervention involving oncologists, patients with advanced cancer, and caregivers would promote patient-centered communication, and to estimate intervention effects on shared understanding, patient-physician relationships, QOL, and aggressive treatments in the last 30 days of life.

**DESIGN, SETTING, AND PARTICIPANTS**—Cluster RCT at community- and hospital-based cancer clinics in Western New York and Northern California; 38 medical oncologists (mean age 44.6 years; 11 (29%) female) and 265 community-dwelling adult patients with advanced nonhematologic cancer participated (mean age, 64.4 years, 146 [55.0%] female, 235 [89%] white; enrolled August 2012 to June 2014; followed for 3 years); 194 patients had participating caregivers.

**INTERVENTIONS**—Oncologists received individualized communication training using standardized patient instructors while patients received question prompt lists and individualized communication coaching to identify issues to address during an upcoming oncologist visit. Both interventions focused on *engaging* patients in consultations, *responding* to emotions, *informing* patients about prognosis and treatment choices, and *balanced framing* of information. Control participants received no training.

**MAIN OUTCOMES AND MEASURES**—The prespecified primary outcome was a composite measure of patient-centered communication coded from audio recordings of the first oncologist visit following patient coaching (intervention group) or enrollment (control). Secondary outcomes included the patient-physician relationship, shared understanding of prognosis, QOL, and aggressive treatments and hospice use in the last 30 days of life.

**RESULTS**—Data from 38 oncologists (19 randomized to intervention) and 265 patients (130 intervention) were analyzed. In fully adjusted models, the intervention resulted in clinically and statistically significant improvements in the primary physician-patient communication end point (adjusted intervention effect, 0.34; 95% CI, 0.06–0.62;  $P = .02$ ). Differences in secondary outcomes were not statistically significant.

**CONCLUSIONS AND RELEVANCE**—A combined intervention that included oncologist communication training and coaching for patients with advanced cancer was effective in improving patient-centered communication but did not affect secondary outcomes.

**TRIAL REGISTRATION**—[clinicaltrials.gov](https://clinicaltrials.gov) Identifier: NCT01485627

The National Cancer Institute, the National Academy of Medicine, the American Society for Clinical Oncology, and the National Priorities Partnership all call for improved patient-physician communication in the context of serious and life-limiting illnesses, citing effects of good communication on quality of care and quality of life (QOL) and an ethical mandate that patients be offered participation in informed decisions regarding their care.<sup>1–4</sup> In advanced cancer, inadequate communication about prognosis and treatment choices is common<sup>5–7</sup> and is associated with unrealistic patient expectations regarding curability,<sup>8</sup> provision of aggressive treatment that is not concordant with patients' wishes and enrollment in hospice too late to deliver discernable benefit.<sup>8–12</sup> Critical conversations typically do not happen, or happen in hospital shortly before a patient's death.<sup>13</sup>

Making high-quality conversations happen is difficult. More than 90% of patients with advanced cancer say they want to be actively involved in their care and value frank and sensitive conversations about QOL, prognosis, and treatment choices.<sup>10,14,15</sup> Yet patients are often reluctant to be assertive, ask questions, request clarification, express emotions directly, or state opinions and preferences.<sup>16</sup> As death approaches, patients express considerable

ambivalence about end-of-life discussions, often indicating that now is “not the right time.”<sup>17–20</sup> Similarly, while most clinicians indicate willingness to have these discussions “now,” few follow through.<sup>21,22</sup> More typically, clinicians wait for patients to signal interest, then offer prognostic information that is optimistically biased.<sup>23,24</sup>

Prior attempts to improve patient-physician communication in advanced cancer have had limited impact. Intensive workshops inconsistently improve trainee communication behaviors<sup>25,26</sup> and are impractical for busy clinicians. Brief individualized in-office interventions using expert feedback on video recorded encounters improved oncologists’ empathy and patient-reported trust,<sup>27</sup> but this approach has not been applied to other communication behaviors, such as delivery of prognostic information. Patient coaching increased discussion of cancer pain,<sup>28</sup> and, in palliative care, question prompt lists (QPLs) have increased question-asking<sup>29</sup>—but only when physicians encouraged patients to ask questions.

The Values and Options in Cancer Care (VOICE) study<sup>30</sup> combined 2 interventions, a brief individualized oncologist skill-based training, and individualized patient and caregiver coaching incorporating a QPL. Based on an ecological model of patient-clinician communication, both interventions were designed to promote the involvement in care that patients and families desire but rarely request and emphasized the same communication skills and topics identified in prior research: engaging patients to participate in the consultation, responding to patients’ emotions, informing patients about prognosis and treatment choices, and framing information in a balanced manner.<sup>6,18,29,31–35</sup> The primary outcome was patient-centered communication in these domains. Secondary outcomes were shared understanding, patient-physician relationships, QOL, and health care utilization at the end of life.<sup>33</sup>

## Methods

### Overview

We conducted a multisite cluster randomized clinical trial (RCT) of an intervention to improve communication between patients (and caregivers when available) and oncologists. Oncologists randomized to the intervention arm participated in individualized communication training using standardized patient-instructors (SPIs), while their patients (with caregivers) participated in an individualized communication coaching session with follow-up telephone calls. After a prerandomization phase designed to assess baseline communication patterns of participating oncologists, we enrolled participants (from August 2012 through June 2014) and followed them until October 2015. We obtained institutional review board approval for all study sites, and participants provided written informed consent and received \$15 per questionnaire completed. See the published study description<sup>36</sup> and the eAppendix in Supplement 1 for the study protocol and descriptions of the interventions and Supplement 2 for the statistical analysis plan.

## Settings and Participants

We conducted the study in community-based cancer clinics (4), academic medical centers (3) and community hospitals (3) in Western New York and Sacramento, California.

**Physicians**—We recruited medical oncologists who care for patients with nonhematologic cancers at practice meetings at participating clinics. The mean physician age was 44 years; 27 (71%) were male; 17 (45%) were white, 16 (42%) were Asian, and 5 (13%) were of other race.

**Patients**—With clinic staff, research assistants reviewed clinic rosters of enrolled physicians to contact potentially eligible patients age 21 years or older, able to understand spoken English and provide written informed consent, and who had either stage IV nonhematologic cancer or stage III cancer and whose physician “would not be surprised” if the patient were to die within 12 months.<sup>37,38</sup> We excluded inpatients and those in hospice. We first recruited 3 to 4 “prerandomization” patients per physician who agreed to have 1 office visit audio recorded and complete questionnaires before and after the office visit. After physician randomization, we recruited a new cohort of patients, up to 10 per physician, for the cluster RCT (eTable 1 in Supplement 3) until we reached the target sample size of 265 patients. Cluster RCT patients also agreed to an audio recorded office visit and previsit and postvisit questionnaires; in addition, they agreed to participate in intervention or control conditions, complete questionnaires quarterly for 3 years, and to have their medical records abstracted. Patients were blinded to study arm assignment until completion of baseline measures.

**Caregivers**—Research assistants asked patients to identify “a family member, partner, friend, or other individual involved with your health care issues, preferably someone who comes to physician appointments with you.” Eligible caregivers were 21 years or older and able to understand spoken English and provide written informed consent.

## Interventions

The experimental intervention<sup>36</sup> included (1) a 2-session in-office physician training (1.75 hours) using a brief video, feedback from standardized patients portraying roles of patients with advanced cancer who also critiqued up to 2 audio recorded study patient visits, and (2) a single 1-hour patient and caregiver coaching session incorporating a question prompt list to help patients bring their most important concerns to their oncologist’s attention at an upcoming office visit, plus up to 3 follow-up phone calls (Table 1; eTable 2 in Supplement 3). Trainers and coaches underwent 3-day on-site trainings. To promote patient-centered communication about disease course, prognosis, treatment decisions and end-of-life care, physician and patient interventions focused on the same 4 key domains of patient-centered communication.<sup>36</sup> Intervention sessions were audio recorded and reviewed by lead trainers and investigators using a fidelity checklist. Fidelity was 94% or higher.

All intervention physicians completed both training sessions. All intervention patients received in-person coaching; of the 52% who responded to a mailed survey, 87% “would recommend coaching to other patients with cancer”; and 85% were able to ask “all” or

“most” of their “most important” questions. Of the 130 coached patients, 94% participated in 1 follow-up call (2 calls, 78.7%; 3 calls, 58.3%); reasons for nonparticipation were death and/or illness (47.1%), unreturned phone calls (47.1%) and refusal and/or withdrawal (5.8%). Control physicians and patients received no training.

### Data Collection and Outcome Measures

We audio recorded the first physician visit after the coaching session (for intervention) or after study entry (control). The primary outcome was a composite of 4 prespecified communication measures matched to the goals of communication training, described in detail in Table 1—*engaging* patients in consultations (Active Patient Participation Coding [APPC]<sup>39</sup>), responding to patients’ emotions (Verona VR-CoDES<sup>41,42</sup>), informing patients about prognosis and treatment choices (Prognostic and Treatment Choices [PTCC] Informing subscale<sup>44</sup>) and balanced framing of decisions (PTCC Balanced Framing subscale<sup>44</sup>). The composite score derived from these scales were designed to capture key elements of 6 interrelated functions of communication outlined by the National Cancer Institute: fostering healing relationships (APPC), exchanging information (PTCC), managing uncertainty (PTCC), making decisions (APPC, PTCC), responding to emotions (Verona), and enabling patient self-management (APPC).<sup>47</sup> Coding of the 4 measures was performed by teams of trained university students who were audited continuously and blinded to study hypotheses and group assignment. We transformed each of the 4 component scores to *z* scores based on the prerandomization phase sample means (SDs):

$$z = (\text{Raw Score} - \text{Prerandomization Phase Mean}) / \text{Prerandomization Phase SD}$$

The 4-component *z*-scores were averaged to form the primary outcome, a composite measure with better overall precision and sensitivity than the individual components for assessing intervention effects on the multiple targeted communication goals.

We assessed patient-physician relationships using The Human Connection (THC) scale,<sup>48</sup> the Health Care Climate Questionnaire (HCCQ),<sup>49</sup> and the Perceived Efficacy in Patient-Physician Interactions (PEPPI) scale<sup>50</sup> shortly after the audio recorded visit. Physicians and patients were also asked to estimate 2-year survival and curability of the patient’s cancer on a 7-point scale (100%, about 90%, about 75%, about 50/50, about 25%, about 10%, 0%, don’t know); discordance was defined as 2 or more categories of difference.

We administered QOL questionnaires at 3-month intervals from study entry for up to 3 years and prespecified a composite QOL score to be the average of 5 *z*-scored subscales: McGill QOL scale single item, McGill Psychological Well-Being subscale, McGill Existential Well-Being subscale, FACT-G Physical Functioning subscale, and FACT-G Social Functioning subscale<sup>51,52</sup>; all are widely used in research in advanced cancer. Fewer than 3% of follow-up questionnaires were missing.

Trained nurses and physicians abstracted utilization data from medical records at relevant hospitals, offices, and hospice organizations. Based on a review of the literature,<sup>9,53–55</sup> we prespecified a composite utilization score of 3 indicators of aggressive treatment in the last

30 days of life (chemotherapy, potentially burdensome interventions, emergency department [ED]/hospital admission) and hospice utilization (eTable 3 in Supplement 3).

### Randomization and Blinding

We randomized by physician and stratified by site (New York or California) and oncologist subspecialty (50% vs <50% of patients with breast cancer) to balance sex and other unmeasured patient characteristics that might be associated with the communication outcomes. Within strata, we randomly assigned physicians at a 1:1 ratio to intervention or control. We recruited, obtained consent, and enrolled patients based on the arm to which their physician was assigned. We oversampled patients with caregivers to achieve recruitment goals for a companion study of caregiver bereavement. Only the study statisticians were aware of the random number sequences and treatment assignment, preserving blinding among transcriptionists, coders, and abstractors.

### Sample Size

To affect utilization and patient outcomes meaningfully, we felt a moderately large effect on communication would be needed. To account for attrition and variance inflation arising from cluster randomization, we used standard formula as well as simulation studies using SAS statistical software to determine that a target sample size of 38 physicians and 265 patients would yield the effective sample needed to provide at least 80% power (2-sided testing,  $\alpha = .05$ ) to detect standardized effects of 0.50 for the primary communication outcome.<sup>36</sup>

### Statistical Analysis

Between-group comparisons on communication and utilization outcomes were conducted using Wald-type tests from prespecified mixed-effects linear regression models (for continuous outcomes) and generalized estimating equations for binary outcomes, specified to account for the nesting of patients (the units of analysis) within physicians (the units of randomization). For all regression analyses, covariates for study site and breast cancer subspecialty were included to account for the stratified randomization, as well as patient-level covariates to adjust for demographic and cancer characteristics. Between-group comparisons of QOL trajectories were performed using the terminal decline model (TDM) of Li et al<sup>56</sup> that accounts for mortality by jointly modeling QOL and survival using piecewise linear regression and exponential hazards regression models, respectively. The TDM parameterizes time counting backward from patient time of death and is specified with 2 periods for each component, the “terminal decline” period nearest death and the more remote period before then; our model extends on Li et al<sup>56</sup> to permit the inclusion of study covariates. We chose 9 months and 12 months as the duration of the terminal decline period for QOL and mortality, respectively, based on the observed change point in the data.

For the analysis of communication outcomes, we used the prerandomization data to adjust for between-physician differences among the 38 physician clusters. Hence, the data sets for these mixed models analyses included observations from prerandomization and postrandomization audio recordings, and the models included fixed-effects terms for phase (prerandomization vs postrandomization), study arm, and the interaction of phase and arm. Intervention effects were estimated as the between-arm difference in adjusted mean

difference from prerandomization to postrandomization samples. For the other continuous outcomes, only postrandomization data were included, and intervention effects were estimated as adjusted mean differences. In model validation and exploratory analysis, heterogeneity of treatment effects was assessed by adding interaction terms to regression models to compare intervention effects across prespecified subgroups. Residual plots were also used for model validation.

Statistical analyses (Supplement 2) were conducted in version 9.4 of the SAS System.

## Results

### Study Participants

Of 52 physicians contacted, 43 enrolled and 38 participated in the cluster RCT (eFigure 1 in Supplement 3). Of the 265 participating patients, 194 (73.0%) had an enrolled caregiver. Patient characteristics across study arms were well matched (eTable 1 in Supplement 3); mean age was 64.4 years, 55.0% were female, 11.5% were nonwhite, 28.0% had high school education or less, and 19.0% reported income of \$20 000 or less. The mean follow-up for patients was 15 months; by study closing (October 1, 2015), 151 patients had died, 18 had withdrawn, and 1 was lost to follow-up (eFigure 1 in Supplement 3). We abstracted all decedents' medical records.

### Primary Outcome

In fully adjusted models, the composite communication score showed a significant intervention effect (estimated adjusted intervention effect, 0.34; 95% CI, 0.06–0.62;  $P = .02$ ) (Table 2; eTable 4 in Supplement 3). The sample standard deviation of the composite from the prerandomization cohort was 0.53, hence the estimated intervention effect of 0.34 corresponds to a standardized effect of 0.64, corresponding to 5.7 additional “engaging” statements (a 44% increase), 0.6 additional responses to emotion (a 71% increase), and 1.4 additional statements regarding prognosis and treatment choices (a 38% increase).

### Secondary Outcomes

Of the individual communication component measures, only the engaging measure (APPC) was statistically significant. There were no statistically significant effects of the intervention on the PEPPI, THC, or HCCQ scales, or on 2-year survival and curability estimates; 2-year survival discordance was 59% in the intervention group vs 62% for control; corresponding figures for curability discordance were 39% and 44%. Quality of life was stable until 6 to 9 months prior to death, with a terminal decline (eFigure 2 in Supplement 3); overall, QOL differences between intervention and control were not statistically significant. We observed no intervention effects on health care utilization.

### Exploratory Outcomes

None of the prespecified candidate effect modifiers were associated with heterogeneity in treatment effects on communication outcomes. Median survival was 16 months: 19 months in the intervention group and 14 months in the control (hazard ratio, 0.84; 95% CI, 0.61–1.15) (eFigure 3 in Supplement 3).



## Discussion

In this study, a brief combined intervention targeting physicians, patients with advanced cancer, and their caregivers (when available) promoted patient-centered communication in the near term, with clinically meaningful increases in engaging patients in discussions, responding to emotions and discussions of prognosis and treatment choices. These communication domains are linked; provision of information or emotional support, for example, may depend on a patient cue or request as well as a clinician's willingness and capacity to respond. Of the 4 communication domains, the most fundamental, engaging patients as active partners in care—being assertive, asking questions, requesting clarification, expressing opinions and preferences to a greater degree than control patients—was independently significant in secondary analyses. Our approach was individualized and tailored to participants' educational needs; it was theory-based, highly rated by patients, caregivers, and oncologists, and focused on important domains of patient-centered communication but whose incorporation into practice remains elusive.<sup>1,9-11</sup> While prior reports suggest that activated patients and those receiving bad news may rate their physicians more harshly,<sup>8,57</sup> we did not observe these effects, perhaps because our intervention focused on aligning patient, caregiver, and physician expectations.

Despite calls for improved patient-centered communication between oncologists and their patients and evidence that linking end-of-life discussions with more realistic prognosis estimates, better QOL and reduced utilization of aggressive treatments,<sup>8-12</sup> there has been little headway over the past 20 years. Many patients hold unrealistically optimistic prognostic estimates,<sup>8,11,21,58,59</sup> which they mistakenly believe their physicians share<sup>60</sup>; future studies can unravel how to interrupt the temporarily adaptive but ultimately dysfunctional *pas de deux*, in which physicians, caregivers, and patients avoid, euphemize, or misinterpret these discussions.<sup>61-64</sup> Oncologists need better training in the provision of information to patients with varying levels of health numeracy and literacy as well as “terror management,” a defense mechanism that may prompt some patients (and physicians) to respond to fear of death through avoidance and selective attention.<sup>65-67</sup> Venues already exist for communication and awareness training during residency and fellowship,<sup>25,68,69</sup> and interventions such as ours are feasible for practicing oncologists.

Consistent with prior data,<sup>70,71</sup> QOL is remarkably stable during the course of cancer, until the terminal decline. It is possible that the timing of the intervention may have not have been optimized to affect QOL trajectories. Future patient and caregiver interventions might be targeted to key junctures in the clinical course, such disease progression, symptoms, or early declines in QOL. Because patient-centered timing of interventions poses logistic and methodological difficulties, training existing office personnel to coach patients might better adapt to patient needs. While outpatient palliative care consultations may improve QOL, widespread implementation for all patients with advanced cancer is unrealistic; oncologists still need to communicate disease-related information clearly, respond to emotions, help patients make choices, and facilitate referrals when indicated.<sup>72</sup>

We observed no intervention effects on utilization. The 2 study sites have moderate to high use of palliative care and low to moderate use of aggressive interventions,<sup>73</sup> possibly

limiting room for improvement. As expected, utilization outcomes clustered by physician, suggesting that addressing underlying physician attributes<sup>74</sup> and institutional norms<sup>75–77</sup> might also be needed to address utilization of aggressive interventions and hospice.

In addition to the study limitations addressed herein, the choice of only 2 study sites may limit generalizability, and the use of more than 1 audio recorded office visit and different measures of patient-centered communication<sup>57</sup> may have revealed patterns that were not observed here. Median survival in this study was 16 months, longer than anticipated, during which time the intervention effects may have waned. Lengthier physician interventions may have reinforced skills more effectively, but at a price: longer training could limit participation to only the most motivated physicians. Similarly, longer or more intensive patient interventions might not be feasible for patients who are symptomatic or close to death.

## Conclusions

Although clinician-patient communication patterns are difficult to change,<sup>78</sup> an intentionally brief communication intervention was effective in improving patient-centered communication in advanced cancer but requires refinement in focus, delivery, support, or timing to promote shared understanding, QOL, and appropriate use of health care at the end of life. The current productivity-oriented practice environment also presents barriers to effective communication. Changes are needed in medical education and health systems to provide communication skills training for physicians, meaningful support for them to participate, and trained personnel to coach patients so that their voices can be heard.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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## References

1. Epstein, RM., Street, RL, Jr. *Patient-Centered Communication in Cancer Care: Promoting Healing and Reducing Suffering*. Bethesda, MD: National Cancer Institute, NIH; 2007.
2. Institute of Medicine. *Assessing and Improving Value in Cancer Care: Workshop Summary*. Washington, DC: The National Academies Press; 2009.
3. National Priorities Partnership. *National Priorities and Goals: Aligning Our Efforts to Transform America's Healthcare*. Washington, DC: National Quality Forum; 2008.
4. Institute of Medicine. *Approaching Death: Improving Care at the End of Life*. Washington, DC: The National Academies Press; 1997.

5. DesHarnais S, Carter RE, Hennessy W, Kurent JE, Carter C. Lack of concordance between physician and patient: reports on end-of-life care discussions. *J Palliat Med.* 2007; 10(3):728–740. [PubMed: 17592985]
6. Parker SM, Clayton JM, Hancock K, et al. A systematic review of prognostic/end-of-life communication with adults in the advanced stages of a life-limiting illness: patient/caregiver preferences for the content, style, and timing of information. *J Pain Symptom Manage.* 2007; 34(1): 81–93. [PubMed: 17531434]
7. Institute of Medicine Committee on Approaching Death. *Dying in America: Improving Quality and Honoring Individual Preferences Near the End of Life* Key findings and recommendations. Washington, DC: National Academies Press; 2014.
8. Weeks JC, Catalano PJ, Cronin A, et al. Patients' expectations about effects of chemotherapy for advanced cancer. *N Engl J Med.* 2012; 367(17):1616–1625. [PubMed: 23094723]
9. Prigerson HG, Bao Y, Shah MA, et al. Chemotherapy use, performance status, and quality of life at the end of life. *JAMA Oncol.* 2015; 1(6):778–784. [PubMed: 26203912]
10. Wright AA, Zhang B, Ray A, et al. Associations between end-of-life discussions, patient mental health, medical care near death, and caregiver bereavement adjustment. *JAMA.* 2008; 300(14): 1665–1673. [PubMed: 18840840]
11. Weeks JC, Cook EF, O'Day SJ, et al. Relationship between cancer patients' predictions of prognosis and their treatment preferences. *JAMA.* 1998; 279(21):1709–1714. [PubMed: 9624023]
12. Mack JW, Weeks JC, Wright AA, Block SD, Prigerson HG. End-of-life discussions, goal attainment, and distress at the end of life: predictors and outcomes of receipt of care consistent with preferences. *J Clin Oncol.* 2010; 28(7):1203–1208. [PubMed: 20124172]
13. Mack JW, Cronin A, Taback N, et al. End-of-life care discussions among patients with advanced cancer: a cohort study. *Ann Intern Med.* 2012; 156(3):204–210. [PubMed: 22312140]
14. Hagerty RG, Butow PN, Ellis PM, Dimitry S, Tattersall MH. Communicating prognosis in cancer care: a systematic review of the literature. *Ann Oncol.* 2005; 16(7):1005–1053. [PubMed: 15939716]
15. Hagerty RG, Butow PN, Ellis PM, et al. Communicating with realism and hope: incurable cancer patients' views on the disclosure of prognosis. *J Clin Oncol.* 2005; 23(6):1278–1288. [PubMed: 15718326]
16. Frosch DL, May SG, Rendle KA, Tietbohl C, Elwyn G. Authoritarian physicians and patients' fear of being labeled “difficult” among key obstacles to shared decision making. *Health Aff (Millwood).* 2012; 31(5):1030–1038. [PubMed: 22566443]
17. Brandes K, Butow PN, Tattersall MH, et al. Advanced cancer patients' and caregivers' use of a question prompt list. *Patient Educ Couns.* 2014; 97(1):30–37. [PubMed: 25023487]
18. Walczak A, Henselmans I, Tattersall MH, et al. A qualitative analysis of responses to a question prompt list and prognosis and end-of-life care discussion prompts delivered in a communication support program. *Psychooncology.* 2015; 24(3):287–293. [PubMed: 25079976]
19. Detmar SB, Aaronson NK, Wever LD, Muller M, Schornagel JH. How are you feeling? who wants to know? patients' and oncologists' preferences for discussing health-related quality-of-life issues. *J Clin Oncol.* 2000; 18(18):3295–3301. [PubMed: 10986063]
20. Clayton JM, Butow PN, Tattersall MH. The needs of terminally ill cancer patients versus those of caregivers for information regarding prognosis and end-of-life issues. *Cancer.* 2005; 103(9):1957–1964. [PubMed: 15789363]
21. Liu PH, Landrum MB, Weeks JC, et al. Physicians' propensity to discuss prognosis is associated with patients' awareness of prognosis for metastatic cancers. *J Palliat Med.* 2014; 17(6):673–682. [PubMed: 24742212]
22. Mack JW, Smith TJ. Reasons why physicians do not have discussions about poor prognosis, why it matters, and what can be improved. *J Clin Oncol.* 2012; 30(22):2715–2717. [PubMed: 22753911]
23. Lamont EB, Christakis NA. Prognostic disclosure to patients with cancer near the end of life. *Ann Intern Med.* 2001; 134(12):1096–1105. [PubMed: 11412049]
24. Walczak A, Mazer B, Butow PN, et al. A question prompt list for patients with advanced cancer in the final year of life: development and cross-cultural evaluation. *Palliat Med.* 2013; 27(8):779–788. [PubMed: 23630055]

25. Back AL, Arnold RM, Baile WF, et al. Efficacy of communication skills training for giving bad news and discussing transitions to palliative care. *Arch Intern Med*. 2007; 167(5):453–460. [PubMed: 17353492]
26. Curtis JR, Back AL, Ford DW, et al. Effect of communication skills training for residents and nurse practitioners on quality of communication with patients with serious illness: a randomized trial. *JAMA*. 2013; 310(21):2271–2281. [PubMed: 24302090]
27. Tulsky JA, Arnold RM, Alexander SC, et al. Enhancing communication between oncologists and patients with a computer-based training program: a randomized trial. *Ann Intern Med*. 2011; 155(9):593–601. [PubMed: 22041948]
28. Street RL Jr, Slee C, Kalauokalani DK, Dean DE, Tancredi DJ, Kravitz RL. Improving physician-patient communication about cancer pain with a tailored education-coaching intervention. *Patient Educ Couns*. 2010; 80(1):42–47. [PubMed: 19962845]
29. Clayton JM, Butow PN, Tattersall MH, et al. Randomized controlled trial of a prompt list to help advanced cancer patients and their caregivers to ask questions about prognosis and end-of-life care. *J Clin Oncol*. 2007; 25(6):715–723. [PubMed: 17308275]
30. Street, RL. Communication in Medical Encounters: An Ecological Perspective. In: Thompson, TL, Dorsey, AM, Miller, KI., Parrott, R., editors. *Handbook of Health Communication*. London, England: Lawrence Erlbaum Associates; 2003. p. 63-89.
31. Clayton JM, Butow PN, Arnold RM, Tattersall MH. Discussing end-of-life issues with terminally ill cancer patients and their carers: a qualitative study. *Support Care Cancer*. 2005; 13(8):589–599. [PubMed: 15645187]
32. Steinhauser KE, Christakis NA, Clipp EC, McNeilly M, McIntyre L, Tulsky JA. Factors considered important at the end of life by patients, family, physicians, and other care providers. *JAMA*. 2000; 284(19):2476–2482. [PubMed: 11074777]
33. Street RL Jr, Makoul G, Arora NK, Epstein RM. How does communication heal? pathways linking clinician-patient communication to health outcomes. *Patient Educ Couns*. 2009; 74(3):295–301. [PubMed: 19150199]
34. Dimoska A, Tattersall MH, Butow PN, Shepherd H, Kinnersley P. Can a “prompt list” empower cancer patients to ask relevant questions? *Cancer*. 2008; 113(2):225–237. [PubMed: 18484592]
35. Clayton JM, Hancock KM, Butow PN, et al. Clinical practice guidelines for communicating prognosis and end-of-life issues with adults in the advanced stages of a life-limiting illness, and their caregivers. *Med J Aust*. 2007; 186(12 suppl):S77; S79; S83–108. [PubMed: 17727340]
36. Hoerger M, Epstein RM, Winters PC, et al. Values and options in cancer care (VOICE): study design and rationale for a patient-centered communication and decision-making intervention for physicians, patients with advanced cancer, and their caregivers. *BMC Cancer*. 2013; 13(1):188. [PubMed: 23570278]
37. Carroll, T., Epstein, RM., Gramling, R. What are strategies for estimating survival prognosis in advanced cancer?. In: Goldstein, N., Morrison, S., editors. *Evidence-based Practice of Palliative Medicine*. Cambridge, MA: Elsevier Press; 2012.
38. Moss AH, Lunney JR, Culp S, et al. Prognostic significance of the “surprise” question in cancer patients. *J Palliat Med*. 2010; 13(7):837–840. [PubMed: 20636154]
39. Street RL Jr, Gordon H, Haidet P. Physicians’ communication and perceptions of patients: is it how they look, how they talk, or is it just the doctor? *Soc Sci Med*. 2007; 65(3):586–598. [PubMed: 17462801]
40. Street RL Jr, Krupat E, Bell RA, Kravitz RL, Haidet P. Beliefs about control in the physician-patient relationship: effect on communication in medical encounters. *J Gen Intern Med*. 2003; 18(8):609–616. [PubMed: 12911642]
41. Del Piccolo L, de Haes H, Heaven C, et al. Development of the Verona coding definitions of emotional sequences to code health providers’ responses (VR-CoDES-P) to patient cues and concerns. *Patient Educ Couns*. 2011; 82(2):149–155. [PubMed: 20346609]
42. Zimmermann C, Del Piccolo L, Bensing J, et al. Coding patient emotional cues and concerns in medical consultations: the Verona coding definitions of emotional sequences (VR-CoDES). *Patient Educ Couns*. 2011; 82(2):141–148. [PubMed: 20430562]

43. Back AL, Arnold RM, Baile WF, Tulsy JA, Fryer-Edwards K. Approaching difficult communication tasks in oncology. *CA Cancer J Clin*. 2005; 55(3):164–177. [PubMed: 15890639]
44. Shields CG, Coker CJ, Poulsen SS, et al. Patient-centered communication and prognosis discussions with cancer patients. *Patient Educ Couns*. 2009; 77(3):437–442. [PubMed: 19819098]
45. Back AL, Arnold RM, Quill TE. Hope for the best, and prepare for the worst. *Ann Intern Med*. 2003; 138(5):439–443. [PubMed: 12614110]
46. Kiely BE, Soon YY, Tattersall MH, Stockler MR. How long have I got? estimating typical, best-case, and worst-case scenarios for patients starting first-line chemotherapy for metastatic breast cancer: a systematic review of recent randomized trials. *J Clin Oncol*. 2011; 29(4):456–463. [PubMed: 21189397]
47. Epstein RM, Street RL. *A Framework for Patient-Centered Communication in Cancer Care*. Patient-Centered Communication in Cancer Care. Bethesda, MD: National Cancer Institute, NIH; 2007. p. 17-38.
48. Mack JW, Block SD, Nilsson M, et al. Measuring therapeutic alliance between oncologists and patients with advanced cancer: the Human Connection Scale. *Cancer*. 2009; 115(14):3302–3311. [PubMed: 19484795]
49. Williams GC, Rodin GC, Ryan RM, Grolnick WS, Deci EL. Autonomous regulation and long-term medication adherence in adult outpatients. *Health Psychol*. 1998; 17(3):269–276. [PubMed: 9619477]
50. Maly RC, Frank JC, Marshall GN, DiMatteo MR, Reuben DB. Perceived efficacy in patient-physician interactions (PEPPI): validation of an instrument in older persons. *J Am Geriatr Soc*. 1998; 46(7):889–894. [PubMed: 9670878]
51. Cohen SR, Mount BM, Strobel MG, Bui F. The McGill Quality of Life Questionnaire: a measure of quality of life appropriate for people with advanced disease: a preliminary study of validity and acceptability. *Palliat Med*. 1995; 9(3):207–219. [PubMed: 7582177]
52. Cella DF, Tulsy DS, Gray G, et al. The Functional Assessment of Cancer Therapy scale: development and validation of the general measure. *J Clin Oncol*. 1993; 11(3):570–579. [PubMed: 8445433]
53. Wright AA, Zhang B, Keating NL, Weeks JC, Prigerson HG. Associations between palliative chemotherapy and adult cancer patients' end of life care and place of death: prospective cohort study. *BMJ*. 2014; 348:g1219. [PubMed: 24594868]
54. Earle CC, Park ER, Lai B, Weeks JC, Ayanian JZ, Block S. Identifying potential indicators of the quality of end-of-life cancer care from administrative data. *J Clin Oncol*. 2003; 21(6):1133–1138. [PubMed: 12637481]
55. Barnato AE, Farrell MH, Chang C-CH, Lave JR, Roberts MS, Angus DC. Development and validation of hospital “end-of-life” treatment intensity measures. *Med Care*. 2009; 47(10):1098–1105. [PubMed: 19820614]
56. Li Z, Tosteson TD, Bakitas MA. Joint modeling quality of life and survival using a terminal decline model in palliative care studies. *Stat Med*. 2013; 32(8):1394–1406. [PubMed: 23001893]
57. Bakitas MA, Tosteson TD, Li Z, et al. Early versus delayed initiation of concurrent palliative oncology care: patient outcomes in the ENABLE III randomized controlled trial. *J Clin Oncol*. 2015; 33(13):1438–1445. [PubMed: 25800768]
58. Epstein RM, Franks P, Fiscella K, et al. Measuring patient-centered communication in patient-physician consultations: theoretical and practical issues. *Soc Sci Med*. 2005; 61(7):1516–1528. [PubMed: 16005784]
59. Temel JS, Greer JA, Admane S, et al. Longitudinal perceptions of prognosis and goals of therapy in patients with metastatic non-small-cell lung cancer: results of a randomized study of early palliative care. *J Clin Oncol*. 2011; 29(17):2319–2326. [PubMed: 21555700]
60. Enzinger AC, Zhang B, Schrag D, Prigerson HG. Outcomes of prognostic disclosure: Associations with prognostic understanding, distress, and relationship with physician among patients with advanced cancer. *J Clin Oncol*. 2015; 33(32):3809–3816. [PubMed: 26438121]
61. Gramling RF, Fiscella K, Xing G, et al. Differences of opinion or inadequate communication? determinants of patient-oncologist prognostic discordance in advanced cancer [published online July 14, 2016]. *JAMA Oncol*.

62. Miller SM. Monitoring versus blunting styles of coping with cancer influence the information patients want and need about their disease. Implications for cancer screening and management. *Cancer*. 1995; 76(2):167–177. [PubMed: 8625088]
63. The AM, Hak T, Koeter G, van der Wal G. Collusion in doctor-patient communication about imminent death: an ethnographic study. *West J Med*. 2001; 174(4):247–253. [PubMed: 11290678]
64. de Haes H, Koedoot N. Patient centered decision making in palliative cancer treatment: a world of paradoxes. *Patient Educ Couns*. 2003; 50(1):43–49. [PubMed: 12767584]
65. Penson RT, Partridge RA, Shah MA, Giansiracusa D, Chabner BA, Lynch TJ Jr. Fear of death. *Oncologist*. 2005; 10(2):160–169. [PubMed: 15709218]
66. Niemiec CP, Brown KW, Kashdan TB, et al. Being present in the face of existential threat: the role of trait mindfulness in reducing defensive responses to mortality salience. *J Pers Soc Psychol*. 2010; 99(2):344–365. [PubMed: 20658848]
67. Burke BL, Martens A, Faucher EH. Two decades of terror management theory: a meta-analysis of mortality salience research. *Pers Soc Psychol Rev*. 2010; 14(2):155–195. [PubMed: 20097885]
68. Rodenbach RA, Rodenbach KE, Tejani MA, Epstein RM. Relationships between personal attitudes about death and communication with terminally ill patients: how oncology clinicians grapple with mortality. *Patient Educ Couns*. 2016; 99(3):356–363. [PubMed: 26519993]
69. Shayne M, Quill TE. Oncologists responding to grief. *Arch Intern Med*. 2012; 172(12):966–967. [PubMed: 22732755]
70. Back AL, Arnold RM, Baile WF, et al. Faculty development to change the paradigm of communication skills teaching in oncology. *J Clin Oncol*. 2009; 27(7):1137–1141. [PubMed: 19171703]
71. Zimmermann C, Swami N, Krzyzanowska M, et al. Early palliative care for patients with advanced cancer: a cluster-randomised controlled trial. *Lancet*. 2014; 383(9930):1721–1730. [PubMed: 24559581]
72. Quill TE, Abernethy AP. Generalist plus specialist palliative care—creating a more sustainable model. *N Engl J Med*. 2013; 368(13):1173–1175. [PubMed: 23465068]
73. Mitchell JJ Jr. The findings of the Dartmouth Atlas Project: a challenge to clinical and ethical excellence in end-of-life care. *J Clin Ethics*. 2011; 22(3):267–276. [PubMed: 22167990]
74. Cutler, D., Skinner, J., Stern, AD., Wennberg, D. Working Paper 19320. Cambridge, MA: National Bureau of Economic Research; Aug. 2013 Physician beliefs and patient preferences: a new look at regional variation in health care spending. <http://www.nber.org/papers/w19320>. Accessed August 24, 2016
75. Barnato AE, Cohen ED, Mistovich KA, Chang C-CH. Hospital end-of-life treatment intensity among cancer and non-cancer cohorts. *J Pain Symptom Manage*. 2015; 49(3):521–529. e525. [PubMed: 25135656]
76. Barnato AE, Mohan D, Lane RK, et al. Advance care planning norms may contribute to hospital variation in end-of-life ICU use: a simulation study. *Med Decis Making*. 2014; 34(4):473–484. [PubMed: 24615275]
77. Barnato AE, Herndon MB, Anthony DL, et al. Are regional variations in end-of-life care intensity explained by patient preferences? a study of the US Medicare population. *Med Care*. 2007; 45(5):386–393. [PubMed: 17446824]
78. Lewin SA, Skea ZC, Entwistle V, Zwarenstein M, Dick J. Interventions for providers to promote a patient-centred approach in clinical consultations. *Cochrane Database Syst Rev*. 2001; (4):CD003267. [PubMed: 11687181]

### Key Points

**Question**

Can communication between patients with advanced cancer and their oncologists be improved?

**Findings**

This cluster randomized clinical trial of communication training for oncologists paired with previsit coaching for patients showed clinically and statistically significant improvement in patient-centered communication.

**Meaning**

Paired communication training for patients and oncologists helps achieve patient-centered care in advanced cancer: engaging patients in consultations (asking questions, expressing preferences), responding to emotions, and providing information about prognosis and treatment choices.

Table 1  
Communication Domains That Promote Patient Involvement in Care Through Being Engaged, Responded to, Informed, and Debiased

Communication Domain	Goal of Intervention	Examples of Physician and Patient Behaviors	Measure	What Is Measured	Reliability and Validation
Engaging	Engaging patients and CGs to be more active participants in clinical care. Oncologists acknowledge and endorse the use of QPLs, encourage participation in decision-making. Patients ask relevant questions that clarify their values and preferences and are emboldened to participate in decisions to the degree they wish.	Physician: Asking patients what questions are most important to them. Bringing attention to the QPL. Patient: Asking questions, expressing concerns, and opinions, requesting clarification	APPC <sup>39</sup>	Absolute number of active patient communication behaviors (eg, asking questions, requesting opinions) and facilitative physician behaviors (partnership-building and supportive talk, eg, empathy, reassurance and praise), coded from audio recordings	Intraclass correlations for patient behaviors were 0.91–0.97 and for physician behaviors were 0.82–0.91. Higher scores associated with <i>patient</i> preference for a shared, patient-centered model of care <sup>40</sup>
Responding	Responding to patients' emotions (expressed as direct concerns and indirect cues) by listening and offering acknowledgment, legitimization, empathic support. Patients are comfortable participating more actively in the consultation.	Physician: Identifying patient emotions, opening the door for further exploration, expressing empathy Patient/CG: expressing emotions, eg, fear and sadness	Verona VR-CoDES system <sup>41,42</sup>	Percentage of physician responses to patients' emotional cues and concerns that were coded as "opening space" (eg, acknowledgment, support) vs "closing space" (eg, cutoff, change of topic), coded from transcripts	Discrepancies were adjudicated first by consulting the coding manual then by 1 of the investigators (R.G.) (all discrepancies were in identifying indirect "cues"; there was agreement on all "concerns" and "responses")
Informing	Informing patients about disease, prognosis and treatments; assessing desire for information; checking understanding. Patients and CGs ask for information and clarification.	Physician: Asking patient what he or she wants to know about prognosis and treatment choices. Explicitly checking patient understanding using an "ask-tell-ask" approach. <sup>43</sup> Patient: asking specific questions about the disease, treatment choices, prognosis, QOL	PTCC, <sup>44</sup> Informing subscale	The number of statements discussing curability, survival, future quality of life and future functional status, coded from transcripts	Developed by Shields et al <sup>44</sup> for an unannounced standardized patient study of physician communication in cancer settings and adapted and divided into 2 subscales for this study. Informing subscale contains 9 items. Intraclass correlation was 0.75
Balanced framing	Framing positive and negative aspects of a decision to reduce biases introduced by 1-sided presentation of data.	Physician: Indicating percentage of patients likely to benefit from a treatment and percentage who are unlikely to benefit Patient: Asking about the pros and cons of important choices	PTCC, <sup>44</sup> Balanced Framing subscale	Number of (1) expressions of probabilities in a balanced fashion (eg, 60% chance of cure and 40% chance of relapse) or (2) occurrences of "best case/worst case" framing of future probabilities, coded from transcripts	Based on recommendations for debiasing decisions, <sup>45,46</sup> this scale represents 2 items that are part of the PTCC scale. Intraclass correlation was 0.75

Abbreviations: APPC, Active Patient Participation Coding; CG, caregiver; PTCC, Prognostic and Treatment Choices; QPL, question prompt list.



**Table 2**  
Adjusted Effects of Intervention on Oncologist-Patient Communication, Quality of Life (QOL), and Utilization of Health Care Resources at the End of Life

Study Outcomes	Measures	Prerandomization Patients (n = 118) <sup>d</sup>			Cluster RCT Patients (n = 265) <sup>d</sup>			Estimated Adjusted - Intervention Effect (95% CI) <sup>b</sup>	P Value
		Intervention (58)	Control (60)	Intervention (130)	Control (135)				
Main communication outcome measure	Patient-centered communication in advanced cancer score	-0.08 (0.46)	0.09 (0.59)	0.16 (0.81)	-0.01 (0.66)	0.34 (0.06 to 0.62)	.02		
		Component communication outcome measures							
	APPC (z score) <sup>c</sup>	-0.11 (0.89)	0.10 (1.10)	0.30 (1.17)	-0.02 (1.05)	0.53 (0.07 to 0.99)	.03		
	Verona VR-CoDES (z score) <sup>c</sup>	0.00 (0.89)	0.01 (1.11)	0.10 (1.08)	-0.21 (0.65)	0.33 (-0.07 to 0.73)	.10		
	PTCC: informing subscale coding (z score) <sup>c</sup>	-0.12 (0.81)	0.13 (1.14)	0.15 (0.85)	0.08 (0.92)	0.31 (-0.07 to 0.69)	.11		
	PTCC: informing subscale coding (z score) <sup>c</sup>	-0.10 (0.78)	0.10 (1.17)	0.08 (1.80)	0.11 (1.68)	0.18 (-0.48 to 0.84)	.59		
Main QOL outcome measure <sup>d</sup>	Aggregate QOL score	NA	NA	-0.005 (0.73)	-0.07 (0.80)	0.18 (-0.27 to 0.64)	.43		
Component QOL measures <sup>d</sup>	McGill QOL Scale single item (z score)	NA	NA	-0.10 (0.99)	-0.08 (1.03)	0.19 (-0.55 to 0.94)	.62		
	McGill Psychological Well-Being subscale (z score)	NA	NA	-0.03 (0.98)	-0.07 (0.96)	0.12 (-0.49 to 0.74)	.70		
	McGill Existential Well-Being subscale (z score)	NA	NA	-0.07 (0.98)	-0.14 (1.04)	0.15 (-0.45 to 0.75)	.63		
	FACT-G Physical Functioning subscale (z score)	NA	NA	0.04 (0.95)	-0.12 (1.03)	0.16 (-0.42 to 0.75)	.58		
	FACT-G Social Functioning subscale (z score)	NA	NA	0.14 (1.15)	0.05 (1.16)	0.23 (-0.19 to 0.65)	.29		
Main utilization outcome measure <sup>e</sup>	Index score of aggressive care at the end of life <sup>e</sup>	NA	NA	0.76 (median, 0)	0.58 (median, 0)	0.26 (-0.14 to 0.66)	.19		
Component utilization measures <sup>e</sup>	ED and hospital admission	NA	NA	0.30 (median, 0)	0.20 (median, 0)	0.10 (-0.10 to 0.30)	.31		
	Aggressive treatments	NA	NA	0.08 (median, 0)	0.10 (median, 0)	-0.003 (-0.15 to 0.14)	.97		
	Chemotherapy	NA	NA	0.38 (median, 0)	0.28 (median, 0)	0.13 (-0.08 to 0.35)	.22		

Abbreviations: APPC, Active Patient Participation Coding; ED, emergency department; ICC, intracluster correlation; NA, not applicable; PTCC, Prognostic and Treatment Choices; RCT, randomized clinical trial.

<sup>d</sup>Data are given as mean (SD) except where noted.

<sup>g</sup>Communication outcomes adjusted for site, breast cancer physician, patient age, sex, race, education, and aggressive cancer. Effects estimated with robust standard errors in 2-level mixed-effects linear regression models (with random intercepts for physicians) and expressed as adjusted between-arm differences in mean changes from prerandomization to postrandomization. The ICC for the Index score of aggressive care at the end of life was 0.166; ICCs for all other outcomes were less than 0.1.

<sup>h</sup>The APPC codes active patient statements, such as asking questions, asking for clarification, and expressing opinions. The Verona VR-Codes system first identifies patients' cues and concerns, then codes physician responses as "opening space" for discussion of emotions or not. The revised PTCC Informing scale includes content items relating to assessing the patient's knowledge of the state of disease, asking the patient what they wish to know about the future (eg, prognosis, curability); assessing patient understanding, how the disease is changing for the worse, future QOL, palliative care, advance directives, curability, estimated survival. The PTCC Balanced Framing subscale includes whether the physician used "best case/worst case" or double framing of survival or curability estimates.

<sup>i</sup>The QOL outcomes (at each participant's most recent measurement) are summarized with means (SDs). Intervention effects are reported as adjusted mean differences at death and were estimated in terminal decline models using all available longitudinal quality of life assessments. These models statistically adjust for differential mortality and include covariates to statistically adjust for baseline measure, site, and breast cancer physician. When computing summative subscale scores for all survey measures, we replaced missing item values with the participant's mean response (on the same interview date) to other subscale items, provided that at least 50% of the subscale items were nonmissing.

<sup>j</sup>For details about how utilization outcomes were derived, see eTable 3 in Supplement 3.