Patient-provider Sex and Race/Ethnicity Concordance
A National Study of Healthcare and Outcomes

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Background: Increasing patient-provider sex and race/ethnicity concordance has been proposed to improve healthcare and help mitigate health disparities, but the relationship between concordance and health outcomes remains unclear.

Objective: To examine associations of patient-provider sex, race/ethnicity, and dual concordance with healthcare measures.

Research Design and Participants: Analyses of data from adult respondents indicating a usual source of healthcare (N = 22,440) in the 2002 to 2007 Medical Expenditure Panel Surveys (each a 2-year panel).

Measures: Year 1 provider communication, sex-neutral (colorectal cancer screening, influenza vaccination) and sex-specific (mammography, Papanicolaou smear, prostate-specific antigen) prevention; and year 2 health status (SF-12). Analyses adjusted for patient sociodemographics and health variables, and healthcare provider (usual source of care) sex and race/ethnicity.

Results: Of 24 concordance assessments, 3 were statistically significant. Women with female providers were more likely to report mammography adherence [average adjusted marginal effect = 3.9%, 95% confidence interval (CI): 1.6%, 6.2%; $P < 0.01$]. Respondents reporting dual concordance were less likely to rate provider communication in the highest quartile (average adjusted marginal effect = −4.2%, 95% CI: −8.1%, −0.2%; $P = 0.04$), but dual concordance was associated with higher adjusted SF-12 Physical Component Summary scores (0.58 points, 95% CI: 0.00, 1.15; $P = 0.05$).

Conclusions: Little evidence of clinical benefit resulting from sex or race/ethnicity concordance was found. Greater matching of patients and providers by sex and race/ethnicity is unlikely to mitigate health disparities.

Key Words: physician-patient relations, socioeconomic factors, race relations, health disparities, female, preventive health services, health status, communication, ethnic groups

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Despite considerable study, the extent to which patient-healthcare provider sex and race/ethnicity concordance influence health outcomes remains unclear. Interest in this question stems from the notion that sex and race/ethnicity are proxies for unmeasured psychological (eg, cognitive, attitudinal, affective, sociocultural) characteristics presumed to be better aligned in concordant than discordant dyads.[1,2] Theory suggests that optimal alignment of such characteristics may have salutary effects on provider and patient beliefs and behaviors during clinical encounters, mutually reducing overt stereotyping (prejudice) and unconscious biases.[3,4] Thus, among providers, concordance may result in less biased interpretations of and uncertainty with regard to patient viewpoints and symptoms, potentially improving communication and decision-making related to health conditions associated with increased short-term and long-term morbidity.[5] Among patients, concordance may encourage more active participation in care (eg, question-asking, self-disclosure), potentially improving communication with providers[6] and optimizing health behaviors (eg, fostering adherence to morbidity-reducing treatments[7]). Collectively, such theorized effects of concordance could improve overall health.

Studies conducted 10 to 20 years ago provided some support for these ideas. Patient-provider communication was noted to be more patient centered, and patient satisfaction higher, in sex concordant and racial/ethnicity concordant dyads.[8–10] Women seeing female physicians were found to be more likely to undergo cervical and breast cancer screening[11,12] and to receive higher quality breast cancer treatment.[13] Black patients were more likely to report that evidence-based prevention and other healthcare needs were met when seeing black physicians.[9] These findings suggested that, beyond being clearly desirable in social justice terms, having the option of race and/or sex concordant healthcare providers might help mitigate health disparities.[3–5,14]

However, the findings of subsequent studies have been less consistent. Many found no evidence of salutary sex or race/ethnicity concordance effects,[15–22] and several found concordance was associated with worse outcomes.[23–25] Of studies reporting positive concordance effects, most considered multiple outcomes—especially patient-provider communication, patient satisfaction, and selected process of care (eg, preventive screening) and specific disease status indicators (eg, glycemic control)—generally finding small magnitude associations for only some of the outcomes examined, with variation among studies in outcomes affected.[7,15,16,26–32]

The mixed findings of prior concordance studies in part may reflect the wide variety of datasets, participant samples, and methodologies used, limiting meaningful comparisons. Methodological limitations also play a role, including the frequent use of relatively small, local or regional, non-representative patient and provider samples and failure to control for the main effects of provider and patient sex and/or race/ethnicity. Apart from 1 regional study,[30] studies of combined sex and race/ethnicity concordance (dual concordance) have not been published. Finally, no national studies examined whether concordance is associated with health status.

We analyzed longitudinal data from the nationally representative 2002 to 2007 Medical Expenditures Panel Survey (MEPS),[33] examining associations between patient-provider sex concordance, race/ethnicity concordance, and dual concordance and a range of healthcare outcomes: healthcare provider communication, sex-specific and sex-neutral preventive measures, and physical and mental health status.

METHODS

The MEPS is an annual national survey of healthcare use and costs in the United States civilian, noninstitutionalized population, using an overlapping panel design.[33] Individual data are collected over a 2-year period through 6 interviews. All respondents answer a question asking whether they had a usual source of healthcare in the past year (yes/no). The analytic sample for the current study included adults 18 years and older self-reporting being non-Hispanic white (white), non-Hispanic black (black), or Hispanic (regardless of race) and identifying a usual source of care. Other race/ethnicity categories were not included in the analyses due to limited sample sizes in these categories.

The MEPS Household Component includes information on respondent self-reported healthcare features, sociodemographics, and health insurance. A self-administered questionnaire in both years includes items on respondent-perceived healthcare provider communication, chronic health conditions, and health status. The full-year response rate varied from 69.2% to 62.5% for the 6 panels of data (2002 to 2007) we used.[33]

Measures

Healthcare Provider Communication

The MEPS self-administered questionnaire each year included 4 items from the Consumer Assessment of Healthcare Providers and Systems relating to perceived healthcare provider communication.[34] Using a 4-point Likert response scale (1 = never, 2 = sometimes, 3 = usually, 4 = always), respondents rated how often in the last 12 months their doctors or other healthcare providers listened carefully; explained things in a way that was easy to understand; showed respect for what they had to say; and spent enough time with them. Individual items scores were averaged to yield a summary score [standardized to a mean of zero (standard deviation 0.86); Cronbach α 0.89; higher scores = better communication; and, divided into quartiles for analyses].

Preventive care was ascertained each year by self-report. Two sex-neutral preventive measures were examined. Receipt of influenza vaccination within the prior year was assessed for all respondents. Colorectal cancer screening (CRC) was assessed for respondents aged 50 years and older. Respondents were asked whether they had ever undergone fecal occult blood testing or "flexible sigmoidoscopy or colonoscopy" (a single item) and, if so, the interval (in the past year; 2, 3, or 5 y ago; or >5 y ago). Respondents reporting fecal occult blood testing in the previous 2 years[35] and/or endoscopic testing in the prior 5 years[36] were categorized as up-to-date for CRC screening. Three sex-specific preventive tests were also examined: for all female respondents, Papanicolaou (Pap) testing within the prior 3 years[37]; for women aged 40 years and older, mammography within the past 2 years[38]; and for men aged 50 years or older, prostate-specific antigen testing in the prior 2 years.[39]

Health-related Measures

Health status was measured each year with the SF-12 Physical Component Summary (PCS-12) and Mental Component Summary scores (range of scores 0 to 100, higher scores = better health).[40] We also included a single-item global self-rated health measure in our model, as self-rated health is associated with a variety of health outcomes, independent of mental and physical health status.[41] The item asked "In general, would you say your health is excellent, very good, good, fair, or poor?" Respondents self-reported 8 "chronic health conditions": diabetes, hypertension, coronary heart disease, myocardial infarction, cerebrovascular disease, asthma, emphysema, and arthritis. They also self-reported the number of office visits to their usual source of care.

Patient sociodemographic and insurance variables examined (all self-reported) were age in years; sex; race/ethnicity (Hispanic, white, or black); U.S. Census region (West, Midwest, Northeast, South); urbanicity (living in a Metropolitan Statistical Area [MSA] or not); education level [0 to 8 y formal schooling (less than high school), 9 to 11 y (some high school), 12 y (high school graduate), 13 to 15y (some college), >16 y (college graduate)]; household income level (<100%, 100% to 124%, 125% to 199%, 200% to 399%, or >400% of the Federal Poverty Level); and health insurance status [uninsured (no insurance for the whole year), privately insured any private insurance during the year or publicly insured (only public insurance during the year)].

Sex and race/ethnicity of the respondents' usual source of care were assessed each year per respondent report. Race/ethnicity categories examined were black, white, and Hispanic. On the basis of patient and provider sex and race/ethnicity, concordance was defined as none, sex only, race/ethnicity only, or both concordant (dual concordance). Agreement between year 1 and year 2 respondent-reported provider sex and race/ethnicity concordance status was 0.76 (agreement expected by chance 0.29).

Data Analysis

Data were analyzed using Stata version 11.1 (Stata Corporation, College Station, TX), adjusting for the complex survey design of MEPS. Data were analyzed using

longitudinal strata and primary sampling unit identifiers and survey weights, to derive estimates representative of the U.S. civilian, noninstitutionalized adult population.

Primary analyses used logistic regression (dichotomous dependent measures) and linear regression (continuous dependent measures) to examine the associations between year 1 patient-provider concordance (parameterized as sex only, race/ethnicity only, and dual concordance, with no concordance as the reference group) and patient ratings of year 1 provider communication [considered as a dichotomous measure (highest quartile vs. not)], year 1 preventive care adherence, and year 2 health status. All analyses adjusted for patient sociodemographic characteristics (patient age, sex, race/ethnicity, urbanity, census region, education level, household income level, and health insurance status), patient health-related characteristics [year 1 physical and mental health status, global self-rated health, health conditions (count of 8 chronic conditions), and office visits], and provider sex (except in analyses of sex-specific preventive tests) and race/ethnicity category. Analyses also adjusted for MEPS panel year, included as a categorical variable. For dichotomous outcomes, we report adjusted odds ratios in Tables 2 to 5 and, to further facilitate study interpretation, we also report in the Results section the average marginal effects (AMEs; ie, percentage point difference in outcome for concordant vs. nonconcordant dyads).

Secondary analyses of change scores assessed the association of year 2-year 1 improvements in outcomes (a) with year 1 concordance and (b) with year 2-year 1 changes in concordance (ie, a first differences analysis).[42] Additional secondary analyses limited to minority respondents were also conducted, to explore the potential for the findings of the primary analyses to simply reflect the large numbers of white respondents with racially concordant providers, and given theory and prior research suggesting concordance may be most salient to minority persons.[1,2] Another set of secondary analyses was restricted to those respondents with the same provider concordance status in both years, to increase the reliability of concordance assessment and consistency of the usual source of care, and employing year 2 outcome data. Parameter estimates across models were compared using the method of Clogg et al,[43] implemented in Stata using the suest program.

RESULTS

There were 22,572 eligible adults entering MEPS panels between 2002 and 2007; 22,440 (93.5%, population weighted) had no missing independent variables. Table 1 summarizes the characteristics of the analytic sample by patient-provider concordance status. The sample was predominantly white and privately insured, with higher income and education. Overall, there were few differences across concordance categories, but female providers were more likely than other providers to have concordant patients, and respondents reporting dual concordance with providers were more likely to be adherent to CRC screening and mammography, and less likely to report high provider communication.

Healthcare Provider Communication (Table 2)

Patients reporting dual concordance were less likely to report provider communication in the highest quartile [AME = −4.2%, 95% confidence interval (CI): −8.1%, −0.2%; $P = 0.04$]. A follow-up analysis included only 2 concordance terms (dummy variables for any sex concordance and for any race/ethnicity concordance) to explore the independent contributions of sex and race/ethnicity concordance to this finding. Although the sex concordance parameter effect was statistically significant (AME = −2.3%, 95% CI: −3.9%, −0.6%; $P < 0.01$) and that for race/ethnicity was not (AME = −2.8%, 95% CI: −6.4%, 0.7%, $P = 0.12$), these parameter estimates did not differ statistically [$F(1,443) = 0.09$, $P = 0.76$].

Preventive Care

Among sex-neutral preventive measures (Table 3), no concordance type was significantly associated with CRC screening or influenza vaccination adherence. For sex-specific preventive measures (Table 4), neither Pap nor prostate-specific antigen testing was significantly associated with any concordance type. Mammography was significantly associated with sex only concordance and with dual concordance, the parameter estimates for these associations did not differ significantly [$F(1,442) = 0.03$, $P = 0.88$]. A follow-up analysis including any sex concordance and any race/ethnicity concordance revealed that women with female physicians were more likely to report up-to-date mammography status (AME = 3.9%, 95% CI: 1.6%, 6.2%; $P < 0.01$), whereas the effect for any race/ethnicity concordance was not statistically significant ($P = 0.84$).

Health Status (Table 5)

Dual concordance (but not sex or race/ethnicity only concordance) was associated with higher year 2 PCS-12 scores (adjusted parameter estimate = 0.58 points, 95% CI: 0.00, 1.15; $P = 0.05$; N = 17,330). In a secondary analysis excluding adjustment for year 1 SF-12 scores, the association between race concordance and year 2 PCS-12 was also significant (adjusted parameter estimate = 0.82, 95% CI: 0.12, 1.52; $P = 0.02$), and the parameter estimate did not differ significantly from that in the primary model. No concordance type was significantly associated with year 2 SF-12 Mental Component Summary score.

Secondary Analyses

In analyses of change scores, none of the concordance parameter estimates was statistically significant. Analyses limited to minorities, limited to respondents with the same provider concordance status in years 1 and 2, and using year 2 data for all outcomes largely mirrored those reported above, with no statistically significant differences in parameter estimates between years 1 and 2 analyses (results not reported, available from authors).

DISCUSSION

In exploring the association of patient-provider sex and race/ethnicity concordance with healthcare and outcomes, we found little evidence of clinically meaningful effects. In

TABLE 1. Patient and Provider Characteristics by Provider-Patient Concordance Status*

Characteristics (Year 1 Except Where Noted)	Provider-Patient Concordance: None N = 3371 (11.5%)	Sex N = 3459 (12.1%)	Race/Ethnicity N = 7578 (36.6%)	Both N = 8032 (39.8%)	Total N = 22,440 (100%)
Dependent variables					
Provider communication highest quartile, % (SE)†,§	43.3 (1.2)	44.0 (1.1)	42.2 (0.7)	39.4 (0.8)	41.4 (0.5)
Preventive care, % (SE)					
CRC screening‡,§	42.5 (1.6)	44.6 (1.5)	45.7 (1.1)	48.4 (0.9)	46.4 (0.7)
Influenza vaccination§	35.6 (1.1)	32.8 (1.0)	40.6 (0.8)	39.3 (0.7)	38.6 (0.5)
Mammography‡,§	74.9 (1.3)	79.9 (1.4)	76.3 (0.8)	79.9 (0.9)	77.6 (0.5)
Pap testing‡,§	82.3 (1.1)	84.0 (1.1)	79.1 (0.8)	82.3 (0.7)	81.1 (0.5)
PSA testing‡	72.7 (2.4)	70.2 (1.9)	74.4 (1.5)	74.3 (1.1)	73.7 (0.8)
Year 2 health status, mean (SE)					
PCS-12§	46.8 (0.3)	47.4 (0.3)	47.3 (0.2)	47.8 (0.2)	47.5 (0.1)
MCS-12	50.4 (0.2)	49.9 (0.3)	51.1 (0.2)	51.1 (0.2)	50.9 (0.1)
Independent variables					
Patient characteristic					
Age, mean (SE)§	50.7 (0.6)	49.9 (0.5)	53.3 (0.3)	52.5 (0.3)	52.3 (0.2)
Female, % (SE)§	67.0 (1.1)	49.3 (1.1)	66.7 (0.7)	45.0 (0.7)	56.0 (0.3)
Race/ethnicity, % (SE)§					
White	44.1 (1.5)	44.2 (1.5)	92.2 (0.4)	92.7 (0.4)	81.0 (0.6)
Hispanic	22.6 (1.2)	24.0 (1.2)	4.5 (0.4)	3.9 (0.3)	8.7 (0.4)
Black	33.3 (1.4)	31.8 (1.3)	3.3 (0.2)	3.4 (0.3)	10.2 (0.4)
Income, % FPL, %(SE)§					
<100%	11.8 (0.6)	9.9 (0.6)	7.2 (0.3)	6.9 (0.3)	7.9 (0.2)
100-<125%	4.6 (0.4)	5.0 (0.5)	3.3 (0.2)	3.3 (0.2)	3.6 (0.2)
125-<200%	14.8 (0.7)	13.3 (0.7)	11.8 (0.4)	10.6 (0.4)	11.8 (0.3)
200-<400%	32.6 (1.1)	31.4 (1.1)	29.7 (0.7)	29.1 (0.6)	30.0 (0.5)
≥400%	36.2 (1.1)	40.4 (1.2)	48.0 (0.8)	50.1 (0.8)	46.6 (0.6)
Education, % (SE)§					
No high school	7.4 (0.6)	7.1 (0.5)	4.5 (0.3)	4.4 (0.3)	5.1 (0.2)
Some high school	13.1 (0.7)	12.3 (0.6)	9.4 (0.4)	8.9 (0.3)	10.0 (0.2)
High school graduate	34.5 (1.1)	33.1 (0.9)	33.2 (0.7)	31.8 (0.7)	32.8 (0.5)
Some college	23.8 (0.9)	23.7 (0.9)	23.8 (0.6)	23.8 (0.6)	23.8 (0.4)
College graduate	21.1 (1.0)	23.7 (1.1)	29.2 (0.7)	31.1 (0.8)	28.4 (0.6)
Health insurance, %(SE)§					
Private	71.7 (1.0)	74.8 (1.0)	79.3 (0.6)	80.5 (0.5)	78.4 (0.4)
Public	20.9 (0.9)	17.6 (0.8)	15.3 (0.5)	13.7 (0.4)	15.6 (0.4)
None	7.4 (0.6)	7.6 (0.5)	5.3 (0.3)	5.8 (0.3)	6.0 (0.2)
Urban residence, % (SE)§	86.1 (1.3)	86.6 (1.2)	81.6 (1.1)	82.5 (1.1)	83.1 (1.0)
Patient characteristics					
Census region, % (SE)§					
Northeast	22.1 (1.3)	23.5 (1.3)	24.8 (1.2)	25.6 (1.2)	24.6 (1.1)
Midwest	18.8 (1.2)	18.7 (1.3)	23.3 (1.2)	23.1 (1.2)	22.1 (1.1)
South	41.7 (1.6)	40.6 (1.6)	36.8 (1.2)	35.2 (1.1)	37.2 (1.1)
West	17.4 (1.3)	17.2 (1.3)	15.1 (1.1)	16.1 (1.3)	16.0 (1.1)
Panel start year, % (SE)§					
2002	15.3 (0.9)	12.7 (0.7)	15.7 (0.6)	12.5 (0.5)	14.0 (0.5)
2003	15.2 (0.8)	13.6 (0.7)	16.4 (0.6)	13.0 (0.5)	14.5 (0.4)
2004	14.3 (0.8)	14.5 (0.7)	13.9 (0.5)	14.4 (0.5)	14.2 (0.4)
2005	13.7 (0.8)	14.7 (0.9)	13.5 (0.5)	14.8 (0.5)	14.2 (0.4)
2006	13.5 (0.8)	14.4 (0.8)	13.1 (0.5)	14.4 (0.6)	13.8 (0.4)
2007	10.0 (0.7)	11.1 (0.9)	10.8 (0.6)	11.5 (0.6)	11.0 (0.5)
2008	18.2 (1.0)	19.1 (1.2)	16.6 (0.7)	19.5 (0.8)	18.2 (0.6)
Office visits, mean (SE)	2.8 (0.04)	2.7 (0.04)	2.8 (0.03)	2.8 (0.03)	2.8 (0.02)
Year 1 health status, mean (SE)					
PCS-12‡	46.5 (0.3)	47.1 (0.3)	47.4 (0.2)	47.7 (0.2)	47.4 (0.1)
MCS-12	50.1 (0.2)	49.8 (0.3)	50.8 (0.2)	50.9 (0.1)	50.6 (0.1)
Self-rated health, % (SE)§					
Excellent	20.6 (0.9)	21.3 (0.9)	23.5 (0.6)	24.6 (0.6)	23.3 (0.4)
Very good	31.6 (1.1)	32.9 (1.0)	35.0 (0.6)	34.2 (0.6)	34.1 (0.4)
Good	30.6 (1.0)	28.6 (0.9)	26.8 (0.6)	27.0 (0.6)	27.6 (0.4)
Fair	12.5 (0.7)	12.1 (0.6)	10.8 (0.4)	10.5 (0.4)	11.0 (0.3)
Poor	4.7 (0.4)	5.1 (0.5)	3.9 (0.3)	3.7 (0.2)	4.0 (0.2)

(*continued*)

TABLE 1. Patient and Provider Characteristics by Provider-Patient Concordance Status* (*continued*)

Characteristics (Year 1 Except Where Noted)	Provider-Patient Concordance: None N = 3371 (11.5%)	Sex N = 3459 (12.1%)	Race/Ethnicity N = 7578 (36.6%)	Both N = 8032 (39.8%)	Total N = 22,440 (100%)
Health conditions, %(SE)‖					
0	42.4 (1.2)	43.5 (1.0)	41.5 (0.7)	42.8 (0.7)	42.3 (0.5)
1	24.6 (1.0)	24.9 (0.9)	27.7 (0.6)	27.5 (0.6)	26.9 (0.4)
2	18.6 (0.8)	18.8 (0.9)	17.7 (0.6)	16.8 (0.5)	17.6 (0.3)
3	9.2 (0.6)	7.3 (0.5)	8.1 (0.4)	7.9 (0.3)	8.0 (0.2)
≥4	5.3 (0.5)	5.6 (0.5)	5.0 (0.3)	5.0 (0.3)	5.1 (0.2)
Provider characteristics					
Female§	33.0 (1.1)	49.3 (1.1)	33.3 (0.7)	45.0 (0.7)	39.8 (0.5)
Hispanic§	4.0 (0.4)	3.2 (0.4)	8.0 (0.5)	7.6 (0.4)	6.8 (0.3)
Black§	4.8 (0.5)	5.3 (0.5)	3.4 (0.2)	3.4 (0.3)	3.8 (0.2)
White§	39.5 (1.4)	40.4 (1.3)	96.6 (0.3)	96.5 (0.3)	83.2 (0.5)

*Percentages are population weighted.

†Percentages are higher than the anticipated 25% for this variable because the score distribution was skewed toward higher scores, because of the effects of population weighting, and because the analytic sample included only individuals reporting a usual source of care and answering all communication questions, resulting in a mean standardized communication score of >0.

‡Percentages for Pap based on women, those for mammogram on women aged ≥40 years, those for PSA on men aged ≥50 years, and those for CRC screening on respondents aged ≥50 years.

§$P < 0.01$

‖$P < 0.05$—Omnibus test of concordance group differences for each variable (analysis of variance for continuous variables, χ^2 for categorical variables).

CRC indicates colorectal cancer screening; FPL, Federal Poverty Level; MCS-12, SF-12 Mental Component Summary score; Pap, Papanicolaou smear; PCS-12, SF-12 Physical Component Summary score; PSA, prostate-specific antigen; SE, standard error.

primary analyses that included 24 separate concordance assessments on a range of outcomes, including provider communication, sex-neutral and sex-specific preventive adherence, and health status, we found only 3 significant, small magnitude associations between concordance and outcomes. These findings were mirrored by the findings of secondary analyses limited to minority respondents, for whom prior study suggested concordance may be most relevant.[1,2] Finally, analyses examining changes in outcomes during each panel revealed no statistically significant concordance findings.

Our results suggest few substantive associations between patient-provider sex or race/ethnicity concordance and health outcomes. These findings expand on the mixed results of prior concordance studies, potentially stemming from varying methodologies, samples, and limitations. Moreover, with 1 exception,[30] prior studies did not consider dual concordance effects.

We conducted a secondary analysis based on differences (or changes) in outcomes from years 1 to 2, which implicitly adjusts for fixed unmeasured covariates (such as the possible tendency of health-conscious individuals to choose concordant providers). However, these analyses are sensitive only to improvements occurring between the first and the second panel year, thereby missing potential benefits of concordance accruing before the study period. Although more sensitive to prior benefits of concordance, our primary analyses may be more susceptible to unmeasured confounding. As these complementary analytical approaches likely bracket the actual effects of concordance, the true effects of concordance may be even smaller than those reported.

Of the 3 significant concordance associations observed, 2 were positive: women with female providers were more likely to report mammography adherence, and dual concordance was associated with higher year 2 physical health status. The third significant concordance association was negative: patients with dually concordant providers were less likely to rate provider communication highly, underscoring that concordance effects should not be presumed to be beneficial, as has often been implied. Several prior studies reported negative effects of concordance on patient-provider communication and selected health outcomes.[23–25,44]

All 3 of the significant concordance associations were small in absolute terms. The point estimate of the gain in PCS-12 (physical health status) score associated with dual concordance was only 0.6 points, less than the proposed minimal clinically important difference of 3 points.[45] Thus, the association is unlikely to be clinically meaningful. By contrast, the association of sex concordance with up-to-date mammography status was potentially clinically meaningful, though small (AME <5%). Other studies have found patients of female providers are more likely to report having up-to-date mammography.[11,12,20] This finding could reflect that female providers are better attuned to female preventive healthcare needs than are male providers. However, sex concordance was not significantly associated with Pap testing. Given the large number of analyses we conducted, and the negative findings of the change score analyses, the mammography finding could also be due to chance.

Our finding that dual concordance was negatively associated with high-quality provider communication is novel. Only one prior published study, involving direct observation of clinical encounters at a single center, examined this issue.[30] Findings of that study were mixed, with prevention and health promotion discussions being more common with male patients than female patients only for nonminority male physicians.

TABLE 2. Adjusted Associations Between Patient and Provider Sex and Race/Ethnicity and Provider-Patient Concordance and Year-1 Patient Ratings of Provider Communication*

Characteristics	Highest Communication Quartile (N = 18,325) AOR (95% CI)†	*P*
Patients		
Female	1.00 (0.91, 1.10)	0.97
Race/ethnicity (ref = white)		
Hispanic	0.98 (0.83, 1.16)	0.83
Black	1.36 (1.15, 1.60)	< 0.01
Providers		
Female		
Hispanic	1.09 (0.94, 1.26)	0.28
Black	1.05 (0.81, 1.36)	0.73
White	1.11 (0.96, 1.29)	0.17
Provider-patient concordance (ref = none)		
Sex	1.01 (0.89, 1.16)	0.84
Race/ethnicity	0.95 (0.81, 1.12)	0.56
Both sex and race/ethnicity	0.83 (0.70, 0.99)	0.04

*Analyses also adjusted for the following year 1 patient characteristics: age; income [< 100% (ref), 125—< 200%, 200—< 400%, or ≥ 400% of Federal Poverty Level]; education (no high school [ref], some high school, high school graduate, some college, or college graduate); health insurance (private [ref], public, or none); urban residence (vs. not); U.S. Census region (Northeast [ref], Midwest, South, West); Medical Expenditures Panel Survey start year (ref = 2002); number of office visits to the usual source of care; health status (SF-12 Mental Component Summary and Physical Component Summary scores); self-rated health [excellent (ref), very good, good, fair, or poor]; and a count of 8 chronic health conditions (diabetes, hypertension, coronary heart disease, myocardial infarction, cerebrovascular disease, asthma, emphysema, arthritis).

†Compared with remaining quartiles. AOR indicates adjusted odds ratio; CI, confidence interval; ref, analytic reference comparison.

Patient self-selection may explain our finding, as provider communication quality was ascertained through patient report. Patients who procure concordant providers may have relatively high and ultimately unrealized expectations with regard to provider communication. A prior study finding patient satisfaction was lowest among women who chose a female provider lends some support to this notion.[24]

Dual concordance may impair certain aspects of communication. Several prior sex concordance and race/ethnicity concordance studies using direct observation of clinical encounters reported negative effects on patient-provider communication. For example, in 1 study, smoking was less often discussed in race/ethnicity concordant encounters,[23] whereas in another, depression assessment performed less often in sex concordant encounters.[44] These studies have potential relevance to our findings, as both sex concordance and race/ethnicity concordance contributed to the negative association between dual concordance and high provider communication quality.

Why are not sex, race/ethnicity, and dual concordance consistently and strongly associated health outcomes, as theory and initial studies suggested?[8–13] The answer may lie partly in variable patient and provider attitudes and preferences. In some prior studies noting a positive association between concordance and patient ratings of provider communication, the association was independent of directly observed provider communication, suggesting unmeasured patient and/or provider attitudes may have explained the relationship.[46] Prior research also suggests the proportion of racial/ethnic minorities and women who strongly prefer a concordant provider is relatively small, and relatively few endorse the belief that communication is more optimal with concordant providers.[47] Thus, concordance may matter in ways that could affect communication strongly enough to influence health for only a small subset of patients.

In addition, although healthcare provider biases regarding women and racial/ethnic minority persons likely persist,[48] compared with providers of the past, providers in this era may

TABLE 3. Adjusted Associations Between Provider and Patient Sex and Race/ethnicity and Patient-Provider Concordance and Year 1 Sex Neutral Preventive Care Adherence*

Characteristics	Colorectal Cancer Screening (N = 11,584) AOR (95% CI)†	*P*	Influenza Vaccination (N = 22,355) AOR (95% CI)	*P*
Patients				
Female	0.87 (0.80, 0.95)	< 0.01	1.21 (1.13, 1.30)	< 0.01
Race/ethnicity (ref = white)				
Hispanic	0.80 (0.66, 0.98)	0.03	0.80 (0.67, 0.97)	0.02
Black	1.13 (0.93, 1.37)	0.21	0.57 (0.49, 0.68)	< 0.01
Providers				
Female	1.14 (1.01, 1.29)	0.03	1.05 (0.95, 1.16)	0.32
Hispanic	0.98 (0.82, 1.17)	0.79	0.94 (0.79, 1.10)	0.42
Black	0.84 (0.60, 1.19)	0.33	0.92 (0.70, 1.21)	0.56
White	0.94 (0.76, 1.15)	0.54	1.07 (0.89, 1.28)	0.46
Provider-patient concordance (ref = none)				
Sex	1.01 (0.85, 1.20)	0.94	0.91 (0.80, 1.05)	0.19
Race/ethnicity	1.08 (0.86, 1.35)	0.51	0.85 (0.70, 1.02)	0.08
Both sex and race/ethnicity	1.10 (0.89, 1.36)	0.38	0.84 (0.70, 1.03)	0.09

*Analyses also adjusted for the following year 1 patient characteristics: age; income [< 100% (ref), 125—< 200%, 200—< 400%, or ≥ 400% of Federal Poverty Level]; education [no high school (ref), some high school, high school graduate, some college, or college graduate]; health insurance (private [ref], public, or none); urban residence (vs. not); U.S. Census region (Northeast [ref], Midwest, South, West), Medical Expenditures Panel Survey start year (ref = 2002); number of office visits to the usual source of care; health status (SF-12 Mental Component Summary and Physical Component Summary scores); self-rated health [excellent (ref), very good, good, fair, or poor]; and a count of 8 chronic health conditions (diabetes, hypertension, coronary heart disease, myocardial infarction, cerebrovascular disease, asthma, emphysema, arthritis).

†Analysis limited to respondents aged ≥ 50 y.

AOR indicates adjusted odds ratio; CI, confidence interval; ref, analytic reference comparison.

TABLE 4. Adjusted Associations Between Provider and Patient Race/Ethnicity and Patient-provider Concordance and Year 1 Sex-specific Preventive Care Adherence*

Characteristics	Pap (N = 12,716) AOR (95% CI)	*P*	Mammography (N = 9210) AOR (95% CI)	*P*	PSA (N = 4533) AOR (95% CI)	*P*
Patient race/ethnicity (ref = white)						
Hispanic	1.88 (1.46, 2.43)	< 0.01	1.27 (0.99, 1.62)	0.06	1.06 (0.74, 1.52)	0.76
Black	2.20 (1.71, 2.82)	< 0.01	1.61 (1.26, 2.06)	< 0.01	1.52 (1.07, 2.17)	0.02
Provider race/ethnicity						
Hispanic	0.77 (0.61, 0.98)	0.03	1.05 (0.83, 1.32)	0.71	0.96 (0.68, 1.34)	0.79
Black	1.04 (0.66, 1.66)	0.86	1.27 (0.88, 1.83)	0.21	1.34 (0.73, 2.46)	0.35
White	0.94 (0.71, 1.24)	0.65	1.07 (0.85, 1.33)	0.57	1.06 (0.76, 1.50)	0.72
Provider-patient concordance (ref = none)						
Sex	0.95 (0.75, 1.20)	0.65	1.36 (1.07, 1.73)	0.01	0.77 (0.54, 1.10)	0.15
Race/ethnicity	1.09 (0.83, 1.45)	0.52	1.06 (0.82, 1.36)	0.66	0.99 (0.65, 1.51)	0.97
Both sex and race/ethnicity	1.13 (0.84, 1.51)	0.43	1.33 (1.01, 1.75)	0.04	0.86 (0.55, 1.33)	0.49

*Patient and provider sex not included in these models due to collinearity with sex concordance. Analyses also adjusted for the following year 1 patient characteristics: age; income [< 100% (ref), 125—< 200%, 200—< 400%, or ≥ 400% of Federal Poverty Level]; education (no high school [ref], some high school, high school graduate, some college, or college graduate); health insurance [private (ref), public, or none]; urban residence (vs. not); U.S. Census region [Northeast (ref), Midwest, South, West], Medical Expenditures Panel Survey start year (ref = 2002); number of office visits to the usual source of care; health status (SF-12 Mental Component Summary and Physical Component Summary scores); self-rated health (excellent [ref], very good, good, fair, or poor); and a count of 8 chronic health conditions (diabetes, hypertension, coronary heart disease, myocardial infarction, cerebrovascular disease, asthma, emphysema, arthritis).

AOR indicates adjusted odds ratio; CI, confidence interval; Pap, Papanicolaou smear; PSA, prostate-specific antigen; ref, analytic reference comparison.

have greater ability to recognize and avert detrimental clinical effects of their biases during encounters. Patients may also be more adept at overcoming their providers' biases. Studies examining these possibilities would be helpful. Finally, there is relatively little evidence to suggest positive effects of provider communication on health outcomes, regardless of patient-provider concordance status.[49] Thus, the finding of few salutary effects of patient-provider concordance in our study may ultimately reflect a minimal influence of provider communication style in general.

Our study had some limitations. The analyses were observational, so causal associations cannot be inferred. As provider concordance and outcomes of interest were based on respondent report, unmeasured covariates (eg, patient and/or provider demographics and attitudes) may largely explain the few significant associations we observed. Of note, provider age may account for the sex effects, given the female providers identified by respondents in our study were likely younger on average than the male providers. Although we considered a range of broadly relevant outcomes, concordance might have beneficial effects on outcomes not examined in our study, such as indicators of chronic disease control (eg, glycosylated hemoglobin levels in diabetes). Analyses were also limited to MEPS respondents reporting a usual source of care, so our findings may not be applicable to other kinds of patients and outcomes. MEPS nonresponse

TABLE 5. Adjusted Associations Between Provider and Patient Sex and Race/Ethnicity and Provider-patient Concordance and Year 2 Physical and Mental Health Status*

Characteristics	PCS-12 Score, Year 2 (N = 17,330) APE (95% CI)	*P*	MCS-12 Score, Year 2 (N = 17,342) APE (95% CI)	*P*
Patients				
Female	−0.09 (−0.33, 0.15)	0.45	−0.51 (−0.78, −0.24)	< 0.01
Race/ethnicity (ref = white)				
Hispanic	0.79 (0.22, 1.35)	0.01	0.87 (0.14, 1.59)	0.02
Black	0.53 (0.02, 1.05)	0.04	1.08 (0.50, 1.66)	< 0.01
Providers				
Female	0.07 (−0.22, 0.35)	0.65	0.16 (−0.21, 0.53)	0.39
Hispanic	−0.68 (−1.26, −0.10)	0.02	−0.18 (−0.84, 0.49)	0.60
Black	−0.70 (−1.48, 0.08)	0.08	−0.43 (−1.46, 0.61)	0.42
White	−0.25 (−0.73, 0.23)	0.31	−0.17 (−0.81, 0.48)	0.61
Provider-patient concordance (ref = none)				
Sex	0.25 (−0.20, 0.71)	0.28	−0.31 (−0.77, 0.15)	0.19
Race/ethnicity	0.37 (−0.21, 0.94)	0.21	0.40 (−0.26, 1.07)	0.23
Both sex and race/ethnicity	0.56 (−0.01, 1.14)	0.05	0.30 (−0.38, 0.98)	0.39

*Analyses also adjusted for the following year 1 patient characteristics: age; income [< 100% (ref), 125—< 200%, 200—< 400%, or ≥ 400% of Federal Poverty Level]; education (no high school [ref], some high school, high school graduate, some college, or college graduate); health insurance [private (ref), public, or none]; urban residence (vs. not); U.S. Census region [Northeast (ref), Midwest, South, West], Medical Expenditures Panel Survey start year (ref = 2002); number of office visits to the usual source of care; health status (SF-12 Mental Component Summary and Physical Component Summary scores); self-rated health [excellent (ref), very good, good, fair, or poor]; and a count of 8 chronic health conditions (diabetes, hypertension, coronary heart disease, myocardial infarction, cerebrovascular disease, asthma, emphysema, arthritis).

APE indicates adjusted parameter estimate; CI, confidence interval; PCS-12, SF-12 Physical Component Summary score; MCS-12, SF-12 Mental Component Summary score; ref, analytic reference comparison.

may have also produced some bias, making generalization of the results to nonresponders uncertain. Still, MEPS data are likely the most representative available to examine our research question.

In conclusion, we found limited evidence of significant sex, race/ethnicity, and dual concordance effects. In 8 analyses (24 concordance assessments) examining the association of patient-provider concordance with healthcare measures, only 3 statistically significant associations were noted. One of these associations was potentially clinically beneficial: women with female providers were significantly more likely to report up-to-date mammography. By contrast, patients with dually concordant providers were significantly less likely to report high provider communication, supporting the notion that when concordance effects do exist, they may not always be beneficial. Although striving to ensure a more diverse healthcare provider workforce is worthwhile for myriad reasons, efforts to increase matching of patients and providers by sex or race/ethnicity are unlikely to yield substantive health improvements or mitigate health disparities.

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