Mental Health Screening Results Associated with Women Veterans' Ratings of Provider Communication, Trust and Care Quality

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ABSTRACT

Background

Identifying factors influencing patient experience and communication with their providers is crucial for tailoring comprehensive primary care for women Veterans within the Veterans Health Administration (VA). In particular, the impact of mental health (MH) conditions that are highly prevalent among women Veterans is unknown.

Methods

From January to March 2015, we conducted a cross-sectional survey of women Veterans with three or more primary care and/or women's health visits in the prior year at 12 VA sites. Patient measures included ratings of provider communication, trust in provider, and care quality; demographics, health status, healthcare utilization; and brief screeners for symptoms of depression, anxiety and posttraumatic stress disorder. We used multivariate models to analyze associations of patient ratings and characteristics.

Results

Among the 1,395 participants, overall communication ratings were high, but significant variations were observed among women screening positive for MH conditions. In multivariate models, high communication ratings were less likely among women screening positive for multiple MH conditions compared to patients screening negative (OR=0.43; P<0.001). High trust in their provider and high care ratings were significantly less likely among women with positive MH screens. Controlling for communication, the effect of MH on trust and care ratings became less significant, whereas the effect of communication remained highly significant.

Conclusions

Women Veterans screening positive for MH conditions were less likely to give high ratings for provider communication, trust and care quality. Given the high prevalence of MH comorbidity among women Veterans, it is important to raise provider awareness about these differences, and to enhance communication with patients with MH symptoms in primary care.

INTRODUCTION

Effective patient-provider communication contributes to patient trust in their provider and experience with care, both of which have been shown to improve treatment adherence and health outcomes (Anhang Price et al., 2014; Epstein & Street, 2007; Kaplan, Greenfield, & Ware, 1989; Street, 2013; Street, Makoul, Arora, & Epstein, 2009). Taken together, these findings suggest that patient-provider communication may mediate the relationship of patient factors with trust in provider and patient experience. On this basis, identifying patient factors associated with provider communication is an essential step for tailoring care to specific groups of patients, as it may provide guidance to improve care and health outcomes. There is evidence that patient health is a strong determinant of patient-provider communication, and poorer MH and physical health (PH) are associated with patient reports of worse provider communication (Hall, Horgan, Stein, & Roter, 2002; Matthias et al., 2010). In contrast, the impact of MH multimorbidity (e.g., the coexistence of MH conditions) has not previously been investigated, to our knowledge, despite how common the co-occurrence of MH conditions is in some patient populations, in particular women Veterans (Curry, Aubuchon-Endsley, Brancu, Runnals, & Fairbank, 2014; Davis et al., 2016; Frayne et al., 2014; M. B. Stein et al., 2011).

Women Veterans constitute the fastest growing segment of new VA users (Frayne et al., 2014; Frayne et al., 2007; Yano, Haskell, & Hayes, 2014). Yet they currently represent only 9% of Veterans Health Administration (VA) users. Delivering high-quality, comprehensive primary care to women Veterans may represent a challenge for VA providers who see a low volume of female patients and may be less familiar with women Veterans' specific healthcare needs. Among VA users, women Veterans are often younger than men Veterans, and more likely to have a health condition (Frayne et al., 2014; Frayne et al., 2007; Yano et al., 2014). In particular, mental health (MH) conditions are more frequent among women Veterans, with depression,

posttraumatic stress disorder (PTSD) and anxiety disorders being the most prevalent (Frayne et al., 2014; Frayne et al., 2008). High rates of comorbidity are also observed among those three conditions (Curry et al., 2014; Davis et al., 2016; M. B. Stein et al., 2011). VA efforts to improve the delivery of comprehensive primary care for women include tailoring patient-centered approaches based on the recognition that improving quality of care hinges not only on technical skills but also on how well providers communicate during clinical encounters. Previous studies have identified provider characteristics and organizational factors associated with better communication between women Veterans and their providers (Bastian et al., 2014; Bean-Mayberry, Chang, McNeil, & Scholle, 2006; Mattocks et al., 2011; Mengeling, Sadler, Torner, & Booth, 2011; Washington, Bean-Mayberry, Mitchell, Riopelle, & Yano, 2011). In contrast, little is known about the patient factors that shape communication between women Veterans and their primary care providers.

In the present study, we evaluated the effect of patient health factors, including overall health, MH and PH, on communication between women Veterans and their VA providers. We hypothesized that, among women Veterans who are routine primary care users at VA, patients in worse health, and those with greater burden of PH and MH conditions, would be associated with poorer communication. Furthermore, we hypothesized that those patients in worse health and those with greater PH and MH burdens would report lower trust in their provider and lower care ratings, and that communication would mediate the effect of patient health on trust and care ratings.

MATERIAL AND METHODS

Study design and sample

We used data collected from the baseline survey wave of a cluster-randomized controlled trial of an evidence-based quality improvement approach to tailoring VA's medical home model

(Patient Aligned Care Teams or PACT) to the needs of women Veterans (Yano et al., 2016). Twelve VA Medical Centers distributed across nine states were recruited through the Women's Health Practice-Based Research Network (Frayne et al., 2013). Using administrative data, we randomly sampled 4,307 women Veterans who had three or more primary care or women's health encounters in the prior year (December 1, 2013 to November 30, 2014) within the 12 study sites. Eligibility was confirmed for 3,102 women Veterans, and 1,395 completed a computer-assisted telephone interview from January to March 2015 (response rate: 45%; flow chart describing the survey sampling in Appendix A). Respondents were, on average, older than the non-respondents (mean age, 52.7 [SD 13.8] versus 48.2 [SD 14.7], respectively); no difference was observed on other characteristics available for the two groups (marital status, US region, and service connected disability). The study protocol was approved by the Institutional Review Board at VA Greater Los Angeles.

Outcome variables

Our principal outcome measures included patient ratings of provider communication, trust in their provider, and care quality (Appendix B). Questions asking patients to rate provider communication, trust, and care quality were asked in reference to their main VA primary care provider identified using VA administrative data.

We measured patient ratings of provider communication using the Communication scale from the Consumer Assessment of Healthcare Providers and Systems (CAHPS®) Patient-Centered Medical Home (PCMH) survey (Cronbach's alpha, 0.88; Agency for Healthcare Research and Quality, 2015). Specifically, patients rated six communication behaviors of their main VA primary care provider on a 4-point Likert scale ("Always", "Usually", "Sometimes", "Never"). To account for a ceiling effect and following standard scoring methods (Agency for

Healthcare Research and Quality, 2015), we defined a high communication rating as the selection of "Always" on all items.

Patient trust in provider was measured using the Primary Care Assessment Survey (PCAS) 7-item Trust scale (Cronbach's alpha =0.91; Safran et al., 1998), expressed as a 0-10 score (higher score indicating higher trust). Patients rated VA care quality for overall care and primary care, respectively, on a scale of 0 (worst possible care) to 10 (best possible care; Agency for Healthcare Research and Quality, 2015; Washington et al., 2011).

Independent variables

Independent variables included health measures, patient sociodemographics, healthcare utilization, and urban/rural location. Health measures included overall health, number of PH conditions, and number of positive MH screeners. Overall health was self-reported as "poor," "fair," "good," "very good" or "excellent" (Kazis et al., 2006). The number of probable MH conditions (0-3) was established from self-administered screeners: the Patient Health Questionnaire-2 screener for depression (PHQ-2; Kroenke, Spitzer, & Williams, 2003), the Generalized Anxiety Disorder scale (GAD-2; Kroenke, Spitzer, Williams, Monahan, & Lowe, 2007), and the Posttraumatic Stress Disorder (PTSD) Checklist (PCL-2; Lang et al., 2012). Each screener includes two questions specific to core criteria of each condition, and is designed for rapid assessment in primary care. The number of PH conditions (0-3+) was based on participants' responses on a checklist of common illnesses developed for the Seattle Index of Comorbidity, used in the outpatient setting and validated within VA (diabetes, chronic lung disease, congestive heart failure, and prior occurrence of stroke, prior heart attack, cancer, and pneumonia; Fan et al., 2002).

Patient sociodemographics collected in the survey included age, race/ethnicity, marital status, education, and employment. Healthcare utilization was dichotomized as using VA as the only source of primary care versus dual use of VA and community care in the past 12 months. We included urban/rural location given prior evidence of different care structures and staffing in primary care that could influence outcomes of interest (Weeks, Yano, & Rubenstein, 2002). Rurality of the medical site was established using the VA Site Tracking database (VAST), and two of the 12 sites were categorized as rural (versus urban).

Statistical analysis

We adjusted all analyses for patient clustering within sites and probability of response using survey weights. Differences between groups were tested using Pearson's χ^2 for categorical variables. For our primary aim to examine the determinants of communication ratings, we modeled the odds of a high communication rating using logistic regression models adjusted for sociodemographics, and healthcare utilization, with the sequential addition of the three health measures (first overall health, then PH, and MH). The full model was used to separately estimate the odds of an "Always" response to individual communication items. We used the same approach to examine the odds of high trust in provider, and high ratings of care quality (on each of the two scales, a high rating being defined as a score of 9-10 versus 1-8), with and without controlling for communication ratings.

Only 6% of the respondents had missing values for at least one covariate included in the analysis, and none of the covariates had more than 1.3% missing values, except for the MH screeners (in all, 2.8% missing). Therefore, the multivariate analyses were performed on the complete cases. In addition we performed the following sensitivity analyses. To test for potential selection bias from performing the analysis on complete cases (n=1,285), we compared those

with and without missing data based on the covariates; no significant differences were detected except for education (no college education, 16.3% among complete cases versus 25.6% of cases with missing, P=0.013). We repeated the multivariate analyses on 10 imputed datasets generated with chained equations applied to all covariates (Rubin, 1987). The estimates obtained after multiple imputation were similar to those obtained using the complete cases. Insofar as MH conditions may intrinsically lower communication ratings (Schenker, Stewart, Na, & Whooley, 2009), we examined results from the models run on the subgroups of patients with at least one positive MH screener.

Throughout, values were considered significant for $P < 0.05$. Analyses were conducted in STATA 13 (Stata Corp., College Station, TX).

RESULTS

Characteristics of the 1,395 participants are presented in Table 1. Half of the sample (n=671) screened positive, with 18% for one condition, 14% for two, and 16% for all three MH conditions (Figure 1).

Overall, 50% of women Veterans rated their providers' communication ratings highly. Considering specific provider behaviors, 64% indicated that their primary care provider always knew their medical history; 72% indicated that they always received easy to understand information, and 79% reported receiving clear explanations. In addition, most women reported that their providers always provided enough time, showed a respectful attitude and listened carefully (75%, 78% and 83% of the respondents, respectively).

Patients giving high communication ratings reported better overall health (percentage of patients reporting good-to-excellent health, 68% versus 56% among those giving lower ratings; $P < 0.001$). The percentage of negative MH screens was significantly higher among patients

giving high communication ratings (58% versus 39% among those giving lower ratings; P <

0.001). The number of PH conditions, however, was not associated with communication ratings

(P=0.52). Patients receiving care at VA only were more likely to give high communication

ratings compared to dual users of VA and non VA care (67% vs 57%; P < 0.001). We observed

no significant association of communication with age, race/ethnicity, marital status, education, or

employment. Most participants reported having high trust in their provider (63% with 9-10

scores). High care ratings were more frequent for primary care (64%) than for overall VA care

(50%). The proportions of women with high trust scores and high care ratings were significantly

greater among those with high communication ratings (Figure 2).

Relationship of health status and communication ratings

We examined the relationship of communication ratings with patient characteristics using a

series of multivariate logistic models adjusted for overall health with the sequential additions of

PH conditions, and MH positive-screens (Table 2). In the first model, controlling for

sociodemographics, healthcare utilization and overall health, older age was positively associated

with the odds of high communication ratings, and patients in poorer overall health were less

likely to give high ratings. In the second model, we added the number of PH conditions, which

was not significantly associated with communication ratings (Table 2, Model 2). Finally, in the

full model (Table 2, Model 3), screening positive for MH conditions was significantly associated

with communication, while the association with overall health was no longer significant. High

communication ratings were less likely as the number of positive MH screeners increased:

specifically, the odds of a high communication rating were 45% lower for participants screening

positive for one or two MH conditions compared to those screening negative (P =0.023 and

0.005, respectively; Table 2), and 57% lower for those screening positive for all three MH conditions (P =0.0001).

To examine if the association of positive MH screeners and communication ratings related to specific provider communication behaviors, we estimated separately the odds that a patient would answer "Always" to individual items of the scale using the set of covariates from Model 3. For each communication behavior, the odds of an "Always" response was significantly lower for women screening positive for all three screeners (ORs ranging from 0.31 to 0.46; all P<.05, Table 3).

Relationship of positive mental health screens and communication ratings with trust and care quality ratings

In multivariate models, patients screening positive for all three MH conditions were significantly less likely to report high trust and high care ratings (Table 4, model series 1). In models adjusted for communication (Table 4, model series 2), the effect of screening positive for MH conditions remained significant for those with three positive screeners but the effect was attenuated compared with the model without communication ratings. Furthermore, better communication was positively associated with trust and both care ratings (P < 0.001; Table 4).

DISCUSSION

To our knowledge, this is the first study to investigate patient factors associated with patient-provider communication among women Veterans. We found that positive screens for mental health conditions were associated with how women rated their providers' communication. We also found that how women Veterans perceived their providers' communication was positively associated with their trust in that provider and how they rated their care quality.

Our study also illustrates that a high proportion of women Veterans screen positive for MH conditions among routine users of VA primary care and women's health care. Half of the women screened positive for at least one condition among PTSD, depression, and/or anxiety. While MH screeners do not reflect diagnostic rates, the prevalence of positive screens in this sample is comparable to rates established from diagnoses. Nearly 45% of women Veterans treated at VA in 2012 had been diagnosed with at least one MH condition, with depression, PTSD and anxiety disorder being the most common (Frayne et al., 2014). Prior studies of patients with MH conditions have identified high comorbidity rates among the three conditions (Curry et al., 2014; Davis et al., 2016; M. B. Stein et al., 2011). Our study highlights that positive MH screens may be useful not only for detection and diagnosis but for signaling different perspectives on how their primary care providers communicate, an effect that has not been examined before despite high prevalence in this population. Our study also brings a new contribution to the field of patient-provider communication by showing that MH multimorbidity has a greater negative association on communication compared with single MH conditions. Previous studies have shown that patients with depression are more likely to report poor communication with their providers (Rutten, Augustson, & Wanke, 2006; Schenker et al., 2009), and communication ratings were found to be lower among patients with multiple chronic conditions, and among patients with both a chronic physical illness and mental comorbidity (Fung et al., 2008; Green, Rothman, & Cavanaugh, 2012; Jonassaint et al., 2013; Schenker et al., 2009). Yet the mechanisms underlying these associations are still unclear. Disease burden may complicate conversations due to time constraints in visits, or to differences in perspectives of patient and providers in prioritizing health issues (Hall et al., 2002; Matthias et al., 2010). Other reports have found a direct relationship between patient health and physician behaviors, with providers feeling less comfortable communicating with patients in worse physical health (Fung et al.,

2008; Keller, Gangnon, & Witt, 2013; Rutten et al., 2006). Our analysis of ratings for individual communication behaviors showed that the lowest patient ratings were observed for provider's knowledge of patient medical history, which was not expected given VA's electronic medical record. Among patients screening positive for MH conditions, we identified the largest gaps in providers' listening skills, respectful attitude, and clarity of explanations. Those results point to specific provider behaviors that may be amenable to training and sensitivity to patients' information and interaction needs.

Our study was guided by conceptual frameworks for patient-centered communication that link communication to health outcomes through indirect pathways, including provider trust, and patient experience (Kaplan et al., 1989; Street et al., 2009). There is strong empirical evidence for the existence of those pathways, and that effective communication increases trust (Gordon, Pugach, Berbaum, & Ford, 2014; Gordon, Street, Sharf, Kelly, & Souchek, 2006) and improves patient experience of care (Boissy et al., 2016; Carlin, Christianson, Keenan, & Finch, 2012). In turn, those factors promote adherence to treatment (Zolnierek & Dimatteo, 2009) and self-management, all together contributing to better health outcomes (Safran, Montgomery, Chang, Murphy, & Rogers, 2001). Conversely, poor communication may reduce patients' engagement in care, limit information exchange and prevent disclosure, and result in patients' having insufficient knowledge of their diseases, thereby compromising efforts to attain self-management (Dorflinger, Kerns, & Auerbach, 2013; Heisler, Bouknight, Hayward, Smith, & Kerr, 2002; Lederer et al., 2015; Slatore, Golden, Ganzini, Wiener, & Au, 2015). In our study, we add new information on the contribution of MH symptomatology to how patients perceive and rate their providers' communication that may be helpful in explaining prior studies of women Veterans' MH care experiences and outcomes. For instance, poor communication and lower trust are known predictors of patient's failure to follow provider's recommendations, which could explain

the lower use of preventive services among women with PTSD or depression (Weitlauf et al., 2013; Yee et al., 2011). Gaps in communication and trust could also prevent disclosure of risky behaviors, such as substance use or alcohol misuse, that are prevalent among women Veterans with MH comorbidities (Abraham, Lewis, Drummond, Timko, & Cucciare, 2016; Cucciare et al., 2016). More research is needed to understand how these communication gaps may contribute to missed opportunities for preventive care and/or behavioral health care among routine primary care patients. This is an important issue because of the elevated risk of future health problems among those patients (Cohen et al., 2012; Nazarian, Kimerling, & Frayne, 2012).

In addition to patient factors, we add to the general knowledge of factors associated with high ratings of provider communication among women Veterans (Bastian et al., 2014; Bean-Mayberry, Chang, McNeil, et al., 2006; Mengeling et al., 2011; Washington et al., 2011). We observed better communication ratings and care ratings among patients receiving care at VA only compared to those receiving dual VA/non-VA care. This result is in line with the findings from the National Survey of Women Veterans (Washington, Farmer, Mor, Canning, & Yano, 2015), and may reflect the effect of continuity of care, and longer relationships with their providers (Bastian et al., 2014; Bean-Mayberry, Chang, & Scholle, 2006; Katz, McCoy, & Sarrazin, 2014). VA plans to substantially expand Veterans' access to community care, which may have unintended consequences for patients' ratings of provider communication, trust and care quality moving forward.

As a result, our findings raise questions regarding the care of patients with positive MH screens outside VA. A majority of women Veterans nationally receive care in the community, with only 22% of all women Veterans receiving care at VA in 2015 (National Center for Veterans Analysis and Statistics, 2017). While the quality of communication between women

Veterans and their non-VA providers was not assessed in this study, it will be important to evaluate if similar associations exist between MH status and quality of patient-provider communication for women Veterans who are not VA users. This is important because primary care providers outside VA may not be familiar with women Veterans' characteristics and specific healthcare needs, and may not deploy MH screeners as routinely as occurs in VA settings. Furthermore, over the past decades, primary care providers have increasingly played a major role in the diagnosis and treatment of common MH conditions, and primary care is the sole source of MH care for most patients outside the VA system (R. Kessler & Stafford, 2008; Petterson, Miller, Payne-Murphy, & Phillips, 2014). Yet the quality of MH care in primary care is suboptimal, with high rates of underdiagnosis and undertreatment (Cepoiu et al., 2008; Duhoux, Fournier, Gauvin, & Roberge, 2012; M. B. Stein et al., 2011). Gaps in communication between patients with MH conditions and their primary care providers may constitute missed opportunities in the delivery of quality care (Tai-Seale, McGuire, Colenda, Rosen, & Cook, 2007). In addition, diagnosing and treating MH multimorbidity may be outside the usual comfort zone for providers by complicating the diagnosis and treatment response of individual. This issue goes well beyond the care of women Veterans. It is estimated that half of all primary care patients have MH needs, with almost 40% of patients with either depression or anxiety having both conditions (R. C. Kessler et al., 2002; D. J. Stein, 2001). And while PTSD prevalence is lower among civilians than among Veterans, about 10% of women are at risk for PTSD in their lifetime (R. C. Kessler et al., 2005). Therefore, the potential impact of MH symptoms on patients' ratings of their providers' communication in the general population is also likely large, and warrants further research to investigate whether our findings among women Veterans apply also to the general population.

Our study has both strengths and limitations. Limitations include the use of cross-sectional data that precludes addressing a causal relationship between MH screening results and communication ratings. Also, variations in time elapsed between the last visit and the interview may affect patient ratings and cause recall errors. Information on probable MH conditions were collected with screeners routinely used in primary care, and the results of screeners may not provide the same quality of information as clinical diagnoses; however, this methodology may capture conditions that may have been missing in clinical data if currently untreated. We used a list of PH conditions specifically developed for the outpatient setting and validated in a largely male VA patient population (Fan et al., 2002), which may not include other conditions more prevalent among women Veterans (Frayne et al., 2011). Sample selection bias cannot be excluded as the nonrespondents were significantly younger than respondents. We aimed to limit this potential source of bias using survey weights. The study also focused on patients' perspectives and did not document other determinants of communication quality. Strengths of the study include the use of patient-reported measures that are gold standards for capturing patient perspectives on care experiences. The large size of our sample, encompassing 12 sites within 9 states, provided access to a more diverse and representative sample of women veterans to analyze the patterns of communication with their VA providers.

IMPLICATIONS FOR PRACTICE AND POLICY

Our findings have implications both for VA and community care. We identified specific gaps that may provide an empirical foundation for provider and organizational changes. For instance, patient perception that their provider is lacking knowledge of their medical history may relate to the difficulty of providing more comprehensive care for women. The need for more time, or support, to review information before each visit may be addressed through policies

supporting smaller patient panels, or longer appointments for women Veterans, which are in place but variably implemented. In addition, the diffusion of practices, such as the integration of primary care and MH care, or the practice of routine huddles (i.e., brief clinical team meetings to review patient management issues prior to visits) already used by some VA primary care teamlets, may help in strategizing the care of more complex cases (Rodriguez, Meredith, Hamilton, Yano, & Rubenstein, 2015).

While VA already mandates annual patient screening for depression and PTSD, little is known about how providers use this information during the visit. Research is needed to promote a more effective use of information about MH status during the visit. Information from screeners performed before the visits may provide simple clues for patient identification and to initiate discussions about MH issues. Future research should assess how to best support providers in addressing the communication needs of those patients. Provider-targeted interventions could include evidence-based trainings to improve communication skills that are known to be effective in improving patient experience (Boissy et al., 2016). The use of starting points to enhance communication during visits may increase trust and disclosure; it may also provide additional opportunities for patient education. Finally, in view of our data on the prevalence of MH positive-screens in our sample, it will be important to determine whether adding a systematic screening for anxiety in addition to the screenings routinely used for depression and PTSD is warranted among women Veterans. Also, while MH screeners are not used routinely in most primary care practices outside VA, there is strong evidence for feasibility, acceptability and patient support for the use of screeners in primary care (Samuels et al., 2015; Yano et al., 2012). Research is needed to evaluate the potential benefit of systematic mental health screenings in community primary care as a tool to improve the quality of MH care in primary care.

CONCLUSIONS

Improving Veterans' trust and experience of care is a top priority at VA, and our work points to the role of provider communication in contributing to this goal in day-to-day practice. Future research should address the need for evidence-based strategies to improve provider response to the communication needs of women Veterans with MH symptoms. The relevance of our findings extends outside the VA setting as the contribution of MH symptoms to how patients rate their providers' communication is not setting-specific.

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Figure and Tables

Figure 1: Patterns of Positive Mental Health Screens among Women Veteran Primary Care Users (n=671)

Not included in the diagram, 70 cases with one or more responses missing: 41 of unknown mental health status, and 29 with at least one positive screener and unknown status for the others. PTSD, posttraumatic stress disorder.

83% PTSD+

9% PTSD+
& Depression+

14% Anxiety+
& PTSD+

6% Anxiety+
& Depression+

32 % Positive
for all three

63% Anxiety+

56% Depression+
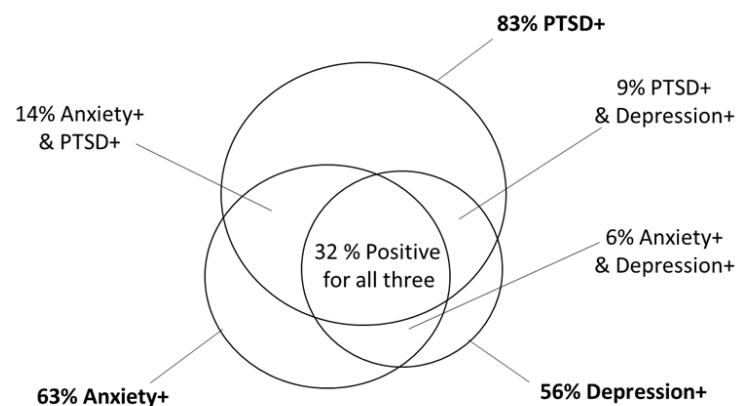
Figure 2: Association of trust in provider and care quality ratings with communication ratings

Histogram showing the proportions of patients with high ratings (values 9-10) for trust in provider, overall VA ratings and PC ratings comparing the patients who gave a high communication ratings to their provider (*white bars*) to those giving lower communication ratings (*grey bars*). Stars indicate differences between groups that are statistically significant at the 5% level.
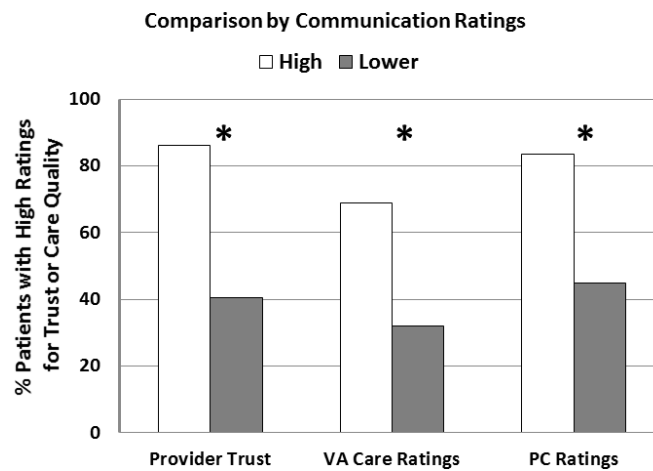
Table 1: Sociodemographics, Health Care Source, and Health Measures of the Sample

Characteristics	N (weighted %)
Socio-demographics	
Age	
18-44	370 (35%)
45-64	756 (51%)
65+	265 (15%)
Race/ethnicity	
White	855 (59%)
Black	319 (25%)
Other	203 (16%)
Marital status	
Married/partner	530 (38%)
Divorced	550 (39%)
Never married	300 (23%)
Education	
No College	252 (17%)
Some college	609 (44%)
College degree	531 (39%)
Employment	
Employed	549 (43%)
Unemployed	73 (6%)
Not looking for job	765 (52%)
Settings of care	
Source of care in past 12 months	
VA care only	867 (62%)
VA/non-VA care	528 (38%)
Rurality	
Urban	1210 (88%)
Rural	185 (12%)
Health characteristics	
Overall health	
Poor	115 (8%)
Fair	406 (29%)
Good	524 (37%)
Very good/Excellent	345 (25%)
Positive MH screeners	
0	654 (49%)
1	255 (19%)
2	196 (15%)
3	220 (17%)
Physical health conditions	
None	699 (54%)
1	398 (27%)
2	159 (10%)
3 or more	139 (8%)

N= 1395 women Veterans. Number of observations, and weighted %. Totals, or weighted percentages, may not add up to 1395, or 100%, because of missing data (less than 3% information missing for any variable) and rounding. We tested for differences in distribution between the complete cases used in multivariate analysis (n=1285) and the cases with missing data (n=110), and found no significant differences between the two groups for the variables listed here, except education (women reporting no college education, 25.6% among cases with missing versus 16.3% among complete cases, P=0.013).

Table 2: ORs for the Likelihood of High Provider Communication Ratings

	Overall health (Model 1)		Addition of physical health (Model 2)		Addition of mental health (Model 3)	
	OR	95% CI	OR	95% CI	OR	95% CI
Age, year	1.01*	(1.00 , 1.03)	1.01*	(1.00 , 1.03)	1.01	(1.00 , 1.02)
Race/Ethnicity (ref. white)						
Black	0.98	(0.66 , 1.45)	0.97	(0.66 , 1.44)	0.98	(0.66 , 1.46)
Other	1.08	(0.89 , 1.31)	1.09	(0.90 , 1.32)	1.09	(0.90 , 1.33)
Marital status (ref. married/partn)						
Divorced	0.76	(0.54 , 1.07)	0.76	(0.54 , 1.06)	0.76	(0.55 , 1.05)
Never married	0.82	(0.62 , 1.10)	0.83	(0.62 , 1.10)	0.80	(0.59 , 1.07)
No College	1.55	(0.96 , 2.51)	1.54	(0.97 , 2.47)	1.51	(0.96 , 2.40)
Employment (ref. employed)						
Unemployed	0.60	(0.33 , 1.09)	0.61	(0.34 , 1.11)	0.64	(0.37 , 1.10)
Not in labor force	0.86*	(0.75 , 1.00)	0.87	(0.76 , 1.00)	0.98	(0.84 , 1.14)
VA-only vs dual care	1.58***	(1.31 , 1.90)	1.58***	(1.32 , 1.89)	1.58***	(1.31 , 1.90)
Rural vs urban	1.15	(0.85 , 1.56)	1.16	(0.85 , 1.59)	1.14	(0.85 , 1.52)
Overall health (ref. good)						
Poor	0.63	(0.34 , 1.15)	0.64	(0.35 , 1.16)	0.83	(0.42 , 1.64)
Fair	0.66**	(0.51 , 0.85)	0.67**	(0.51 , 0.87)	0.77	(0.59 , 1.01)
V. good/excellent	1.24	(0.89 , 1.72)	1.24	(0.89 , 1.75)	1.12	(0.76 , 1.65)
PH conditions (ref. 0)						
1	--	--	1.11	(0.77 , 1.59)	1.11	(0.77 , 1.61)
2	--	--	0.92	(0.64 , 1.32)	0.90	(0.60 , 1.35)
3 or more	--	--	0.87	(0.59 , 1.28)	0.90	(0.63 , 1.28)
Positive MH screeners (ref.0)	--	--				
1	--	--	--	--	0.55*	(0.34 , 0.91)
2	--	--	--	--	0.55**	(0.38 , 0.80)
3	--	--	--	--	0.43***	(0.31 , 0.59)

N= 1265 complete cases.

* p < 0.05, ** p < 0.01, *** p < 0.001
Odds ratios of a high communication ratings from multivariate logistic regression models witth sequential addition of physical health and mental health. A high communication rating is reporting "Always" to each of the six communication items ("In the past 12 months, how often did your VA provider… know important information about your medical history ["Knows"]… explain things in a way that was easy to understand ["Explains"]… show respect for what you had to say ["Respect"]… spend enough time with you ["Time"]… listen carefully to you ["Listens"]… give you easy to understand information ["Informs"]…?"). Models are adjusted for sampling design and survey responses using survey weights with the sequential addition of an

indicator for the number of physical conditions (PH) and of a count of positive mental health screeners (MH).

Table 3: ORs for the Likelihood of High Ratings of Individual Provider Communication Behaviors

	Number of positive mental health screeners (ref. 0)		
	1 screener	2 screeners	3 screeners
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Knows	0.60* (0.40,0.88)	0.76 (0.50,1.16)	0.46** (0.29,0.71)
Explains	0.78 (0.52,1.18)	0.47*** (0.37,0.60)	0.34*** (0.22,0.51)
Respects	0.70 (0.45,1.10)	0.62 (0.38,1.03)	0.32*** (0.20,0.52)
Time	0.73 (0.42,1.27)	0.62* (0.39,1.00)	0.46** (0.32,0.66)
Listens	0.54* (0.31,0.92)	0.49* (0.29,0.83)	0.31** (0.18,0.56)
Informs	0.67 (0.41,1.07)	0.50** (0.35,0.72)	0.43** (0.28,0.66)

N= 1265 complete cases, except for "Informs" (N=1130).

Odds ratios associated with MH status are presented horizontally for six separate multivariate logistic regression models; each regression is a model for the odds of reporting "Always" versus "Not always" to one of the six communication items ("In the past 12 months, how often did your VA provider… know important information about your medical history ["Knows"]… explain things in a way that was easy to understand ["Explains"]… show respect for what you had to say ["Respect"]… spend enough time with you ["Time"]… listen carefully to you ["Listens"]… give you easy to understand information ["Informs"]…?").

All models are adjusted for the same set of covariates: age, race/ethnicity, marital status, education, employment, self-reported health, number of PH conditions, use of VA care only versus dual source of care, rural status of the medical center, and adjusted for sampling design and survey responses. Complete sets of odds ratios are presented in Appendix Table C.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: ORs for High Ratings of Trust in Provider and Quality of Care

	Trust		VA rating		PC rating	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Positive MH screeners (ref.						
1	0.67 (0.41,1.11)	0.86 (0.53,1.40)	0.74 (0.50,1.08)	0.88 (0.61,1.27)	0.79 (0.55,1.14)	0.99 (0.71,1.38)
2	0.69 (0.42,1.11)	0.87 (0.52,1.46)	0.80 (0.52,1.23)	0.97 (0.63,1.48)	0.64* (0.44,0.93)	0.77 (0.53,1.11)
3	0.42*** (0.26,0.68)	0.54* (0.31,0.95)	0.55* (0.34,0.89)	0.70 (0.41,1.22)	0.46** (0.31,0.68)	0.59* (0.38,0.91)
Communication (high vs low rating)	--	8.34*** (6.33,10.99)	--	4.26*** (3.44,5.27)	--	5.91*** (4.76,7.33)

N= 1265 complete cases (Trust), 1257 (VA rating) and 1261 (PC rating), respectively

Odds ratios from multivariate logistic regression models for scoring 9-10 versus lower. Models 1 are adjusted for the number of positive MH screeners; Models 2 are in addition adjusted for the communication ratings (high vs. low). All models were controlled for race/ethnicity, marital status, education, employment, self-reported health, number of PH conditions, use of VA care only versus dual source of care, rural status of the medical center, and adjusted for sampling design and survey responses. Complete sets of odds ratios are presented in Appendix Table D.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Mental Health Screening Results Associated with Women Veterans' Ratings of Provider Communication, Trust and Care Quality
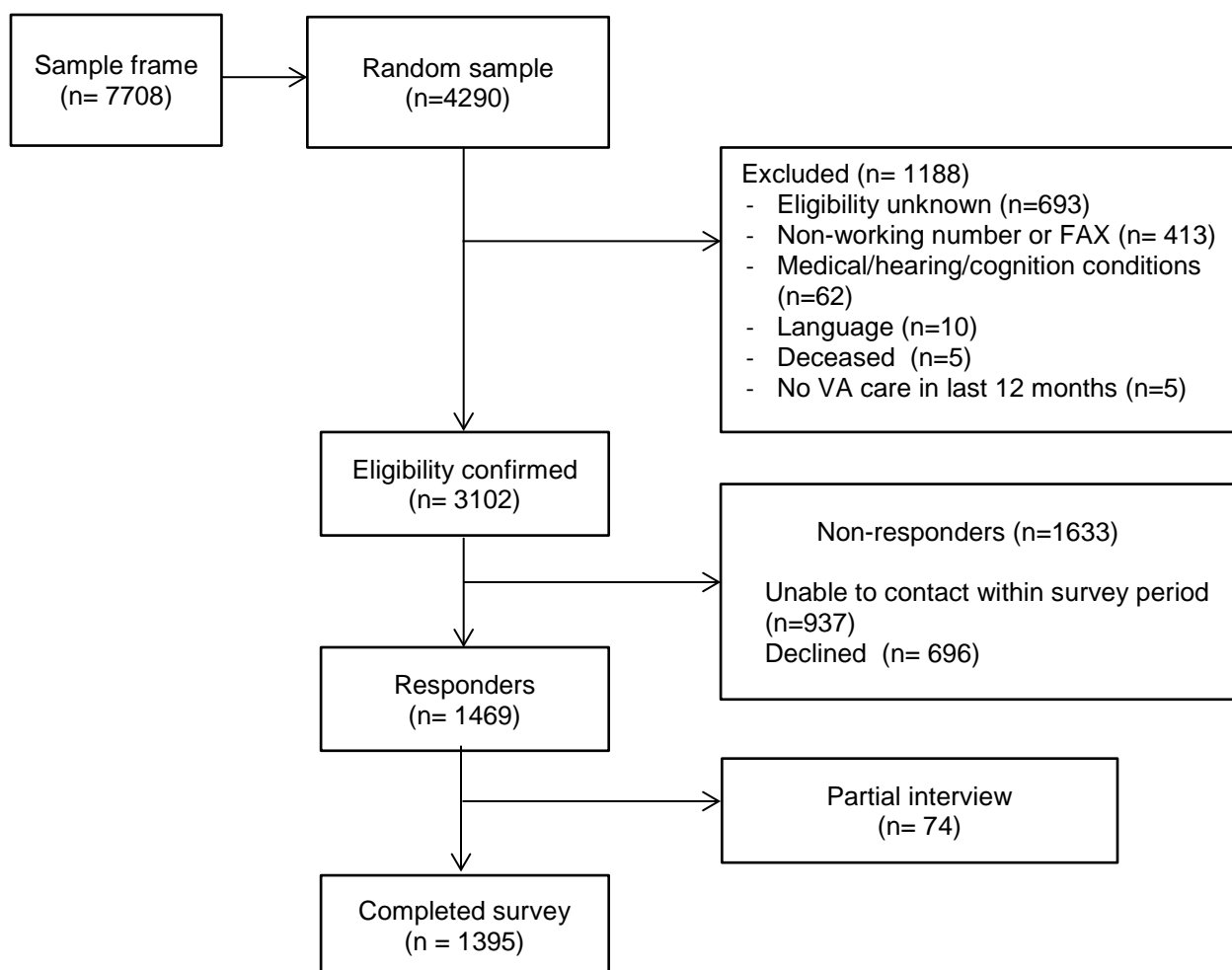
Appendix A: Flow chart describing the survey sampling

```
┌──────────────────┐       ┌──────────────────┐
│ Sample frame     │──────▶│ Random sample    │
│ (n= 7708)        │       │ (n=4290)         │
└──────────────────┘       └──────────────────┘
                                    │
                                    │         ┌─────────────────────────────────────────┐
                                    │────────▶│ Excluded (n= 1188)                      │
                                    │         │  -  Eligibility unknown (n=693)          │
                                    │         │  -  Non-working number or FAX (n= 413)   │
                                    │         │  -  Medical/hearing/cognition conditions │
                                    │         │     (n=62)                               │
                                    │         │  -  Language (n=10)                      │
                                    │         │  -  Deceased  (n=5)                      │
                                    │         │  -  No VA care in last 12 months (n=5)   │
                                    ▼         └─────────────────────────────────────────┘
                           ┌──────────────────┐
                           │ Eligibility      │
                           │ confirmed        │
                           │ (n= 3102)        │
                           └──────────────────┘
                                    │
                                    │         ┌─────────────────────────────────────────┐
                                    │────────▶│ Non-responders (n=1633)                 │
                                    │         │                                         │
                                    │         │ Unable to contact within survey period  │
                                    │         │ (n=937)                                 │
                                    ▼         │ Declined  (n= 696)                      │
                           ┌──────────────────┐└────────────────────────────────────────┘
                           │ Responders       │
                           │ (n= 1469)        │
                           └──────────────────┘
                                    │
                                    │         ┌─────────────────────────────────────────┐
                                    │────────▶│ Partial interview                       │
                                    │         │ (n= 74)                                 │
                                    ▼         └─────────────────────────────────────────┘
                           ┌──────────────────┐
                           │ Completed survey │
                           │ (n = 1395)       │
                           └──────────────────┘
```

7708 female Veterans in the VA's Central Data Warehouse medical records database file met the following inclusion/exclusion criteria: living female Veterans who had three or more PC or women's health encounters at one of the 12 study sites in the prior 12-month period (December 1, 2013 to November 30, 2014), excluding those lacked valid contact information. We randomly sampled 4,307 women from this frame, with the study site as the primary sampling unit. Computer-assisted phone interviews took place in January to March 2015 Overall, 1,469 (47%) consented to participate, and 1,395 (45%) fully completed an interview.

Appendix B: Primary constructs and measures

Construct	Measure
Provider Communication CAHPS (α=.90)	[The questions refer to the main VA primary care provider[1] identified by the participant at the beginning of the survey] In the last 12 months: 1. How often did your VA provider seem to know the important information about your medical history? 2. How often did your VA provider explain things in a way that was easy to understand? 3. How often did your VA provider show respect for what you had to say? 4. How often did your VA provider spend enough time with you? 5. How often did your VA provider listen carefully to you? 6. How often did your VA provider or member of your care team give you easy to understand information about your health questions or concerns? All with options: "Always", "Usually", "Sometimes", "Never" Overall communication ratings defined as high for the selection of "Always" on all items
Trust Primary Care Assessment Survey (PCAS) Cronbach's alpha =0.91	Please tell me how strongly you agree or disagree with the following statements 1. "I can tell my VA provider anything, even things I might not tell anyone else." 2. "My VA Provider sometimes pretends to know things when he or she is really not sure." 3. "I completely trust my VA Provider's judgment about my medical care." 4. "My VA Provider would always tell me the truth about my health even if there was bad news." 5. "My VA provider cares as much as I do about my health." 6. "If a mistake was made in my treatment, my VA provider would try to hide it from me." All with options: "Do you agree strongly, agree somewhat, disagree somewhat or disagree strongly?" 7. All things considered, how much do you trust your VA provider? Rated on 0 "don't' trust at all" to 10 "trust provider completely" and scored after recalibration on 1-5 scale Score calculated as the sum of items (at least 4 items needed) standardized on a scale 0-10.
Quality of care ratings	Thinking about all of the healthcare you have received from VA in the last 12 months: On a scale from 0 to 10 where 0 is the lowest quality health care

CAHPS	and 10 is the highest quality health care, what number would you use to rate your VA health care in general?
	What number would you use to rate the primary care you got from the VA during the past 12 months?

[1] **Identification of the main VA primary care provider:** At the beginning of the survey, participants were asked to confirm the name of their main VA primary care provider, as "the provider you usually see when you need routine primary care from the VA." Specifically, participants were asked about the name of the provider identified as providing the majority of the primary care for that patient based on administrative data.

Thinking about the times you visited the VA for primary care in the last 12 months, did you ever see [Dr.] [PROVIDER NAME]?

Do you consider [Dr.][PROVIDER NAME] to be your main VA primary care provider? That is, the provider who you usually see when you need routine primary care from the VA?

If respondent hesitated the interviewer provided a definition for "primary care":

Would it help for me to repeat the definition of primary care? IF YES, READ: By "Primary care" we mean routine types of healthcare such as management of ongoing conditions like high blood pressure or diabetes, or to get care for minor flus, colds, injuries, or infections, or if you need a checkup, or a physical.]

If the respondent answered No, or did not recognize the name

Is there some other provider at the VA, or who is paid for by the VA, that you think of as your main VA provider, that is, the provider who you usually see when you need routine primary care?

Appendix C: Odds ratios of an "Always" response for the six individual communication items

	Item 1 Knows	Item 2 Explains	Item 3 Respect	Item 4 Time	Item 5 Listens	Item 6 Informs
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age, year	1.01 (1.00,1.02)	1.00 (0.99,1.01)	1.01 (1.00,1.02)	1.02 (1.00,1.03)	1.01 (0.99,1.02)	1.01 (0.99,1.02)
Race/Ethnicity (ref. white)						
Black	1.19 (0.81,1.75)	1.03 (0.76,1.40)	1.15 (0.72,1.84)	1.00 (0.63,1.59)	1.25 (0.78,2.03)	1.05 (0.73,1.51)
Other	1.03 (0.71,1.50)	0.98 (0.76,1.25)	0.81 (0.57,1.14)	0.92 (0.52,1.61)	0.88 (0.63,1.24)	1.28 (0.86,1.89)
Marital status (ref. married/partner)						
Divorced	0.90 (0.71,1.14)	1.11 (0.89,1.38)	0.72 (0.57,0.92)	0.63 (0.47,0.85)	0.64 (0.46,0.89)	0.80 (0.65,0.99)
Never married	0.96 (0.70,1.32)	1.09 (0.71,1.69)	0.77 (0.50,1.17)	0.68 (0.51,0.89)	0.85 (0.61,1.19)	0.89 (0.64,1.24)
No College	1.29 (0.79,2.10)	1.24 (0.85,1.78)	1.30 (0.68,2.48)	1.30 (0.78,2.14)	1.30 (0.83,2.03)	1.38 (0.97,1.95)
Employment (ref. employed)						
Unemployed	0.69 (0.42,1.13)	0.81 (0.42,1.57)	0.72 (0.35,1.49)	0.88 (0.45,1.74)	0.68 (0.38,1.24)	0.93 (0.38,2.27)
Not in labor force	0.98 (0.76,1.26)	0.89 (0.67,1.19)	1.02 (0.75,1.38)	0.85 (0.65,1.11)	0.99 (0.79,1.26)	1.28 (1.00,1.63)
VA-only vs dual care	1.39 (1.06,1.84)	1.34 (1.05,1.72)	1.49 (1.21,1.82)	1.36 (1.07,1.75)	1.58 (1.21,2.06)	1.60 (1.24,2.06)
Rural vs urban	1.82 (1.40,2.35)	1.19 (0.90,1.57)	1.41 (0.92,2.16)	1.24 (0.64,2.41)	1.01 (0.66,1.56)	0.91 (0.69,1.21)
Overall health (ref. good)						
Poor	0.92 (0.51,1.68)	0.89 (0.55,1.45)	0.68 (0.33,1.44)	0.58 (0.30,1.11)	0.83 (0.35,1.96)	0.76 (0.38,1.49)
Fair	0.91 (0.68,1.21)	1.10 (0.79,1.52)	0.85 (0.62,1.17)	0.84 (0.61,1.17)	0.87 (0.60,1.25)	0.92 (0.67,1.26)
V. good/excellent	1.20 (0.83,1.73)	1.45 (1.04,2.01)	1.56 (0.95,2.58)	1.13 (0.76,1.67)	1.19 (0.76,1.87)	1.58 (0.97,2.59)
PH conditions (ref. 0)						
1	0.96 (0.76,1.21)	1.01 (0.62,1.66)	0.73 (0.51,1.03)	1.12 (0.76,1.66)	0.79 (0.56,1.12)	1.09 (0.75,1.58)
2	1.10 (0.84,1.45)	0.84 (0.59,1.20)	1.08 (0.47,2.44)	1.08 (0.61,1.90)	0.98 (0.62,1.57)	1.03 (0.64,1.65)
3 or more	0.77 (0.45,1.34)	0.78 (0.54,1.14)	0.93 (0.60,1.45)	1.32 (0.89,1.96)	1.19 (0.89,1.60)	0.81 (0.38,1.69)
Positive MH screeners (ref.0)						
1	0.60 (0.40,0.88)	0.78 (0.52,1.18)	0.70 (0.45,1.10)	0.73 (0.42,1.27)	0.54 (0.31,0.92)	0.67 (0.41,1.07)
2	0.76 (0.50,1.16)	0.47 (0.37,0.60)	0.62 (0.38,1.03)	0.62 (0.39,1.00)	0.49 (0.29,0.83)	0.50 (0.35,0.72)
3	0.46 (0.29,0.71)	0.34 (0.22,0.51)	0.32 (0.20,0.52)	0.46 (0.32,0.66)	0.31 (0.18,0.56)	0.43 (0.28,0.66)

N= 1265 complete cases, except for "Informs" (N=1130)**.** Complete sets of odds ratios for the six multivariate logistic regression models on the odds of reporting "Always" versus "Usually/Sometimes/Never" to individual communication items; models are adjusted for sampling design and survey responses.

Appendix D: Odds ratios for high ratings of trust in provider, and quality of care

	Trust		VA rating		PC rating	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age, year	1.01 (1.00,1.02)	1.01 (0.99,1.02)	1.03 (1.02,1.04)	1.03 (1.02,1.04)	1.02 (1.01,1.04)	1.02 (1.01,1.04)
Race/Ethnicity (ref. white)						
Black	0.98 (0.68,1.41)	0.98 (0.62,1.56)	0.83 (0.51,1.36)	0.81 (0.49,1.34)	0.96 (0.65,1.41)	0.95 (0.57,1.59)
Other	1.16 (0.77,1.76)	1.14 (0.69,1.87)	1.06 (0.71,1.59)	1.03 (0.65,1.64)	1.25 (0.92,1.71)	1.24 (0.89,1.73)
Marital status (ref. married/partn)						
Divorced	0.80 (0.54,1.18)	0.89 (0.58,1.36)	1.02 (0.77,1.36)	1.14 (0.89,1.47)	1.00 (0.67,1.49)	1.15 (0.75,1.76)
Never married	0.87 (0.73,1.04)	0.95 (0.73,1.24)	0.97 (0.76,1.24)	1.05 (0.80,1.38)	1.08 (0.73,1.60)	1.23 (0.76,1.99)
No college	1.23 (0.85,1.78)	1.03 (0.66,1.60)	2.11 (1.42,3.14)	1.98 (1.25,3.16)	1.79 (1.17,2.73)	1.69 (1.04,2.76)
Employment (ref. employed)						
Unemployed	0.69 (0.43,1.11)	0.80 (0.41,1.55)	1.18 (0.45,3.10)	1.40 (0.47,4.13)	0.74 (0.43,1.27)	0.86 (0.40,1.83)
Not in labor force	1.05 (0.81,1.35)	1.08 (0.74,1.57)	1.24 (0.93,1.65)	1.28 (0.90,1.83)	1.02 (0.75,1.39)	1.04 (0.69,1.57)
VA-only vs dual care	1.82 (1.32,2.49)	1.63 (1.18,2.24)	1.43 (1.07,1.92)	1.26 (0.94,1.68)	1.24 (0.99,1.56)	1.05 (0.82,1.34)
Rural vs urban	1.10 (0.56,2.13)	1.05 (0.52,2.10)	0.99 (0.68,1.45)	0.93 (0.66,1.31)	1.58 (1.17,2.15)	1.61 (1.21,2.15)
Overall health (ref. good)						
Poor	1.07 (0.48,2.38)	1.24 (0.59,2.59)	0.45 (0.21,0.99)	0.43 (0.21,0.88)	0.76 (0.42,1.35)	0.79 (0.44,1.43)
Fair	1.12 (0.78,1.60)	1.33 (0.83,2.15)	0.72 (0.47,1.09)	0.76 (0.48,1.21)	0.96 (0.60,1.54)	1.08 (0.63,1.84)
Very good/excellent	1.59 (1.09,2.32)	1.67 (1.12,2.48)	1.63 (1.25,2.12)	1.64 (1.23,2.19)	1.37 (1.07,1.76)	1.36 (0.96,1.93)
PH conditions (ref. 0)						
1	0.88 (0.72,1.09)	0.80 (0.60,1.06)	0.98 (0.72,1.33)	0.94 (0.69,1.27)	1.05 (0.76,1.45)	0.97 (0.66,1.43)
2	0.86 (0.59,1.26)	0.88 (0.58,1.33)	0.93 (0.59,1.45)	0.94 (0.58,1.53)	1.28 (0.79,2.07)	1.36 (0.78,2.37)
3 or more	0.94 (0.56,1.58)	0.98 (0.56,1.73)	0.87 (0.51,1.48)	0.89 (0.50,1.60)	0.96 (0.53,1.73)	0.98 (0.53,1.84)
Positive MH screeners (ref.0)						
1	0.67 (0.41,1.11)	0.86 (0.53,1.40)	0.74 (0.50,1.08)	0.88 (0.61,1.27)	0.79 (0.55,1.14)	0.99 (0.71,1.38)
2	0.69 (0.42,1.11)	0.87 (0.52,1.46)	0.80 (0.52,1.23)	0.97 (0.63,1.48)	0.64 (0.44,0.93)	0.77 (0.53,1.11)
3	0.42 (0.26,0.68)	0.54 (0.31,0.95)	0.55 (0.34,0.89)	0.70 (0.41,1.22)	0.46 (0.31,0.68)	0.59 (0.38,0.91)
Communication, high ratings		8.34 (6.33,10.99)	--	4.26 (3.44,5.27)	--	5.91 (4.76,7.33)

N= 1265 complete cases (Trust), 1257 (VA rating) and 1261 (PC rating), respectively. Complete sets of odds ratios from multivariate logistic regression models of the odds of scoring 9-10 versus lower, adjusted for sampling design and survey responses