

Patient-Provider Concordance in the Prioritization of Health Conditions Among Hypertensive Diabetes Patients

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BACKGROUND: Many patients with diabetes have multiple other chronic conditions, but little is known about whether these patients and their primary care providers agree on the relative importance that they assign these comorbidities.

OBJECTIVE: To understand patterns of patient-provider concordance in the prioritization of health conditions in patients with multimorbidity.

DESIGN: Prospective cohort study of 92 primary care providers and 1,169 of their diabetic patients with elevated clinic triage blood pressure ($\geq 140/90$) at nine Midwest VA facilities.

MEASUREMENTS: We constructed a patient-provider concordance score based on responses to surveys in which patients were asked to rank their most important health concerns and their providers were asked to rank the most important conditions likely to affect that patient's health outcomes. We then calculated the change in predicted probability of concordance when the patient reported having poor health status, pain or depression, or competing demands (issues that were more pressing than his health), controlling for both patient and provider characteristics.

RESULTS: For 714 pairs (72%), providers ranked the patient's most important concern in their list of three conditions. Both patients and providers ranked diabetes and hypertension most frequently; however, providers were more likely to rank hypertension as most important (38% vs. 18%). Patients were more likely than providers to prioritize symptomatic conditions such as pain, depression, and breathing problems. The predicted probability of patient-provider concordance de-

creased when a patient reported having poor health status (55% vs. 64%, $p < 0.01$) or non-health competing demands (46% vs. 62%, $p < 0.01$).

CONCLUSIONS: Patients and their primary care providers often agreed on the most important health conditions affecting patients with multimorbidity, but this concordance was lower for patients with poor health status or non-health competing demands. Interventions that increase provider awareness about symptomatic concerns and competing demands may improve chronic disease management in these vulnerable patients.

KEY WORDS: concordance; chronic disease; multimorbidity; diabetes; competing demands.

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BACKGROUND

Patients with diabetes often face the challenge of managing multiple chronic conditions. On average, adults with diabetes have 3.5 other chronic conditions,¹ and these comorbidities are associated with increased health care cost and utilization.^{2,3} Comorbid conditions may interfere with self-management of diabetes,^{4,5} and acute symptomatic comorbidities such as chronic pain and depression can be especially disruptive.^{4,6–9} Providers, meanwhile, face the challenge of addressing multiple complex conditions in a brief office visit.^{10–14} Given our knowledge of the benefits of effective patient-provider communication and trust on a range of health outcomes,^{15–18} a shared understanding of which of the patient's health conditions are most likely to affect his future health and function is likely to be important.^{19–22}

Patient-provider concordance has been evaluated previously in the setting of acute problems, with early studies finding that agreement about the nature of an acute problem and the need for follow-up is associated with earlier symptom resolution and retention in outpatient care.^{19–22} More recently, an emphasis on patient-centered care^{16,23–25} has renewed interest in patient-provider concordance as a reflection of effective communication and shared decision-making.^{26,27} Studies attempting to determine correlates of concordance have focused on whether there is agreement regarding the reason for

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the patient's visit, the etiology of the patient's symptoms, and the goals of treatment.²⁸⁻³¹ Fewer studies have examined concordance regarding issues specific to chronic disease, and these studies tend to focus on a single health condition.^{30,32,33} In patients with multiple chronic conditions, little is known about the role of patient-provider concordance and the extent to which patients and providers agree on which of the patient's conditions are most likely to affect the patient's health and well-being.

In this study of diabetic patients presenting to clinic with an elevated triage blood pressure, we examined how often the health concerns prioritized by a patient match the conditions that his provider judges as most likely to affect that patient's health outcomes. We hypothesized that patient-provider concordance would be lower when patients reported that their health was poor, that they were struggling with acute symptomatic conditions, or that they were facing more pressing issues in their lives than their health. On the other hand, we hypothesized that concordance would be higher when the patient rated his relationship with his provider as more favorable on domains such as communication and trust.

METHODS

We conducted a prospective cohort study of patients with a scheduled primary care visit at nine Veterans Affairs facilities located in three Midwestern states. Details about the study design have been published previously.³⁴ Institutional review boards of all participating facilities approved the study protocol, and all patients and providers gave written informed consent before participating.

Study Participants

One hundred twenty-six primary care providers were initially approached about participating in the study, and 104 consented. Of these, 12 providers changed their patient care responsibilities or left the facility prior to the start of data collection, so 92 providers were ultimately enrolled (median providers per facility was 8 with a range of 2 to 28). Diabetic patients of these providers were referred to study staff before a scheduled primary care visit if their lowest triage systolic blood pressure was 140 mmHg or greater, or if their lowest triage diastolic blood pressure was 90 mmHg or greater. Eligibility criteria required that the health care provider enrolled in the study was the patient's primary diabetes care provider. Patients with impaired decision-making ability or a terminal disease, patients who did not speak English, and patients who were residents of nursing homes were excluded. Of 1,556 patients approached by study staff, 213 were ineligible, and 1,169 provided written informed consent. The mean number of enrolled patients per enrolled provider was 13 (range 1-16).

Data Sources

A total of 1,056 patients completed a survey with information about their sociodemographic characteristics, their health and competing demands, and their relationship with their primary care provider. All providers completed a baseline survey with questions about personal characteristics and then completed a

second brief survey after a visit with an enrolled patient (completion rate, 99%). Both the patient survey and the provider brief survey included questions asking the participants to rank the three most important health conditions affecting the patient. Additional information such as patient age, prescribed medications, and comorbidities was obtained from Veterans Health Administration automated data sources.

Variables

Dependent Variable: Concordance in Prioritization of Health Conditions. The primary outcome was whether a patient and their provider agreed in their prioritization of the patient's health conditions. Both the patient survey and the provider survey contained a list of nine health conditions that included both symptomatic chronic conditions (pain, depression, and breathing difficulties) and chronic conditions less likely to be acutely symptomatic (hypertension, diabetes, hyperlipidemia, heart disease or heart failure, obesity, and tobacco use) (Text Box 1). These conditions were chosen based on their prevalence among diabetic VA patients and were presented in a fixed order. The patient survey stated: "Please think about your current health and health concerns and indicate...which of the listed health concerns are your three most important concerns." The provider survey stated: "From the following list of conditions and medical concerns, please indicate the top three most important medical concerns that are likely to affect health outcomes for this patient, whether or not these concerns were addressed in today's visit." Both surveys included space to rank two "other" health concerns. A concordance score was constructed using the number of matches between the patient's ranked list and the provider's ranked list, with an additional point given to the pair if the provider included the patient's top concern in their list of three health concerns. The score was constructed in this way in order to capture the magnitude of agreement between patient and provider while also acknowledging the clinical importance of having a provider prioritize the patient's most important concern.

Independent Variables and Covariates. Table 1 summarizes the patient and provider characteristics that we examined.

Text Box 1. List of Chronic Conditions in Provider and Patient Surveys

Provider Survey	Patient Survey
High cholesterol	Controlling my cholesterol levels
Pulmonary problems (e.g., COPD)	Treating my breathing and lung problems
Depression, anxiety, mood disorders	Feeling less blue, down, or nervous
Glycemic control	Controlling my blood sugar levels
Hypertension	Controlling my blood pressure levels
Physical pain or discomfort	Relieving my physical pain or discomfort
Being overweight or inactive	Losing weight or being more active
CHF or other heart disease	Treating my heart disease
Smoking	Stopping smoking
Other health concern	Other

Table 1. Patient and Provider Characteristics^a

	Value	Sample, n
Patient characteristics		
Age, mean (SD)	65 (11)	995
Education, %		
<High school	17	165
High school/GED	37	372
Trade school/college	46	461
Income, %		
<\$10,000	18	168
\$10,000–\$40,000	72	676
>\$40,000	10	96
Partner status, %		
Not in relationship	37	371
Married or in relationship	63	624
Race, %		
Caucasian	77	760
Not Caucasian, including Hispanic	23	233
No. of health conditions, mean (SD)	8 (3)	1004
Provider characteristics		
Gender, %		
Female	54	50
Male	46	42
Provider type, %		
Physician	70	64
PA/NP	30	28

^aCharacteristics of the 1,004 patients and 92 providers included in final concordance analysis

Patients' non-health competing demands were assessed using their response on a 5-point scale to the question, "I have more pressing issues in my life than my health."⁵ Health status was assessed using a 5-point scale, which was later collapsed to excellent-to-good and fair-to-poor due to skewed data. Single-item measures of health status provide more global but less descriptive information than multi-item measures; however, studies have shown these measures to be reliable and valid, as well as predictive of mortality.^{35–38} Patient pain was assessed using a yes/no question in which patients were asked whether they have had pain present most of the time for 6 months or more during the past year.⁷ Depression was assessed using two 4-point questions drawn from Corson's PHQ-2 measure³⁹ that queried about "little interest or pleasure in doing things" and "feeling down, depressed, or hopeless" over the last 2 weeks. Because of the recognized clinical association between pain and depression,⁴⁰ these conditions were combined into a single variable in the main model and were then examined separately in a sensitivity analysis. Patient assessment of the patient-provider relationship was assessed through eight questions derived from the Primary Care Assessment Survey in the following domains: Trust in the provider, communication quality, interpersonal treatment, and knowledge of the patient.⁴¹ Factor analysis demonstrated that each pair of questions loaded onto a single factor; thus, the eight items were combined by summing them into a single scale that had a Cronbach's alpha of 0.94. Primary analysis looked at this overall measure of the patient-provider relationship, and the four separate domains were evaluated in a sensitivity analysis. Other patient characteristics included age, education, income, partner status, and race. Patient chronic comorbidities were assessed using International Classification of Diseases, Ninth Revision (ICD-9) codes, as described by the Department of Veterans Affairs Health Economics Resource Center.⁴² Provider

characteristics were obtained through the baseline provider survey and included gender and provider type (physician, nurse practitioner, or physician assistant). Time since the last primary care visit was assessed through review of electronic medical records.

Data Analysis

We first examined patterns of concordance to determine how often patients and providers prioritized the same health condition, and how often a provider's list included the patient's top priority and vice versa. We then examined associations between the independent variables and patient-provider concordance using ordinal logistic regression. The proportional odds assumption for the dependent variable was tested using a likelihood ratio test and the Brant test.⁴³ Standard errors were adjusted to account for within-provider clustering effects using the Huber-White sandwich estimator.⁴⁴ Using the ordinal logistic model, we calculated cumulative probabilities of concordance (for a concordance score <3 and ≥3), holding other covariates at their mean value in order to present the effect of independent variables on concordance. Standard errors for the predicted probability of a concordance score were calculated using the delta method.⁴⁵ Multiple imputation by chained equations was used to impute missing values in the dataset.⁴⁶ All analyses were performed using Stata 10. (StataCorp 2007, Stata Statistical Software: Release 10. College Station, TX: StataCorp LP).

RESULTS

Patient and Provider Characteristics

Of the 1,056 patients who completed a survey, 1,028 (97%) ranked their three most important health concerns. Of these, 24 patients (2%) were excluded from the final regression because they wrote in concerns but did not rank any of the nine health conditions listed in the survey. These patients' responses are included in a summary of all write-in responses in the [Appendix](#). Table 1 lists the characteristics of the remaining 1,004 patients and the 92 providers included in the final analysis. The mean patient age was 65 (SD 11), and the population was predominantly Caucasian (77%). The mean number of health conditions extracted from ICD-9 codes was 8 (SD 3).

Most Important Health Concerns to Patients and Providers

For 714 (72%) pairs, the patient's most important concern was ranked somewhere in the provider's list of three conditions. Table 2 shows the frequency with which each health condition was ranked by patients as an important concern and by providers as a condition likely to affect the patient's health outcomes. Overall, 45 (4%) patient-provider pairs did not have any matching health concerns, 251 (25%) pairs had 1 match, 551 (55%) pairs had 2 matches, and 157 (16%) pairs had 3 matches.

Both patients and providers ranked diabetes and hypertension most frequently in their list of the three most important health concerns for the patient (Table 2). However, although providers ranked hypertension as the most important health

Table 2. Most Important Patient Health Conditions, According to Patients and Their Providers

	According to patients		According to providers	
	Most important n (%)	Among three most important n (%)	Most important n (%)	Among three most important n (%)
Diabetes/glycemic control	489 (49)	866 (86)	344 (34)	868 (86)
Hypertension	184 (18)	756 (75)	384 (38)	876 (87)
Weight	67 (7)	351 (35)	51 (5)	206 (21)
High cholesterol	63 (6)	277 (28)	20 (2)	311 (31)
Pain/discomfort	61 (6)	250 (25)	36 (4)	137 (14)
CHF/other heart disease	48 (5)	156 (16)	45 (4)	122 (12)
Pulmonary problems	40 (4)	102 (10)	15 (1)	38 (4)
Depression/anxiety/mood	22 (2)	82 (8)	8 (1)	50 (5)
Tobacco use	13 (1)	70 (7)	13 (1)	49 (5)
Other health concern	17 (2)	51 (5)	86 (9)	305 (30)

condition for 384 (38%) patients, only 184 (18%) patients listed hypertension as their most important health concern. Patients were more likely than providers to list “losing weight or being more active” in their top three concerns (35% vs. 21%, respectively). “Other health concern” was ranked among the top three concerns 51 times by patients and 305 times by providers. There were 26 and 326 write-in responses contributed by patients and providers, respectively (Appendix).

Three of the listed health conditions (pain, depression/anxiety, and breathing/pulmonary problems) were considered “symptomatic.” Patients were more likely than providers to rank these conditions as their most important concern and as one of their three most important concerns (Table 2). Even when a patient listed one of these conditions as their most important concern, these conditions were frequently not ranked in the top three by the patient’s provider. For example, of the 22 patients who listed “feeling less blue, down, or anxious” as their most important health concern, only two had a provider who ranked the corresponding “depression, anxiety, mood disorders” as one of the three conditions most likely to affect health outcomes for the patient. Similarly, of the 62 patients who listed “relieving pain or discomfort” as their most important health concern, only 20 had a provider who ranked “pain or physical discomfort” in their list of three conditions likely to affect the patient’s health outcomes.

Patient and Provider Characteristics Associated with Patient-Provider Concordance

Six hundred five (60%) patient-provider pairs had high concordance (concordance score ≥3), meaning that the patient’s provider ranked the same three health concerns as the patient, or that the provider ranked two of the same health concerns as the patient and that these two included the patient’s most important concern (Table 3).

Ordinal logistic regression revealed that the predicted probability of patient-provider concordance decreased significantly when a patient reported having non-health competing demands (46% vs. 62%, p<0.01) and when a patient reported

Table 3. Factors Associated with Patient-Provider Concordance

	Total patients n (%)	Predicted probability of concordance ≥3% (95% CI) ^c	Adjusted P-value
Health status			
Excellent to good	611 (61)	64 (60–68)	<0.01
Fair to poor	390 (39)	55 (49–60)	
Competing demands (more pressing than health)			
Str. disagree/disagree	866 (89)	62 (59–66)	<0.01
Str. agree/agree/neutral	113 (11)	46 (38–55)	
Pain and depression ^b			
None/low	259 (26)	64 (59–70)	0.12
Moderate	571 (57)	60 (57–64)	
High	174 (17)	56 (49–63)	
Patient-provider relationship	1,045	61 (57–64)	0.65
		61 (57–66) ^a	
Age			
Mean 65	1,048	61 (57–64)	0.27
		59 (54–63) ^a	
Education			
Less than high school	165 (17)	62 (57–68)	0.49
High school/GED	372 (37)	61 (58–64)	
Trade school/college	461 (46)	60 (55–64)	
Income			
<\$10,000	168 (18)	61 (56–67)	0.78
\$10,000–\$40,000	676 (72)	60 (57–64)	
>\$40,000	96 (10)	60 (53–66)	
Partner status			
Not in relationship	371 (37)	55 (50–60)	<0.01
Married or in relationship	624 (63)	64 (60–68)	
Race			
Caucasian	760 (77)	62 (58–65)	0.21
Not Caucasian, including Hispanic	233 (23)	57 (50–63)	
Time since last PCP visit			
Mean 98 days	1,125	61 (58–64)	0.10
		59 (54–63) ^a	
No. of health conditions			
Mean 8	1,004	61 (57–64)	<0.01
		56 (51–61) ^a	
Provider gender			
Female	50 (54)	51 (41–60)	<0.05
Male	42 (46)	58 (53–62)	
Provider type			
Physician	64 (70)	61 (58–65)	0.47
PA/NP	28 (30)	59 (53–65)	

^aChange in predicted probability of concordance as continuous independent variable varies from median to one standard deviation above median

^bHigh score signifies pain and depression; moderate score signifies pain and no depression or moderate/severe depression and no pain; low score signifies mild depression and no pain

^cPredicted probability results reflect cumulative probabilities of a concordance score <3 and a concordance score ≥3, holding other covariates at their mean value

having poor health status (55% vs. 64%, p<0.01). A nonsignificant trend toward decreased concordance was also seen in patients with both pain and depression, compared with those who had only mild depressive symptoms or neither pain nor depression (56% vs. 64%, p=0.12). In a sensitivity analysis, we examined a model with pain alone and a model with depression alone. Both models showed nonsignificant trends toward decreased concordance when either condition was present (58% vs. 63%, p=0.12 for pain; 57% vs. 62%, p=0.46 for depression), with the results for pain remaining unchanged when we adjusted the model for opioid use (results not shown).

The predicted probability of concordance was higher for patients with fewer health conditions ($p < 0.01$). The only other patient characteristic that was associated with greater concordance was being married or in a relationship ($p < 0.01$). Patients also had an increased likelihood of concordance with their provider if their provider was male ($p < 0.05$). There was no significant association between our measure of the patient-provider relationship and patient-provider concordance. The four domains of this measure (trust, communication quality, interpersonal treatment, and knowledge of the patient) were examined separately in a sensitivity analysis, and no association between any of these domains and concordance was seen.

DISCUSSION

In this study of multimorbid diabetic patients with elevated blood pressure in primary care clinic, we found that patients' most important health concerns frequently matched the conditions that their providers ranked as most likely to affect these patients' health outcomes. The probability of concordance, however, was significantly lower for patients with poorer health status and those with non-health competing demands, even after controlling for the patient's comorbidity count.

There are several possible explanations why patient-provider concordance is lower when patients have poor health or other non-health competing demands. One scenario is that this discordance reflects a breakdown in communication. For example, the provider may not fully recognize how the patient's health conditions and non-health concerns are affecting his health and well-being, or the provider might not effectively communicate to the patient the morbidity and mortality risks of his conditions. This explanation, if true, would be troubling because several studies have demonstrated an association between effective patient-provider communication and a multitude of positive patient-centered and clinical outcomes.^{4,15-17} However, when we adjusted our model for the patient's assessment of the quality of the patient-provider relationship, the association between our main independent variables and concordance remained unchanged.

A second scenario is that patients with poor health or non-health competing demands may be more likely to face functional limitations, financial stress, and other barriers to care, and are therefore more likely to prioritize a symptomatic condition that is exacerbating these existing challenges. Providers of these patients, meanwhile, may focus on the long-term health consequences of asymptomatic hypertension or uncontrolled diabetes. While both sets of priorities are valid, previous studies suggest that poor health status and non-health competing demands may interfere with self-management of diabetes as well as productive clinic-based management decisions and processes.^{5,6,30,47} If patients and providers disagree on the importance they ascribe to a patient's different health conditions, this discordance may intensify barriers to self-management and clinical decision-making for that patient.

We observed several notable patterns in the patient- and provider-ranked lists. While diabetes and hypertension were ranked highly by the majority of patients and providers, providers were far more likely to rank hypertension as the most important health concern for the patient (38% vs. 18%). This is consistent with previous findings that many diabetic

patients are unaware of the importance of blood pressure control despite evidence and guidelines that emphasize the critical importance of this issue.⁴⁸⁻⁵² Patients, in contrast, were modestly but consistently more likely than providers to rank weight loss and symptomatic concerns such as pain, depression, and breathing problems among their top three concerns. Strikingly, very few of the patients who listed pain or depression as their top health concern had a provider who ranked these conditions as likely to affect the patient's health outcomes (9% and 32%, respectively). This discordance is concerning, not only because it raises the possibility that providers are unaware of the extent to which these conditions affect their patients, but also because pain and depression can be barriers to effective diabetes self-management,^{7,8} and (in the case of depression) may worsen glycemic control and increase the risk of mortality.^{53,54} Therefore, it is plausible that by deemphasizing symptomatic conditions, providers are actually neglecting some of the most important medical concerns that are likely to affect health outcomes in these patients.

There are several limitations to this study that should be noted. First, we set out to measure the degree to which the patient and provider had a shared set of priorities about the most important problems facing the patient. Thus, our concordance score does not explicitly measure the somewhat different concept of which conditions providers thought the patient would have prioritized. This latter concept is also of interest and merits additional research. Second, all enrolled patients and providers were aware that this was a study of diabetic patients, and patients and providers were filling out their surveys after the patient had an elevated blood pressure in triage. Not surprisingly, a majority of both patients and providers ranked diabetes and hypertension among the top three health conditions affecting the patient. This limited our ability to fully evaluate concordance patterns among other health conditions. Finally, patients and providers ranked "other health concern" in 5% and 30% of instances, respectively. Write-in responses were assessed qualitatively to better understand the health conditions that most frequently take a patient and provider's time and attention away from diabetes and hypertension. These responses, summarized in the [Appendix](#), suggest that the most common other concerns listed by providers were unlisted chronic conditions such as renal disease and cancer, and issues related to medication adherence. Only 26 write-in responses were contributed by patients (vs. 326 by providers), so we were unable to assess concordance using these data. Of the 26 write-in responses from patients, only two (cancer and memory loss) matched write-in responses of the corresponding provider. Therefore, for the purposes of our multivariate analysis, we only used the listed nine conditions to determine patient-provider matches. While this may have inflated the frequency of concordance because participants were constrained by a limited number of choices, it likely did not influence our other results because we adjusted our analyses for total number of conditions.

While previous work has focused extensively on patient-provider concordance regarding a patient's presenting complaint,^{28,29,31} to our knowledge this is the first study to evaluate patient-provider concordance regarding priority given to the chronic health conditions of multimorbid patients. Although we did not assess the influence of this concordance on patient-centered and clinical outcomes, previous studies in

the setting of acute conditions have found an association between higher patient-provider concordance and symptom resolution, improvement in mental health and function, and retention in outpatient care.^{19,20,55} Our finding that patients with poor health status are less likely to share priorities with their provider is thus concerning, as poor health status has been associated with increased risk of mortality,^{35,38} and this population is therefore one in which effective communication and shared understanding of priorities are likely to be critical in developing goals of care and treatment strategies.⁵⁶

In conclusion, diabetes patients with multimorbidity and their primary care providers often agree on the most important health conditions affecting these patients' health. Our findings, however, reinforce the need for heightened provider recognition of patients' symptomatic conditions as well as their non-health competing demands. Fortunately, there is growing evidence that interventions can increase provider awareness about patient concerns and priorities,⁵⁷⁻⁵⁹ and that patient-centered approaches can improve diabetes self-management in the face of multimorbidity and other competing demands.^{60,61} Future research should focus on how best to encourage and implement these practices in primary care in order to optimize chronic disease management in this vulnerable population.

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REFERENCES

- Partnership For Solutions. Diabetes: The impact of multiple chronic conditions. http://www.partnershipforsolutions.org/DMS/files/Diabetes_Common_Comorbidities_Fact_Sheet.doc. Accessed August 15, 2009.
- Struijs JN, Baan CA, Schellevis FG, Westert GP, van den Bos GA. Comorbidity in patients with diabetes mellitus: impact on medical health care utilization. *BMC Health Serv Res*. 2006;6:84.
- Wolff JL, Starfield B, Anderson G. Prevalence, expenditures, and complications of multiple chronic conditions in the elderly. *Arch Intern Med*. 2002;162(20):2269-2276.
- Schoenthaler A, Chaplin WF, Allegrante JP, et al. Provider communication effects medication adherence in hypertensive African Americans. *Patient Educ Couns*. 2009;75(2):185-191.
- Kerr EA, Heisler M, Krein SL, et al. Beyond comorbidity counts: how do comorbidity type and severity influence diabetes patients' treatment priorities and self-management? *J Gen Intern Med*. 2007;22(12):1635-1640.
- Krein SL, Hofer TP, Holleman R, Piette JD, Klamerus ML, Kerr EA. More than a pain in the neck: how discussing chronic pain affects hypertension medication intensification. *J Gen Intern Med*. 2009;24(8):911-916.
- Krein SL, Heisler M, Piette JD, Makki F, Kerr EA. The effect of chronic pain on diabetes patients' self-management. *Diabetes Care*. 2005;28(1):65-70.
- Ciechanowski PS, Katon WJ, Russo JE. Depression and diabetes: impact of depressive symptoms on adherence, function, and costs. *Arch Intern Med*. 2000;160(21):3278-3285.
- Egede LE, Zheng D, Simpson K. Comorbid depression is associated with increased health care use and expenditures in individuals with diabetes. *Diabetes Care*. 2002;25(3):464-470.
- Abbo ED, Zhang Q, Zelder M, Huang ES. The increasing number of clinical items addressed during the time of adult primary care visits. *J Gen Intern Med*. 2008;23(12):2058-2065.
- Fung CH, Setodji CM, Kung FY, et al. The relationship between multimorbidity and patients' ratings of communication. *J Gen Intern Med*. 2008;23(6):788-793.
- Ostbye T, Yarnall KS, Krause KM, Pollak KI, Gradison M, Michener JL. Is there time for management of patients with chronic diseases in primary care? *Ann Fam Med*. 2005;3(3):209-214.
- Piette JD, Kerr EA. The impact of comorbid chronic conditions on diabetes care. *Diabetes Care*. 2006;29(3):725-731.
- Boyd CM, Darer J, Boulton C, Fried LP, Boulton L, Wu AW. Clinical practice guidelines and quality of care for older patients with multiple comorbid diseases: implications for pay for performance. *JAMA*. 2005;294(6):716-724.
- Kaplan SH, Greenfield S, Ware JE Jr. Assessing the effects of physician-patient interactions on the outcomes of chronic disease. *Med Care*. 1989;27(3 Suppl):S110-127.
- Stewart M, Brown JB, Donner A, et al. The impact of patient-centered care on outcomes. *J Fam Pract*. 2000;49(9):796-804.
- Stewart MA. Effective physician-patient communication and health outcomes: a review. *Can Med Assoc J*. 1995;152(9):1423-1433.
- Street RLJ, Makoul G, Arora NK, Epstein RM. How does communication help? Pathways linking clinician-patient communication to health outcomes. *Patient Educ Couns*. 2009;74(3):295-301.
- Bass MJ, Buck C, Turner L, Dickie G, Pratt G, Robinson HC. The physician's actions and the outcome of illness in family practice. *J Fam Pract*. 1986;23(1):43-47.
- Chesney AP, Brown KA, Poe CW, Gary HE Jr. Physician-patient agreement on symptoms as a predictor of retention in outpatient care. *Hosp Community Psychiatry*. 1983;34(8):737-739.
- Starfield B, Steinwachs D, Morris I, Bause G, Siebert S, Westin C. Patient-doctor agreement about problems needing follow-up visit. *JAMA*. 1979;242(4):344-346.
- Starfield B, Wray C, Hess K, Gross R, Birk PS, D'Luogoff BC. The influence of patient-practitioner agreement on outcome of care. *Am J Public Health*. 1981;71(2):127-131.
- Krupat E, Bell RA, Kravitz RL, Thom D, Azari R. When physicians and patients think alike: patient-centered beliefs and their impact on satisfaction and trust. *J Fam Pract*. 2001;50(12):1057-1062.
- Roter D. The enduring and evolving nature of the patient-physician relationship. *Patient Educ Couns*. 2000;39(1):5-15.
- Street RL Jr, Gordon HS, Ward MM, Krupat E, Kravitz RL. Patient participation in medical consultations: why some patients are more involved than others. *Med Care*. 2005;43(10):960-969.
- Bell RA, Kravitz RL, Thom D, Krupat E, Azari R. Unmet expectations for care and the patient-physician relationship. *J Gen Intern Med*. 2002;17(11):817-824.
- Zebienne E, Svab I, Sapoka V, et al. Agreement in patient-physician communication in primary care: a study from Central and Eastern Europe. *Patient Educ Couns*. 2008;73(2):246-250.
- Boland BJ, Scheitel SM, Wollan PC, Silverstein MD. Patient-physician agreement on reasons for ambulatory general medical examinations. *Mayo Clin Proc*. 1998;73(2):109-117.
- Greer J, Halgin R. Predictors of physician-patient agreement on symptom etiology in primary care. *Psychosom Med*. 2006;68(2):277-282.
- Heisler M, Vijan S, Anderson RM, Ubel PA, Bernstein SJ, Hofer TP. When do patients and their physicians agree on diabetes treatment goals

- and strategies, and what difference does it make? *J Gen Intern Med.* 2003;18(11):893–902.
31. **Scheuer E, Steurer J, Buddeberg C.** Predictors of differences in symptom perception of older patients and their doctors. *Fam Pract.* 2002;19(4):357–361.
 32. **Sewitch MJ, Abrahamowicz M, Dobkin PL, Tamblyn R.** Measuring differences between patients' and physicians' health perceptions: the patient-physician discordance scale. *J Behav Med.* 2003;26(3):245–264.
 33. **Stewart MA, McWhinney IR, Buck CW.** The doctor/patient relationship and its effect upon outcome. *J R Coll Gen Pract.* 1979;29(199):77–81.
 34. **Kerr EA, Zikmund-Fisher BJ, Klamerus ML, Subramanian U, Hogan MM, Hofer TP.** The role of clinical uncertainty in treatment decisions for diabetic patients with uncontrolled blood pressure. *Ann Intern Med.* 2008;148(10):717–727.
 35. **DeSalvo KB, Bloser N, Reynolds K, He J, Muntner P.** Mortality prediction with a single general self-rated health question: a meta-analysis. *J Gen Intern Med.* 2005;20:267–275.
 36. **DeSalvo KB, Fisher WP, Tran K, Bloser N, Merrill W, Peabody J.** Assessing measurement properties of two single-item general health measures. *Qual Life Res.* 2006;15(2):191–201.
 37. **Eriksson I, Unden AL, Elofsson S.** Self-rated health. Comparisons between three different measures. Results from a population study. *Int J Epidemiol.* 2001;30(2):326–333.
 38. **Mossey JM, Shapiro E.** Self-rated health: a predictor of mortality among the elderly. *Am J Public Health.* 1982;72(8):800–808.
 39. **Corson K, Gerrity MS, Dobscha SK.** Screening for depression and suicidality in a VA primary care setting: two items are better than one item. *Am J Manag Care.* 2004;10(11 Pt 2):839–845.
 40. **Bair MJ, Robinson RL, Katon W, Kroenke K.** Depression and pain comorbidity: a literature review. *Arch Intern Med.* 2003;163(20):2433–2445.
 41. **Safran DG, Kosinski M, Tarlov AR, et al.** The Primary Care Assessment Survey: tests of data quality and measurement performance. *Med Care.* 1998;36(5):728–739.
 42. **Yu W, Ravelo A, Wagner TH, et al.** Prevalence and costs of chronic conditions in the VA health care system. *Med Care Res Rev.* 2003;60(3 Suppl):146S–167S.
 43. **Long JS, Freese J.** *Regression Models for Categorical Outcomes Using Stata.* 2nd ed. College Station: Stata Press; 2005.
 44. **Rogers WH.** Regression standard errors in clustered samples. *Stata Tech Bull.* 1993;13:19–23.
 45. **Oehlert GW.** A note on the delta method. *Am Stat.* 1992;46:27–29.
 46. **Carlin JB, Galati JC, Royston P.** A new framework for managing and analyzing multiply imputed data in Stata. *Stata J.* 2008;8:49–67.
 47. **Parchman ML, Pugh JA, Romero RL, Bowers KW.** Competing demands or clinical inertia: the case of elevated glycosylated hemoglobin. *Ann Fam Med.* 2007;5(3):196–201.
 48. **Berlowitz DR, Ash AS, Hickey EC, Glickman M, Friedman R, Kader B.** Hypertension management in patients with diabetes: the need for more aggressive therapy. *Diabetes Care.* 2003;26(2):355–359.
 49. **Hansson L, Zanchetti A, Carruthers SG, et al.** Effects of intensive blood-pressure lowering and low-dose aspirin in patients with hypertension: principal results of the Hypertension Optimal Treatment (HOT) randomised trial. HOT Study Group. *Lancet.* 1998;351(9118):1755–1762.
 50. **Snow V, Weiss KB, Mottur-Pilson C.** The evidence base for tight blood pressure control in the management of type 2 diabetes mellitus. *Ann Intern Med.* 2003;138(7):587–592.
 51. **Subramanian U, Hofer TP, Klamerus ML, Zikmund-Fisher BJ, Heisler M, Kerr EA.** Knowledge of blood pressure targets among patients with diabetes. *Prim Care Diabetes.* 2007;1(4):195–198.
 52. **Wong N, Wang SS, Lamoureux E, et al.** Blood pressure control and awareness among patients with diabetes and hypertension attending a tertiary ophthalmic clinic. *Diabet Med.* 2009;26(1):34–39.
 53. **Katon WJ, Rutter C, Simon G, et al.** The association of comorbid depression with mortality in patients with type 2 diabetes. *Diabetes Care.* 2005;28(11):2668–2672.
 54. **Lustman PJ, Anderson RJ, Freedland KE, de Groot M, Carney RM, Clouse RE.** Depression and poor glycemic control: a meta-analytic review of the literature. *Diabetes Care.* 2000;23(7):934–942.
 55. **Staiger TO, Jarvik JG, Deyo RA, Martin B, Braddock CH 3rd.** BRIEF REPORT: patient-physician agreement as a predictor of outcomes in patients with back pain. *J Gen Intern Med.* 2005;20(10):935–937.
 56. **Schoenberg NE, Leach C, Edwards W.** "It's a toss up between my hearing, my heart, and my hip": prioritizing and accommodating multiple morbidities by vulnerable older adults. *J Health Care Poor Underserved.* 2009;20(1):134–151.
 57. **Glasgow RE, Nutting PA, King DK, et al.** Randomized effectiveness trial of a computer-assisted intervention to improve diabetes care. *Diabetes Care.* 2005;28(1):33–39.
 58. **Greenfield S, Kaplan S, Ware JE Jr.** Expanding patient involvement in care. Effects on patient outcomes. *Ann Intern Med.* 1985;102(4):520–528.
 59. **Liaw ST, Young D, Farish S.** Improving patient-doctor concordance: an intervention study in general practice. *Fam Pract.* 1996;13(5):427–431.
 60. **Schillinger D, Handley M, Wang F, Hammer H.** Effects of self-management support on structure, process, and outcomes among vulnerable patients with diabetes: a three-arm practical clinical trial. *Diabetes Care.* 2009;32(4):559–566.
 61. **Williams GC, Lynch M, Glasgow RE.** Computer-assisted intervention improves patient-centered diabetes care by increasing autonomy support. *Health Psychol.* 2007;26(6):728–734.

APPENDIX

"Other" health concerns included as write-in responses by patients and providers

Patient	No. of responses
Cancer	5
Eye-related	4
GI	2
GU	2
Sleep-related (includes OSA)	2
Vascular	2
Alcohol	1
All of the above	1
Dental	1
More than one chronic health problem	1
Cognitive	1
Lowering my potassium	1
Parkinson	1
Physical limitations and diet for one problem	1
conflict with other health problems	1
Polio	1
Total	26

Provider	No. of responses
Renal	41
Compliance	38
GI-related	28
GU	16
Cancer	15
PVD, vascular	15
Alcohol	14
Medication related	12
Foot care, foot issues, leg ulcers, BKA, neuropathy	10
Preventive care, maintenance, screening	9
Skin-related	8
Hematology	6
Angina	5
ED	5
Dementia	4
Dizziness, light-headedness, fatigue	4
Stroke, TIA, cerebrovascular, CVA	4
OSA	3
Acute respiratory conditions (i.e., URI, cough)	3
Eye-related	2
Hearing	2
Other	82
Total	326