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Longitudinal Patient-Reported Performance Status Assessment in the Cancer Clinic Is Feasible and Prognostic

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Abstract

Purpose: Performance status is prognostic in oncology and palliative care settings. Traditionally clinician rated, it is often inconsistently collected, recorded, and measured, thereby limiting its utility. Patient-reported strategies are increasingly used for routine symptom and quality of life assessment in the clinic, and may be useful for tracking performance status.

Methods: Tablet personal computers were used to collect patient-reported reviews of systems via the Patient Care Monitor (PCM) v2.0 for 86 patients with advanced lung cancer. Relevant

subscales included the PCM Impaired Performance and Impaired Ambulation scales. Trained nurse clinicians measured performance status using traditional Karnofsky and Eastern Cooperative Oncology Group (ECOG) instruments. Correlation coefficients were used to compare performance status scales, and survival analysis was performed by Cox proportional hazards modeling.

Results: All four performance status scales demonstrated excellent internal consistency and convergent validity. Initial KPS and ECOG scores were statistically correlated with survival, whereas PCM scores showed a nonsignificant trend in this

direction. Change in PCM Impaired Performance over time was statistically correlated with survival (hazard ratio = 1.62, $P = .046$), whereas the other three performance status measures were not statistically prognostic.

Conclusion: Patient-reported performance status as measured by PCM v2.0 is at least as reliable as KPS or ECOG. The

enhanced resolution provided by this patient-reported method allows for the detection of clinically meaningful changes in trajectory over time, potentially serving as an early-warning system to trigger clinical interventions. Further study is needed to test these findings on a larger scale.

Introduction

Performance status scales are used widely in oncology and palliative care settings. Performance status assessment is among the most powerful prognostic tools available to guide oncologists' decision making about treatment tolerability or the need for specialized medical services.¹

Clinician report is usually regarded as the gold standard in performance status assessment. The two most commonly used scales are the Karnofsky performance status (KPS) score and the Eastern Cooperative Oncology Group (ECOG) score. KPS, an 11-point scale ranging from "normal" (100%) to "dead" (0%), has been the most widely studied and utilized since its development in 1948.¹⁻³ The ECOG scale, developed in 1960, is a simpler 6-point scale ranging from "normal" (0) to "dead" (5), and is increasingly used in oncology trials and clinical practice.^{4,5}

Clinician-reported performance status can, however, be problematic. First, it represents a clinician's perception of a patient's functionality, which may reflect bias; ultimately, it is a clinician-reported measure of a patient-reported construct. Second, despite being prognostic,³ clinician-reported performance status is frequently unavailable for longitudinal tracking, as it often goes unreported in the medical record or is not documented in retrievable databases for future reference. Inter-observer reliability is also a concern.^{4,6-8}

Patient-reported performance status, on the other hand, is not subject to clinician biases; it bypasses this potentially distorting "filter." It may provide a better depiction, although studies to date are inconclusive.^{4,6,7,9} Patient reporting also improves the efficiency of data collection by bypassing clinician involvement in tabulating and recording results. Patient-reported assessments, sometimes called "patient-reported outcomes" (PROs), are accurate and reproducible for documenting other patient-centered constructs like symptoms and quality of life (QOL).¹⁰⁻¹³ Moreover, patient-reported symptoms and QOL accurately reflect survival-related patient functioning when compared with traditional prognostic indicators.^{14,15} In theory, patient-reported performance status could be equally as efficient and prognostic as clinician-reported measures.

The Patient Care Monitor version 2.0 (PCM v2.0) is a validated electronic patient-reported review of systems survey instrument and PRO tool.^{10,12} Data are collected electronically, for example, via point-of-care tablet computers, facilitating the efficient collection of patient-reported data with less burden and more accuracy.^{16,17} Collection of PRO information using the PCM v2.0 is an efficient real-time method to catalogue reliable and valid symptom and QOL data for use in clinical care, research, and quality reporting.¹⁸

Although clinician-reported performance status (using KPS or ECOG scores) is prognostic, the patient's assessment of their own performance status could obviate the need for clinician data collection, improve data quality, and potentially better reflect prognosis. We thus hypothesized that patient-reported performance status (using the Impaired Performance and/or Impaired Ambulation scales of the PCM v2.0) would be similarly prognostic compared with clinician-reported measures.

Methods

Participants

Between January and December 2008, we recruited English-speaking adults from the Duke University oncology clinics, with inoperable non-small-cell lung cancer and a life expectancy of less than 6 months. Individuals without adequate cognitive ability to independently complete questionnaires were excluded. Ninety-four eligible patients were enrolled. Five patients with small-cell histology and three patients who did not complete the KPS, ECOG, or PCM v2.0 measures were excluded, resulting in a final sample size of 86.

Procedures

Duke University Health System's institutional review board approved this project. Patients completed questionnaires in the clinic using wireless tablet computers during up to four outpatient appointments within a 6-month period.^{10,18} Trained research assistants used structured case report forms to collect data from clinicians. All 86 participants completed an initial assessment; 70 completed a second assessment, on average 4.98 ($SD = 4.00$) weeks after the initial assessment; 60 completed a third assessment, on average 9.76 ($SD = 6.08$) weeks after initial assessment; and 51 completed a fourth assessment, on average 12.36 ($SD = 4.59$) weeks after baseline. Participants were reimbursed \$25 per visit.

Measures

KPS. This index is an ordinal forced-choice scale used to rate impairment in daily activities. Scores range from 100% (normal, no complaints) to 0% (dead).^{2,3} Higher scores reflect better function.

ECOG performance status. This is also an ordinal forced-choice scale. Choices range from 0 (fully active) to 5 (dead).⁵ Higher scores reflect worse function.

PCM v2.0. This is an 80-item (86 items for females) clinical review of systems survey.^{12,17} Each item is scored on a 0 ("not a problem") to 10 ("as bad as possible") scale for the previous

week. The tool has six subscales (General Physical Symptoms, Treatment Side Effects, Distress, Despair, Impaired Performance, and Impaired Ambulation) that can be combined to create an overall QOL score. Higher scores indicate worse functioning. Our specific focus was on the Impaired Performance and Impaired Ambulation subscales; their internal consistency in this study was high (Cronbach's $\alpha = 0.88$ and 0.85 , respectively).

Functional Assessment of Chronic Illness Therapy—Fatigue (FACIT-F). This 13-item scale¹⁹ was used to assess fatigue in a more detailed manner than can be achieved using the PCM v2.0. Responses are scored between 0 (“not at all”) and 4 (“very much”) for the past week. Higher FACIT scores generally represent better QOL.²⁰ This scale demonstrated high internal consistency in this study (Cronbach's $\alpha = 0.94$).

The Functional Assessment of Cancer Therapy—Lung Cancer (FACT-L).²¹ This instrument assesses QOL separately from the PCM 2.0 by using four general (Physical Well-Being, Social Well-Being, Emotional Well-Being, and Functional Well-Being) and one lung cancer symptom-specific subscales. Items are rated from 0 (“not at all”) to 4 (“very much”). Items in each subscale are summed, and higher scores represent better QOL and symptom control. FACT-L subscales had high internal consistency in this sample (Cronbach's α s = 0.79 to 0.87).

Survival. Patient survival status was collected in November of 2010 from the Duke Tumor Registry, the Social Security Death Index, obituaries, and direct communication with patients' family members. One coauthor (T.W.L.) reviewed the medical records to confirm survival status for the 35% of patients whose status was in question.

Statistical Analyses

Descriptive statistics were used to summarize demographic, medical, QOL, and performance variables. To examine the PCM Impaired Performance and PCM Impaired Ambulation scales' relationships with KPS and ECOG, correlations (Spearman's ρ) were calculated using data from the initial assessment and the rate of change from initial to final assessment (computed as final assessment score minus initial score divided by the number of weeks). Convergent validity of these two PCM scales, as compared with the KPS and ECOG, was evaluated by examining correlations (Spearman's ρ) between the performance variables and QOL variables (FACT-L scales and other PCM subscales). Cox proportional hazard models were used to obtain hazard ratios (HRs) and their corresponding 95% CIs for the relationship between the four performance status variables and survival. Separate models were conducted for each performance variable collected at the initial assessment and for rate of change in the performance variable, and each model controlled for age, sex, and marital status. For models examining performance variables collected at the initial assessment, the primary outcome was overall survival, defined as the number of days between the date of the initial assessment and the date of death. For models examining rate of change in performance variables, survival analysis was limited to the 53

participants who completed a follow-up assessment within 2 to 4 months of the initial assessment. The primary outcome was overall survival, defined as the number of days between the date of the 2- to 4-month assessment and date of death. In all models, patients alive on a date chosen by researchers (November 1, 2010) were censored.

Results

Sample Description

Mean age of the sample was 62.5 years ($SD = 10$), 58% ($n = 50$) were men, 78% were white ($n = 67$), 19% ($n = 16$) were black, and 70% ($n = 60$) were married. Eighteen percent completed some high school, 23% had earned a high school diploma, 38% had some college or a technical degree, and 21% had earned a college degree or more. Participants were on average 1.4 ($SD = 1.8$) years from their initial lung cancer diagnosis, and 87% ($n = 74$) had metastatic disease (Table 1).

Initial Performance Variables, Descriptive Statistics, and Correlations

Descriptive statistics for KPS, ECOG, PCM Impaired Performance Scale, and PCM Impaired Ambulation Scale at the initial assessment are provided in Table 2. The distributions of initial PCM Impaired Performance and Impaired Ambulation scores were similar to those found in a normative sample of adult cancer outpatients.²² Average scores for the FACT-L subscales were similar to the average scores reported for a normative sample of cancer patients.²³

At the initial assessment, there was significant correlation between KPS and ECOG ($r_s = -0.81$, $P < .001$); this was expected because both evaluate overall performance and were collected by the same trained research assistant at the same point in time. The PCM Impaired Performance and Impaired Ambulation scales both correlated with KPS ($r_s = -0.66$ and -0.53 , respectively; $P < .001$) and ECOG ($r_s = 0.50$ and 0.59 , respectively; $P < .001$). PCM Impaired Performance and Impaired Ambulation scales correlated with each other ($r_s = 0.73$, $P < .001$).

Correlations between the four performance measures, QOL, and symptom variables at initial assessment were used to examine convergent validity (Table 2). PCM Impaired Performance Scale ($r_s = -0.48$ to -0.76 , $P < .001$) and Impaired Ambulation Scale ($r_s = -0.36$ to -0.71 , $P < .001$) demonstrated somewhat stronger correlations with these scales compared with the KPS ($r_s = 0.43$ to 0.58 , $P < .001$) and ECOG ($r_s = -0.36$ to -0.51 , $P < .001$). Consistent with prior work, the four performance measures showed a weak association with the FACT-L Emotional Well-Being Scale, and were not associated with the FACT-L Social Well-Being Scale.¹² Overall, the ECOG showed the weakest associations with QOL and symptom measures.

Change in Performance Variables

We examined whether performance variables changed from the initial to the final assessment using the related-samples Wil-

Table 1. Sample Description

Characteristic	Total N	%	Mean	SD	Range
Age	86		62	10	42-85
Time since initial diagnosis, years	86		1.4	1.8	0-11
Time from initial to final assessment, weeks*	70		11.5	5.4	2-25
Metastatic disease	85	87.1			
Sex	86				
Male		58.1			
Female		41.9			
Race/ethnicity	86				
White		77.9			
Black or African American		18.6			
Spanish, Hispanic, or Latino		1.2			
American Indian/Alaska Native		1.2			
Korean		1.2			
Education	85				
Some high school or less		17.6			
High school		23.5			
Some college/technical degree		37.6			
Bachelor's degree		7.1			
Graduate training		14.1			
Married	86	69.8			
FACT Lung Cancer	84		18.91	4.21	8-28
FACT Physical Well Being	85		21.00	4.76	7-28
FACT Social Well Being	84		21.39	5.61	0-28
FACT Emotional Well Being	85		18.95	4.36	2-24
FACT Functional Well Being	85		15.48	6.61	0-28
FACIT Fatigue	85		34.67	10.91	6-52
PCM General Physical Symptoms	86		21.72	14.36	2-75
PCM Treatment Side Effects	86		11.82	8.93	1-49
PCM Distress	86		6.23	8.56	0-40
PCM Despair	86		6.81	11.94	0-67

Abbreviations: FACT, Functional Assessment of Cancer Therapy; FACIT, Functional Assessment of Chronic Illness Therapy; PCM, Patient Care Monitor.

* Data available for 70 participants who completed a baseline assessment and at least one follow-up assessment.

coxon signed-ranks test. Three measures detected a significant decline in performance: KPS ($Z = -3.38$, $P = .001$), ECOG ($Z = 3.82$, $P < .001$), and PCM Impaired Performance ($Z = 2.13$, $P = .03$). PCM Impaired Ambulation showed no significant change ($Z = -1.12$, $P = .26$).

The association between the rate of change in KPS and ECOG was $r_s = -0.69$ ($P < .001$). The rate of change in the PCM Impaired Performance Scale showed a similar magnitude of association with rate of change in KPS ($r_s = -0.46$, $P < .001$) and ECOG ($r_s = 0.45$, $P < .001$). The rate of change in the PCM Impaired Ambulation Scale was significantly correlated with rate of change in Impaired Performance ($r_s = 0.42$, $P < .001$). The strength of the relationships were not as strong between the rate of change in the PCM Impaired Ambulation Scale and the rate of change in KPS ($r_s = -0.37$, $P = .002$) and ECOG ($r_s = 0.21$, $P = .08$). The correlation between the rate of change in the PCM Impaired Performance and Impaired Ambulation Scale was also significant ($r_s = 0.42$, $P < .001$).

Appendix Table A1 (online only) presents the associations between rate of change in the four performance variables and rate of change in the QOL and symptom measures. In general, changes in PCM Impaired Performance and Impaired Ambulation were more likely than KPS and ECOG to be correlated to changes in physical symptoms and fatigue.

Survival Analysis

Of the 86 participants, 67 were deceased at the end of the follow-up period; median survival was 302 days (range, 9 to 865 days) from initial assessment. The Cox proportional hazard model using KPS obtained at the initial assessment was statistically significant (HR = 0.95, $P < .001$; 95% CI, 0.92 to 0.98), suggesting that lower initial KPS scores were related to shorter survival. There was also a significant HR for the model using initial ECOG scores (HR = 1.57, $P = .02$; 95% CI, 1.07 to 2.30), suggesting that higher ECOG scores predicted shorter survival. HRs for initial PCM Impaired Performance (HR =

Table 2. Means, Standard Deviations, and Spearman's rho Correlations Between KPS, ECOG, PCM Impaired Performance, PCM Impaired Ambulation, and Quality of Life Variables at the Initial Assessment

Measure	N	Mean	SD	KPS		ECOG		PCM Impaired Performance		PCM Impaired Ambulation	
				rho	95% CI	rho	95% CI	rho	95% CI	rho	95% CI
KPS	86	74.2	11.0	—							
ECOG	86	1.4	0.7	−0.81**	−0.87 to −0.72	—					
PCM Impaired Performance	86	13.55	11.0	−0.66**	−0.77 to −0.52	0.59**	0.43 to 0.71	—			
PCM Impaired Ambulation	86	4.0	6.5	−0.53**	−0.67 to −0.36	0.50**	0.32 to 0.64	0.73**	0.61 to 0.81	—	
FACT Lung Cancer	84	18.9	4.2	0.43**	0.24 to 0.59	−0.36**	−0.53 to −0.16	−0.48**	−0.63 to −0.30	−0.46**	−0.61 to −0.28
FACT Physical Well Being	85	21.0	4.8	0.56**	0.40 to 0.69	−0.50**	−0.64 to −0.32	−0.63**	−0.74 to −0.48	−0.56**	−0.69 to −0.40
FACT Social Well Being	84	21.4	5.6	0.14	−0.07 to 0.34	−0.17	−0.37 to 0.04	−0.12	−0.32 to 0.09	−0.17	−0.37 to 0.04
FACT Emotional Well Being	85	19.0	4.4	0.24*	0.03 to 0.43	−0.20	−0.40 to 0.01	−0.30*	−0.48 to −0.09	−0.29*	−0.47 to −0.08
FACT Functional Well Being	85	15.5	6.6	0.43**	0.24 to 0.59	−0.39*	−0.56 to −0.19	−0.48*	−0.63 to −0.30	−0.36*	−0.53 to −0.16
FACIT Fatigue	84	34.7	10.9	0.58**	0.42 to 0.71	−0.51**	−0.65 to −0.33	−0.76**	−0.84 to −0.65	−0.71**	−0.80 to −0.59
PCM General Physical Symptoms	86	21.7	14.4	−0.38**	−0.55 to −0.19	0.30*	0.09 to 0.48	0.53**	0.36 to 0.67	0.53**	0.36 to 0.67
PCM Treatment Side Effects	86	11.8	8.9	−0.24*	−0.43 to −0.03	0.16	−0.05 to 0.36	0.24*	0.03 to 0.43	0.28*	0.07 to 0.46
PCM Distress	86	6.2	8.6	−0.15	−0.35 to 0.06	0.08	−0.13 to 0.29	0.32*	0.12 to 0.50	0.26*	0.05 to 0.45
PCM Despair	86	6.8	11.9	−0.22*	−0.41 to −0.01	0.25*	0.04 to 0.44	0.43**	0.24 to 0.59	0.39**	0.19 to 0.56

NOTE: Italic font indicates a moderate degree of correlation (0.4 to 0.59), and bold font indicates a strong degree of correlation (0.6 to 1).

Abbreviations: ECOG, Eastern Cooperative Oncology Group performance status; FACT, Functional Assessment of Cancer Therapy; FACIT, Functional Assessment of Chronic Illness Therapy; KPS, Karnofsky performance status; PCM, Patient Care Monitor.

* $P < .05$, ** $P < .001$.

1.02, $P = .11$; 95% CI, 0.995 to 1.05) and Impaired Ambulation (HR = 1.02, $P = .25$; 95% CI, 0.99 to 1.06) were not statistically significant (Appendix Fig A1, online only).

At the end of the follow-up period, 40 of the 53 participants with a follow-up assessment within 2 to 4 months of the initial assessment were deceased; median survival was 291 days (range, 12 to 730 days) from the 2- to 4-month assessments. Figure 1 displays the survival functions for each of the performance variables; separate lines display a decrease in scores, no change in scores, and an increase in scores. Cox proportional hazard models showed that the rate of change in PCM Impaired Performance was statistically significant (HR = 1.62, $P = .046$; 95% CI, 1.01 to 2.61), suggesting that an increasing score was related to shorter survival. There was a trend for the rate of change in KPS (HR = 0.73, $P = .07$; 95% CI, 0.52 to 1.02), suggesting an association between decreases in KPS and shorter survival. Results for the rate of change in ECOG (HR = 18.80, $P = .13$; 95% CI, 0.41 to 855.41) and PCM Impaired Ambulation (HR = 1.62, $P = .18$; 95% CI, 0.80 to 3.24) were not statistically significant.

Discussion

Performance status assessment is essential in oncology, given its prognostic abilities regarding treatment tolerability and patient survival. Our data are consistent with and lend further support to this concept. We also offer several novel findings regarding

the reliability and prognostic power of patient-reported performance status assessment.

Consistent with earlier reports, our results using the PCM v2.0 Impaired Performance and Impaired Ambulation subscales demonstrated high internal consistency, which is important when assessing performance status over time, and convergent validity, confirming that changes in scores are consistent with changes in constructs like QOL in a pattern that meets clinical expectations. Furthermore, the patient-reported measures were as reliable and valid as gold standard clinician-assessed performance status. In this study, data were obtained by specially trained study nurses, using structured report forms and standardized approaches; in usual practice, there is more variability in clinician report.

The two PCM scales correlated well with KPS and ECOG, performance status measures that are routinely administered in both clinical practice and research settings. Patient-reported performance status using the Impaired Performance scale may have prognostic power similar to that of clinician-derived measures, when trended over time. In addition, changes in the PCM scales correlated well with standard measures of QOL, indicating that these scales address factors that matter to a patient's well-being.

The initial PCM measurements failed to be a significant factor in predicting survival. This finding was curious. Although the PCM scales are likely more sensitive than either

Figure 1. Survival curves for the rate of change in (A) Karnofsky performance status (KPS), (B) Eastern Cooperative Oncology Group performance status (ECOG), (C) Patient Care Monitor (PCM) Impaired Performance, and (D) PCM Impaired Ambulation.

ECOG or KPS in terms of their “resolution” to detect meaningful change, there was no evidence that the PCM scales offered significant predictive power at the initial assessment. The data trended towards significance, so perhaps our small sample size precluded a statistical prediction. Alternately, these scales may overestimate performance status earlier in the course of disease. Conversely, patients may under-report their limitations before they experience significant impairment, as compared with clinician assessments. Or, quite simply, the PCM v2.0 might not be the best patient-reported instrument for assessing performance status; perhaps other instruments should be used or developed.

Despite the poor prognostic power from a single, initial measure, changing PCM Impaired Performance over time is indeed prognostic. In contrast, the rate of change in KPS and ECOG failed to achieve statistical significance. Assessments were taken at up to four time points, and only the first two were included in the survival analysis, to avoid introducing a reporting bias; sequential clinician and/or patient reporting of performance status over longer periods of time with more time points may improve prognostication.

On the other hand, the PCM Impaired Ambulation scale was not as prognostic. This scale is similar to the KPS and

ECOG scales in their focus on mobility. In comparison with a typical group of patients with advanced lung cancer, ours were quite mobile with higher functioning. Perhaps the PCM Impaired Performance scale is sensitive enough to detect the more subtle changes that occur before significant functional decline. This highlights a particular strength of the electronic PRO (ePRO) method; patients are able to perceive small degrees of change.²⁴ Indeed, ePROs are often better predictors of survival than clinician-based measures,¹⁴ which can be biased by imaging, laboratory data, and prior experiences, limiting appreciation of subtle yet meaningful changes in trajectory.

This ability to detect meaningful change over time is an advantage of ePRO approaches; patients can easily report information at each encounter, or even between clinic visits. These data are electronically captured to continuously updating databases, where the information is discrete and computable. In contrast, standard performance status metrics tend to be inconsistently measured and recorded by clinicians and are often buried in text-based documentation, making it difficult to access and trend information over time. ePRO assessments, such as those collected via the PCM v2.0, are reliable, valid, instantly available, and easily tracked longitudinally. This provides a “high-resolution” snapshot of a patient’s current functional sta-

tus and a chronological portrait of disease trajectory as related to other important clinical variables such as pain score, other symptoms of interest, and information derived from the medical record.

Overall, this was a hypothesis-generating study with many limitations, including (1) retrospective analysis of prospectively collected data; (2) limited convenience sample of predominantly white patients who were well enough to attend clinic; (3) several patients able to complete only two assessments, rather than three to four; and (4) use of an ePRO computer interface requiring participation from committed clinicians and able patients. Despite these limitations, our observations were intriguing and suggest that patient-reported performance status assessment in the clinic has value and should be explored further.

In conclusion, patient-reported performance status, assessed via the PCM v2.0 Impaired Performance scale, provides information consistent with the gold-standard version of clinician-based performance status measurements in the clinic. The superior ease of measurement and ability to track and trend other important clinical information make ePRO systems very attractive in the oncology setting. Our study lends proof-of-concept support to the notion that patient-reported performance status measurement is reliable and similarly prognostic when compared with traditional clinician assessments done with KPS and ECOG. Finally, the ePRO method facilitates tracking the trajectory of a patient's illness, whereas traditional measures of performance status are inconsistently documented in the medical record, precluding the visualization of trends; this is important, considering that a change in trajectory is predictive of survival. ePRO methods provide an early-warning system, alerting clinicians to the need for a targeted intervention, change in goals of care, or both.

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Linking Palliative Care and Oncology Practice: Performance Status As a Common Thread

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Introduction

Aspirations to integrate palliative medicine into comprehensive cancer care are hardly novel. In a 1998 position statement from ASCO, authors describe “the oncologists’ responsibility to care for their patients in a continuum that extends from the moment of diagnosis throughout the course of the illness . . . include[ing] symptom control and psychosocial support during all phases of care.”¹ It is also clear, as shown by public opinion polling, that a majority of patients want access to palliative care services in the setting of serious illness.² More than a decade later, however, ASCO’s vision statement for 2020 recognizes that we still have a long way to go in realizing this objective.³ Why has it been so difficult to integrate these two specialties?

Perhaps this struggle is an operational one, stemming from difficulty in conceptualizing what this integration might actually look like in the clinic. For example, one might wonder, for a patient receiving aggressive chemotherapy, what should trigger a referral to a palliative care specialist? ASCO’s vision for 2020 recognizes that today’s model of cancer care should no longer be one of “cure versus comfort,” yet it can still often feel this way in clinical practice, as we move through each successive standard line of therapy until no options remain.³ Under this older model, palliative care referrals occur very late, when patients either have no remaining therapeutic options or become too debilitated to benefit from or tolerate further chemotherapy.

Performance status, a common concept in both oncology and palliative care practice, may be just the sort of trigger we need to fix this problem, by enabling earlier and more targeted referrals to palliative care specialists. By better tracking and responding to changes in patients’ performance status, we can make more precise interventions earlier in the course of a patient’s decline. Consider the following case:

Mrs F is a 67-year-old woman with stage IV non–small-cell lung cancer. She lives independently and drives herself to all appointments. Her treatment regimen has included multiple courses of standard therapies, such that she is now being treated with single-agent vinorelbine. Recent scans show stable disease, but today she arrives to clinic in a

wheelchair, with her daughter, who reveals that her mom has been struggling with activities of daily living for the last few months, and even fell several times this week while trying to cook meals and clean the house. On further questioning, she has suffered progressive functional decline over the last 3 to 4 months, which was not evident to her doctors as she still drove herself to the clinic.

This scenario is not an uncommon one. Patients often seem to suddenly fall off the proverbial performance status cliff one day in clinic, and it does not always correlate with objectively measurable disease. When a patient like Mrs F arrives in a wheelchair for the first time, red flags go up, often triggering difficult discussions and decision making about how to proceed. One wonders, is palliative chemotherapy providing further benefit in the setting of worsened performance status? Were there earlier signs of her functional decline? Could we have detected this sooner, and intervened then to prevent her falls? Is it time for hospice? Yet when we talk with patients or family members further, we may find—as in this case—that there were subtle changes over the preceding weeks to months that could have altered our approach. Typical measures of performance status are not sensitive enough to detect these changes, are not performed frequently enough, and are not trended over time. We thus miss out on opportunities to recognize these important changes earlier, and to intervene.

Patient-reported performance status assessment, as described by Suh et al⁴ in this issue of *JOP*, could fundamentally change this aspect of our practice. By using electronic methods for collecting, analyzing, and organizing how patients report their own performance status, we can turn a parameter that was unused and inaccessible into a valid piece of data that clinicians and patients could learn from, and even use to inform targeted interventions. As Suh et al suggest, changes in performance status over time likely have predictive power in terms of patients’ survival. Current usage of performance status assessment, on the other hand, barely scratches the surface of what it can and should be doing for us in clinical practice. Most modern medical record systems do not provide a searchable field to document performance status measures, thereby also precluding higher level usage thereof, such as trending values over time in order to visualize patients’ trajectories.