

How Does Patient-Clinician Information Engagement Influence Self-Reported Cancer-Related Problems?

Findings From a Longitudinal Analysis

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BACKGROUND: Past research has linked patient-physician communication with improved emotional, physical, and social health. One component of communication, patient-clinician information engagement (PCIE), predicts improved short-term patient-reported outcomes, such as treatment satisfaction, through perceptions of feeling informed. However, to the authors' knowledge, the relation between PCIE and longer term cancer-related problems has not been examined previously. The authors examined the influence of PCIE on self-reported problems associated with cancer diagnosis and treatment based on a longitudinal survey among a randomly selected sample from the 2005 Pennsylvania Cancer Registry. **METHODS:** In total, 1293 respondents were surveyed who were diagnosed with colorectal, breast, or prostate cancers during 2006 and 2007. The baseline response rate was 64%, and the retention rate was 65%. The authors predicted an index of cancer-related problems at 1-year follow-up with the baseline cancer-related problem index and PCIE, controlling for demographic and clinical factors using regression analyses. The mean age of participants was 65 years, approximately 50% were women, and 86% were white. **RESULTS:** Having more cancer-related problems and PCIE at baseline significantly predicted more cancer-related problems at follow-up. In addition, baseline cancer-related problems and PCIE interacted significantly ($P = .01$): PCIE was associated with more cancer-related problems at follow-up among participants who reported more symptoms rather than fewer symptoms at baseline. **CONCLUSIONS:** If respondents reported engaging more with their physicians at baseline, then they reported experiencing more cancer-related issues at follow-up; this pattern was stronger among those who reported more baseline problems. The current results indicated that increased discussion of cancer information with physicians may maintain the salience of these problems in cancer survivors' minds over time. *Cancer* 2011;117:2569-76. © 2011 American Cancer Society.

KEYWORDS: patient-clinician communication, self-reported outcomes, cancer, survivor.

Effective communication between patients and their physicians plays an integral role in shaping cancer patients' experiences and interactions with their health provider.¹ The information that patients receive becomes increasingly vital to their physical and psychological well being as the US healthcare system continues to encourage engaging patients as active participants and decision-makers in their care.²⁻⁴ Cancer patients are known to seek information about their cancer, treatment, and quality-of-life issues from many sources,^{5,6} including both medical and nonmedical sources.⁷ In this study, we focused on how patients' engagement with a fundamental source of information, their physician, affects their self-reported experience of problems associated with their cancer diagnosis among a representative sample of cancer patients in Pennsylvania.

Communicating information is important in the cancer care setting, because it may have an impact on how patients receive bad news about their diagnosis, understand new and complex material, navigate a multifaceted healthcare system, manage uncertainty, and make important treatment and lifestyle decisions.¹ However, promoting patient-clinician

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DOI: 10.1002/cncr.25804, **Received:** August 3, 2010; **Revised:** September 21, 2010; **Accepted:** October 28, 2010, **Published online** January 10, 2011 in Wiley Online Library (wileyonlinelibrary.com)

communication does not necessarily influence patients' outcomes in positive ways. Of 21 studies that were included in a review of patient-clinician communication on health outcomes,^{8,9} 16 reported positive results, 4 reported nonsignificant results, and 1 was inconclusive.

On one hand, evidence suggests that patient-physician communication has positive effects not just on perceptions of the relationship but on patients' subsequent psychological and physical health outcomes as well. For example, Martinez and colleagues observed that patient-clinician information engagement (PCIE) led to improved treatment decision satisfaction and that this correlation was mediated through feeling informed.¹⁰ An earlier study by Stewart and colleagues indicated that patients who felt that common ground was achieved with their physicians were more likely to have improved health status and more efficient hospital care.⁸ In an experiment of a communication training program for health professionals, the training led to improved ratings by patients, fewer surgery complications, faster transfer to less intensive care levels, and shorter hospital stays.¹¹

In contrast, other studies have reported null or negative outcomes. This meant that increased patient-clinician communication did not always lead to better health consequences. In a study among patients with breast and testicular cancers, reassurance by physicians that symptoms were not sinister yielded mixed results with regard to anxiety.¹² A randomized controlled trial of a patient-centered care training program for general practice teams that treated diabetes indicated that, although patients who attended sessions with trained practiced teams reported better communication and treatment satisfaction, they did not experience improved metabolic control or diabetes-specific quality of life compared with the control group.¹³ Unexpectedly, the authors of that study also reported that patients with diabetes in the intervention group gained more weight at follow-up, potentially contributing to greater cardiovascular risk. In a qualitative study among cancer patients, Leydon and colleagues reported that additional information sometimes may exacerbate fear, undermine patients' hopes, and lead to more worry.¹⁴ Clearly, more research must be conducted to better understand the correlation between patient-clinician communication and disease-related outcomes.

One important effect of patient-clinician communication that requires further exploration is patient-reported outcomes related to cancer diagnosis and treatment. Patient-reported outcomes broadly encompass a diversity of measures that examine the impact of disease on

patients' lives, including health-related quality of life, functional status, symptom status, overall well being, satisfaction with care, and treatment adherence.¹⁵ Patient-reported outcomes can be defined as any aspect of a patient's health status that comes directly from the individual patient with no modification or interpretation by any another observer.¹⁶ There are 3 possible correlations between patient-clinician engagement and self-reported outcomes in cancer patients. One possible effect of enhanced patient-clinician engagement is an improvement in patients' experience of cancer-related problems, perhaps because clinicians can help cancer patients and their caregivers anticipate, identify, and better manage issues such as physical symptoms and anxiety. For instance, an experiment revealed that the routine collection and use of health-related quality of life data from patients led to better subsequent quality of life and emotional functioning.¹⁷ Another possible effect is that more engagement with clinicians could lead patients to be more likely to report having symptoms. An example of this was a study in which the use of patient-reported quality of life assessments during visits led to a greater percentage of patients identifying moderate to severe problems in various health domains.¹⁸ This may be because increased engagement exacerbates patients' underlying concerns about experiencing postdiagnosis problems, as illustrated by a study in which it was observed that anxiety can be exacerbated through medical discussions.¹² The third possibility is that there may be no correlation at all between patient-clinician engagement and patients' experience of cancer-related problems. In the current study, we examined the correlation between PCIE and self-reported problems related to cancer diagnosis and treatment in a population-based sample of patients with breast, prostate, or colorectal cancers.

MATERIALS AND METHODS

Study Population and Procedure

We randomly sampled patients with breast, prostate, or colorectal cancers stratified by cancer type from the 2005 Pennsylvania Cancer Registry (PCR), which included patients who were diagnosed with these cancers between January 2005 and December 2005. We obtained permission to access patient data from the PCR through the Pennsylvania State Health Department. The sampling frame included all patients with breast, prostate, or colorectal cancer who were reported to the PCR in time to have their data compiled by the commencement of the

study in September 2006 (approximately 95% of all incident cases in 2005). We over sampled cancer patients who were diagnosed with stage IV disease and African-American patients to improve the statistical power for subgroup analyses.

The overall study design was a 3-round, longitudinal survey of the sampled population. The analyses in this study used data only from the first 2 rounds. The baseline of the survey was conducted in the fall of 2006 (Round 1), and a follow-up survey in the fall of 2007 (Round 2) was conducted among participants who consented to being contacted after the first round. The Round 1 survey included 2013 patients, and 1293 (64.2%) patients participated in the Round 2 survey. Nonrespondents in Round 2 were patients who refused to be recontacted after Round 1 (255 patients; 12.7%) or who did not respond after the second mailed survey (465 patients; 23%). We mailed surveys to participants based on the method described by Dillman for mail surveys.¹⁹ Potential participants were contacted first with a notice letter that explained the study objectives and included opt-out instructions. The survey (tailored according to the type of cancer), a small monetary incentive (the incentive amounted to either \$3 or \$5 in Round 1 and was \$3 in Round 2), and a stamped addressed envelope to return the survey were sent to participants. Participants who had not returned the survey or who opted out of the study were mailed an additional letter and survey 2 weeks later. The baseline questionnaire was developed after a literature review, expert consultation, a pilot study with 29 cancer patients, and appropriate revisions after pilot testing. All study participants provided informed consent before participation, and the University of Pennsylvania Institutional Review Board approved this study.

Survey Measures

Dependent variable: Cancer-related problem index at Round 2

The outcome variable in this analysis was an index comprising patients' self-reported experience of the following 9 cancer-related issues in the preceding 12 months of the follow-up survey: 1) physical symptoms (eg, pain, fatigue, sleep problems, bowel problems), 2) memory or concentration problems, 3) fertility or menstrual problems ("menstrual problems" were omitted from the survey questionnaire that was designed for respondents with prostate cancer), 4) sexual problems, 5) changes in appearance, 6) anxiety or depression, 7) financial problems, 8) work-related problems, and 9) social or family-related

problems. A higher score indicated that respondents experienced more of these problems within the past year. Although the Cronbach alpha is not an appropriate measure of reliability for this index, because the individual experience items are not expected to correlate with one another, strong evidence for reliability comes from the correlation between this measure and the same index measured 1 year later ($r = .67$).^{20,21}

Independent variable: Cancer-related problem index at Round 1

We postulated that participants' baseline experience of problems would be predictive of their subsequent reporting of cancer-related issues. The baseline problem index was based on a question that asked participants whether they experienced any of the same 9 issues (described above) after their initial cancer diagnosis and treatment. The coding and summation of this measure were identical to the Round 2 problem index.

Independent variable: Patient-clinician information engagement scale at Round 1

We measured PCIE from 8 items in the Round 1 survey as described by Martinez et al.¹⁰ Essentially, participants were instructed to think back to the first few months of their cancer diagnosis and recall whether they: 1) sought information about treatments from their treating physician, 2) sought treatment information from other physicians or health professionals, 3) actively looked for information about their cancer from their treating physician, 4) looked for cancer information from other physicians or health professionals, 5) discussed information from other sources with their treating physician, 6) received suggestions from their treating physician to get information from other sources, 7) actively looked for information about quality of life issues from their treating physician, and 8) looked for quality of life information from other physicians or health professionals. These items demonstrated reasonable internal consistency (Cronbach alpha = .78). Each of the 8 items was transformed to Z-scores, and the average of the 8 Z-scores formed the PCIE scale.

Control variables

Demographic variables (age in years, sex, education level, and ethnicity), psychological variables (worry about cancer at diagnosis), nonclinical sources of cancer information (media or interpersonal sources), and cancer-related variables (cancer type, stage of disease at diagnosis, type of treatment received, health status, frequency of

physician visits, overall cancer experience, and being told about the presence of metastatic disease) were measured in the questionnaire.

Psychological variables

We postulated that patients worry about their cancer condition at baseline potentially could confound the correlation between PCIE and patients' experience of cancer-related problems. For instance, higher worry at baseline may lead patients to engage in more information seeking from physician sources and also may be associated with more self-reported symptoms of anxiety. Therefore, worry at diagnosis was included as a control variable in the analyses. Respondents were asked to describe how worried they were about what might happen to them when they were first diagnosed with their cancer on a 5-point scale ranging from 1 ("not at all worried") to 5 ("extremely worried").

Nonclinical sources of medical information

Other nonmedical sources of cancer information also may confound the correlation between PCIE and reported experience of cancer-related problems. For instance, seeking cancer information from the media may motivate patients to engage with their physician for cancer information seeking. Portrayals of cancer information in the media also may prime patients to be more aware of their cancer-related problems. Parallel to the PCIE scale, we measured patients' nonmedical information seeking from responses that indicated whether patients sought information about 3 domains: 1) treatment information, 2) cancer information, and 3) information about quality of life issues from nonmedical sources. The different non-medical sources included: 1) television or radio; 2) books, brochures, or pamphlets; 3) newspapers or magazines; 4) the Internet (other than personal e-mail); 5) family members, friends, or coworkers; 6) other cancer patients; 7) support groups; and 8) telephone hotlines from the American Cancer Society. The responses from these items were summed within each domain, and the summed scores were standardized and averaged to form the nonmedical seeking scale (Cronbach alpha = .83).

Cancer-related characteristics

Individual clinical characteristics of participants similarly may influence PCIE and experiences of cancer-related problems. We controlled for important factors, including respondents' cancer type (breast, prostate or colorectal cancer), American Joint Committee on Cancer/

International Union Against Cancer TNM stage (derived from the PCR data), type of treatment received, health status at baseline, frequency of physician visits, overall subjective cancer experience, and being told about the presence of metastatic disease by their physician. We recoded respondents' receipt of various treatments for their cancers into 3 binary variables indicating whether respondents underwent surgery, received radiation therapy, or received systemic treatment (chemotherapy or hormone therapy), respectively. (We note that these treatment types are not mutually exclusive: Respondents may report having received 1 or more treatments for their cancer.) Because each cancer type may have disease-specific staging and treatment protocols, we further controlled for the interaction between cancer type and disease stage and for the interaction between cancer type and treatment received.

Analytic Procedure

Analyses were conducted using the Stata Statistical Software (Release 10; Stata Inc., College Station, Tex). We performed multiple imputations to address missing data according to the procedure prescribed by Allison²² using the Stata Imputation by Chained Equations (ICE) program.²³ Essentially, the imputation model was comprised of the dependent variable, all independent variables, and the additional interactions described above (see Survey Measures). By using this procedure, we generated 15 datasets with imputed values of independent variables. Missing data on the dependent variable were not imputed. To reflect the distribution of patients in the PCR by cancer type, date of diagnosis, cancer stage, and demographic variables, poststratification weights were applied to the data for analyses using the Survey program. This enabled us to make inferences about patients with colon, breast, or prostate cancer in Pennsylvania based on the results. Next, we used the Stata Multiply-Imputed (MIM) module to estimate the regression coefficients across the imputed datasets.

First, we performed a preliminary assessment to test the assumption of linearity for the correlation between PCIE (grouped into 10 levels) and the Round 2 cancer-related problem index using an analysis of variance based on the unimputed dataset. The test of linearity was strongly significant ($F = 74.3$; 1 degree of freedom [df]; $P < .0005$), the deviation from linearity test was marginally significant ($F = 2.0$; 8 df; $P = .048$), and eta-square value (.06) was similar to the R-square value (.07). These findings indicated that linear regression will be

appropriate for analyzing the hypothesized correlation between PCIE and the Round 2 cancer-related problem index.

Weighted point estimates of zero-order correlations of PCIE and both rounds of the problem index were computed by averaging correlation estimates from each of the imputed datasets. To test the level of significance of these correlations, we performed bivariate regressions using these variables with the procedures suggested by Sibney.²⁴

We estimated the effects of PCIE and the Round 1 index of cancer-related problems with a series of linear regression models. The regression analyses were conducted with and without applying sampling weights, and the findings were substantively identical. Therefore, only the results from the weighted analyses are reported here.

In Model 1, PCIE and the Round 1 cancer-related problem index were entered as predictor variables to estimate their unadjusted main effects. In Model 2, we estimated the main effects of PCIE and the Round 1 cancer-related problem index controlling for individual characteristics (demographics [sex was omitted from the list of confounder variables because of sex-specific cancer types in our dataset, but this did not alter the findings or conclusions from the analyses], worry at diagnosis, and clinical variables). Model 3 included an interaction term between PCIE and the Round 1 cancer-related problem index (centered at its mean) controlling for individual characteristics. We performed additional postestimation analyses to assess the nature of the interaction effect by predicting the number of cancer-related problems at Round 2 based on the regression coefficients in Model 3, varying the levels of PCIE and the number of problems at Round 1 (1 standard deviation above and below their respective means) and keeping all other control variables at their mean values.

RESULTS

The demographic profile of the sample population approximately matched the profile of the general population of patients in Pennsylvania with the 3 cancers (colorectal, breast, and prostate cancer). The mean age of the sample population was approximately 65 years, 51% of patients were women, almost half had some college education and higher, and most were white. The mean number of cancer-related problems at baseline was 2.5 of a maximum possible score of 9 compared with the mean at Round 2, which was slightly lower at 2.1. Table 1 describes other important characteristics of the sample.

Table 1. Sample Characteristics (N=1293)

Sample Characteristic	Unweighted		Weighted	
	Mean±SE	%	Mean±SE	%
PCIE	0.1±0.0		0.0±0.0	
Baseline cancer-related problem index	2.5±0.1		2.3±0.1	
Follow-up cancer-related problem index	2.1±0.6		1.9±0.6	
Age, y	65.5±0.3		67.8±0.5	
Women		51.4		51.2
Education				
≤High school		52.4		51.7
≥Some college		47.6		48.3
Race/ethnicity				
White		86.2		88.1
Black		10.4		8.4
Hispanic or other		3.4		3.4
Worry at diagnosis	3.73±0.05		3.60±0.05	
Nonmedical seeking	0.1±0.0		0.0±0.0	
Cancer type				
Colon		31.9		31.5
Breast		34.8		35
Prostate		33.3		33.5
Cancer stage				
0		9		12.2
I		20.2		19.6
II		44.7		46.6
III		13		12.1
IV		13.2		9.5
Treatment received				
Surgery		73.3		72.7
Radiation therapy		48.4		49.3
Systemic therapy		56.5		51.7
Health status	3.2±0.0		3.2±0.0	
Frequency of physician visits	3.6±0.0		3.5±0.0	
Cancer experience	3.6±0.0		3.7±0.0	
Informed of metastatic disease		14.3		11.7

SE, standard error; PCIE, patient-clinician information engagement.

The correlations between PCIE and cancer-related problems at Round 1 and Round 2 are displayed in Table 2. These correlations were highly significant for all bivariate associations between these variables. The correlation between the problem indices in Rounds 1 and 2 were strong, whereas the correlations between these variables and PCIE were medium based on the Cohen criteria.²⁵

Table 3 provides the results from the regression models that were used to predict cancer-related problems at Round 2. Model 1 indicates that higher PCIE and more problems at Round 1 were associated with more problems at Round 2. Controlling for potential confounders in Model 2, the coefficients of PCIE and

cancer-related problems at Round 1 were slightly diminished but remained statistically significant. This indicates that increased PCIE was associated with higher levels of cancer-related problems at Round 2 over and above the predicted effect of the presence of problems at baseline. Model 3 indicates a significant positive interaction between PCIE and baseline cancer-related problems. This suggests that the magnitude of effects of PCIE on patients' experience of cancer-related problems at Round 2 was contingent on the level of problems experienced in Round 1.

Figure 1 displays the effects of the interaction between PCIE and cancer-related problems in Round 1 based on the coefficients from the final regression model at various levels for each variable (1 standard deviation above and below their respective means). Among the respondents who had low levels of cancer-related problems at baseline, increasing levels of PCIE were not associated with appreciable changes in the Round 2 problem index. In comparison, for respondents who had more

problems at baseline, increased PCIE was associated with more cancer-related problems at follow-up.

DISCUSSION

In this study, we observed that, as patients discussed with and sought information at baseline from their physicians and other health professionals about their cancer treatment, quality of life, and other cancer-related issues, there was a tendency for patients to report experiencing more cancer-related issues the following year. This correlation was stronger among patients who had reported more cancer-related issues at baseline. On the surface, these are discouraging results—why would talking to one's physician lead to worse patient-reported outcomes? There are 3 possible reasons proposed here: increased salience, the quality or content of the discussion, and a false sense of security.

One plausible reason is that conversation with physicians leads to higher awareness of the various possible cancer-related issues a patient may experience, which may lead to more reporting of issues but not the actual experience of them. Discussing cancer-related symptoms with the physician may establish them as medical concerns worthy of attention and reporting, and the heightened awareness could lead to a lower threshold for labeling a particular issue as a problem. Although the survey items attempted to capture actual experience rather than awareness of or susceptibility to issues related to their cancer diagnoses and treatment, more objective measures of cancer-related problems and refined measures of patients' subjective perceptions of these problems would help to determine whether salience was responsible for our current findings.

Table 2. Weighted Pearson Correlations Between Patient-Clinician Information Engagement and Round 1 and Round 2 Cancer-Related Problem Indices

Variable	Round 1 Cancer-Related Problem Index	Round 2 Cancer-Related Problem Index
PCIE	0.27 ^a	0.25 ^a
Round 1 cancer-related problem index	—	0.67 ^a

PCIE indicates patient-clinician information engagement.

^a $P < .001$.

Table 3. Weighted Ordinary-Least-Squares Regression Analyses Predicting Round 2 Cancer-Related Problem Index^a

Predictor	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
PCIE	0.22 ^b	0.07	0.19 ^c	0.09	0.24 ^b	0.09
Round 1 cancer-related problem index	0.63 ^d	0.02	0.56 ^d	0.03	0.54 ^d	0.03
Interaction of PCIE and Round 1 cancer-related problem index					0.11 ^b	0.04

B indicates the weighted regression coefficients; SE, standard error; PCIE, patient-clinician information engagement.

^a Model 1 presents the main effects of PCIE and the Round 1 cancer-related problem index without the control variables. Models 2 and 3 are controlled for demographic characteristics (age, education level, and ethnicity), psychological variables (worry about cancer at diagnosis), nonclinical sources of cancer information (media or interpersonal sources), and cancer-related variables (cancer type, stage of disease at diagnosis, type of treatment received, health status, frequency of physician visits, overall cancer experience, and being told about the presence of metastatic disease).

^b $P < .01$.

^c $P < .05$.

^d $P < .001$.

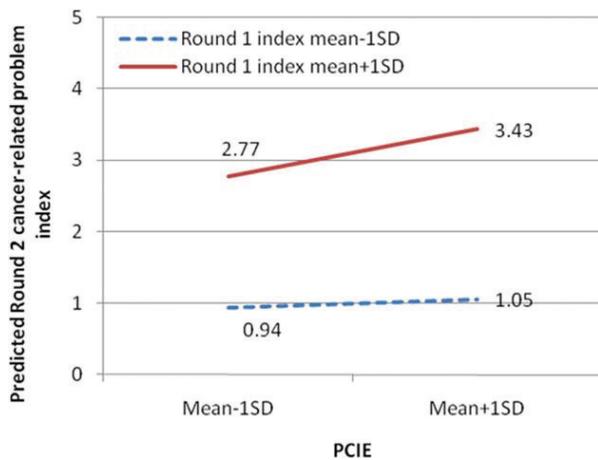


Figure 1. The predicted Round 2 cancer-related problem index is illustrated with various levels of patient-clinician information engagement (PCIE) along with the Round 1 cancer-related problem index. Note that the predicted values were based on weighted regression coefficients from Model 3 adjusting for all control variables at their respective mean values. SD indicates standard deviation.

Second, the measure that we used in this study was a measure of quantity rather than quality or content of the information engagement. Unclear or unsatisfactory communication can lead to worse patient-reported outcomes.^{26,27} It is possible that patients who had more trouble communicating with their physicians engaged in more of it. Although quality-of-life information was included in the PCIE measure, the nature of discussions between patients and oncologists tends to focus on symptoms and treatment and less on psychological, social, and spiritual concerns,²⁸ which also may affect patients' ability to cope with the latter concerns. However, this explanation seems to be at odds with another set of findings from the same dataset, which demonstrated that PCIE increased the feeling of being informed as well as treatment decision satisfaction.¹⁰ Without a clearer picture of the nature of the patient-clinician discussions, levels of health literacy, and patients' perceptions of the discussion within this population, it is not possible to conclude that more PCIE, regardless of its content, leads to increased experiences of cancer-related problems.

Third, more PCIE may have led to greater experience of problems through a false sense of security. Patients who talk more with their physicians may be less concerned about the problems they will face and, thus, may act less vigilantly in their self-care. This explanation may hold especially true for those patients who had more cancer-related issues at baseline, and it is consistent with the

results from the interaction term tested here. These potential causal mechanisms should be tested in future studies.

The current study offers several improvements to the existing literature regarding patient-clinician communication and patient-reported outcomes: specifically, physical and psychosocial issues related to a patient's cancer diagnosis and treatment. First, it uses a representative population-based sample of patients who were diagnosed with 3 of the most prevalent cancers in Pennsylvania, as opposed to studies that typically involve convenience samples of patients in individual oncology clinics. Second, because this study was based on a longitudinal analysis, we were able to make more confident inferences about the causal direction between PCIE and cancer-related problems while controlling for potential confounders, in contrast to studies that examine cross-sectional associations. Finally, the probability sample weighting allowed for the extrapolation of findings at least to the sampling frame of cancer patients in Pennsylvania.

There are several limitations with the current study. First, the sample was composed of Pennsylvanian patients with breast, prostate, or colorectal cancers, and the results may not be generalizable to other patient populations in terms of disease or geographic location. Research among other patients should be conducted to determine whether these findings can be replicated. Second, the PCIE measure that we used captured only the extent to which patient information engagement took place for various cancer-related topics with their physician. It is possible that other measures of patient-clinician communication, such as levels of understanding and rapport, the content discussed, and the clinician's perceptions, could yield different results. Future research should incorporate the nature of the patient-physician communication from such measures. Third, the index of cancer-related problems in the current study was used to assess the self-reported presence or absence of a limited set of health and lifestyle issues. The severity and the extent to which these symptoms impacted patients' well being and lifestyles were not measured. Other dimensions of quality-of-life issues also were not measured. Therefore, additional research using patient-reported outcome measures that include other important dimensions or measures of impact on patients' well being is recommended. Fourth, there may be other potential unmeasured confounders related to the clinical status of patients at baseline. For instance, patients with baseline problems that were severe, difficult to treat or reverse, or progressed over time may be more likely to report increased PCIE and experiencing 1 of the 9 cancer-

related problems at follow-up over and above their tendency to experience them during the first year after diagnosis. Although this analysis did control for certain measures of patients' clinical status at baseline (for example, stage, health status, frequency of physician visits, and subjective cancer experience), the presence and severity of problems that were difficult to resolve may not have been captured in these measured variables.

However, despite these limitations, the current study calls into question the seemingly intuitive positive effects of promoting greater patient-clinician communication in the care of cancer patients. It demonstrates that we cannot rely on the conventional wisdom that more patient engagement with physicians will lead to better long-term health outcomes, and it highlights the need to further examine the underlying causal pathways and the role of moderating factors.

CONFLICT OF INTEREST DISCLOSURES

Research support was received thorough Grant 5P50CA095856-05 from the National Cancer Institute.

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