Research Article

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# Impact of Patient–Provider Race, Ethnicity, and Gender Concordance on Cancer Screening: Findings from Medical Expenditure Panel Survey

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## Abstract

**Background:** Racial and ethnic minorities experience lower rates of cancer screening compared with non-Hispanic whites (NHWs). Previous studies evaluating the role of patient–provider race, ethnicity, or gender concordance in cancer screening have been inconclusive.

**Methods:** In a cross-sectional analysis using the Medical Expenditure Panel Survey (MEPS), data from 2003 to 2010 were assessed for associations between patient–provider race, ethnicity, and/or gender concordance and, screening (American Cancer Society guidelines) for breast, cervical, and colorectal cancer. Multivariable logistic analyses were conducted to examine associations of interest.

**Results:** Of the 32,041 patient–provider pairs in our analysis, more than 60% of the patients were NHW, 15% were non-Hispanic black (NHB), and 15% were Hispanic. Overall, patients adherent to cancer screening were more likely to be non-Hispanic, better educated, married, wealthier, and privately insured. Patient–provider gender discordance was associated with lower rates of breast [OR, 0.83; 95% confidence interval (CI), 0.76–0.90], cervical (OR, 0.83; 95% CI, 0.76–0.91), and colorectal cancer (OR, 0.84; 95% CI, 0.79–0.90) screening in all patients. This association was also significant after adjusting for racial and/or ethnic concordance. Conversely, among NHWs and NHBs, patient–provider racial and/or ethnic concordance was not associated with screening. Among Hispanics, patient–provider ethnic discordant pairs had higher breast (58% vs. 52%) and colorectal cancer (45% vs. 39%) screening rates compared with concordant pairs.

**Conclusions:** Patient–provider gender concordance positively affected cancer screening. Patient–provider ethnic concordance was inversely associated with receipt of cancer screening among Hispanics. This counter-intuitive finding requires further study.

**Impact:** Our findings highlight the importance of gender concordance in improving cancer screening rates. *Cancer Epidemiol Biomarkers Prev; 26(12); 1804–11. ©2017 AACR.*



## Introduction

Routine screening for colorectal, cervical, and breast cancer is essential to reduce the overall incidence and mortality burden of these common cancers. However, there are significant long-standing racial and ethnic disparities in cancer screening rates (1). Racial or ethnic minorities in the United States are less likely than whites to receive regular cancer screening (2, 3). For example, colorectal cancer screening rates are lower among non-Hispanic blacks (NHBs) as well as Hispanics compared with non-Hispanic whites (NHWs; refs. 4, 5), and the rate of cervical cancer screening among Hispanic women is half of that of non-Hispanic women (6). NHB women have been reported to be approximately 20% less likely to receive adequate mammographic screening than NHW women (7). However, several reports indicated that mammographic screening has been comparable between these groups in more recent years (8, 9).

Provider-specific factors may contribute to some of these observed racial and ethnic differences in the utilization of cancer screening. A prior study that evaluated physician characteristics and cancer screening practices in a sample of 212 general practitioners reported a significant association between physicians' colorectal cancer screening practices and the physicians' ethnicity independent of medical training (10). Racial and/or ethnic concordance between patients and physicians has been suggested as an indicator of shared cultural, language, and social characteristics (11, 12) and may contribute to better patient–provider communication and satisfaction. Communication between race and/or ethnic-concordant physician–patient pairs has been characterized as more productive, leading to greater relationship building (13), treatment planning (14), exchange of health information (15, 16), and overall positive effect (17). Persky and colleagues (18) conducted a study in African Americans and observed that participants who interacted with a racially discordant physician were less accurate in their lung cancer risk perceptions. Similarly, gender concordance can also positively influence utilization of cancer screening. A Californian study conducted in a mixed-payer outpatient healthcare serving 800,000 patients reported that screening completion was positively associated with patient–provider gender concordance for mammography and cervical cancer screening (19).

In general, there are limited data on the impact of provider-patient racial or ethnic and gender concordance on cancer screening rates. Knowledge about these factors can help guide future

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interventions to improve screening rates. The handful of studies that reported on this association have mixed findings. Although some found no evidence of salutary gender or race or ethnicity concordance effects (20–23), others have reported that race and/or ethnic discordance was associated with worse outcomes (24, 25). Because of inconsistent reports from existing studies and its potential for public health intervention, examination of the impact of patient–provider race and ethnicity and/or gender concordance on receipt of preventive care deserves attention. In the current study, patient–provider pairs stratified by physician race and/or ethnicity and gender were examined using the nationally representative Medical Expenditure Panel Survey (MEPS) administered from January 1, 2003, to December 31, 2010. The main hypothesis of this analysis was that physician–patient race, ethnicity, and/or gender concordance is associated with a greater likelihood of receiving physician recommended breast, cervical, or colorectal cancer screening.

## Materials and Methods

### Data source

MEPS is a set of large-scale nationally representative surveys of families and individuals, their medical providers, and employers across the United States conducted by the Agency for Healthcare Research and Quality (AHRQ) since March 1996. MEPS provides nationally representative estimates of healthcare use, expenditures, sources of payment and insurance coverage for the U.S. civilian, noninstitutionalized population (26). The Household Component of MEPS (MEPS-HC) collects data from a sample of families and individuals in selected communities across the United States, drawn from a nationally representative subsample of households that participated in the prior year's National Health Interview Survey (conducted by the National Center for Health Statistics). The MEPS-HC uses an overlapping panel design in which a new panel of sample households is selected from the sampling frame each year. The MEPS survey design and administration is described in detail elsewhere (http://meps.ahrq.gov/). Each adult in each household is surveyed five times over a two-and-a-half-year period. Questions on receipt of cancer screening are ascertained from patients only once.

### Study participants

Study participants in this analysis include those who completed the MEPS-HC. Participants included all men and women ages 18 years and older. The data in our study represent 198,835 unique participants over an eight calendar-year period from 2003 to 2010. Participants were asked to identify one healthcare provider they considered to be their usual source of care and are likely the provider recommending the screening to the patient. Because cancer screening is normally recommended in a primary care setting, our analysis was restricted to individuals whose usual source of care was a medical doctor in a general or family practice, internal medicine, OB/GYN, a nurse practitioner or a physician's assistant. Subjects were excluded if age was less than 18 years ($n = 60{,}569$) or race and ethnicity data were missing for the patient ($n = 19{,}577$) or provider ($n = 86{,}648$). The final dataset included 32,041 unique participants. As this was a retrospective analysis of publicly available data, the study was considered exempt by Rutgers Institutional Review Board.

### Variables

***Cancer screening.*** Breast, cervical, and colorectal cancer screening was assessed using the American Cancer Society (ACS) recommendations from the time period matching our years of data collection (27). These three cancers were selected for our analysis as regular screening for these three cancers is recommended by ACS and data regarding the screening for these cancers are available through MEPS. Breast cancer screening (mammogram within the past year) was assessed among all women 40 years of age or older. Assessment of cervical cancer screening (Pap smear within the past year) was restricted to women 21 years of age or older without a report of a previous hysterectomy. The ACS recommends an annual fecal occult blood test (FOBT), a colonoscopy every 10 years or a sigmoidoscopy every 5 years for colorectal cancer screening. However, within the 2003 to 2008 MEPS-HC questionnaire, it was not possible to distinguish the type of endoscopy received (colonoscopy vs. sigmoidoscopy). Therefore, for years 2003 to 2008, individuals 50 years of age and older, having received a FOBT within the past year or a colonoscopy/sigmoidoscopy within the past 5 years were defined as adherent to colorectal cancer screening. After 2008, the MEPS household questionnaire asked subjects about receipt of colonoscopy and sigmoidoscopy separately. Thus, for 2009 to 2010, a respondent over the age of 50 years was considered to be adherent to colorectal cancer screening if they had received an FOBT within the past year, a colonoscopy within the past 10 years or a sigmoidoscopy within the past 5 years. Respondents providing an indefinite answer (do not know, refused, inapplicable, or not ascertained) for a question involving any of the cancer screening outcome measures were excluded from analyses involving the respective measure(s). Thus, breast cancer screening was assessed among 12,561 women, cervical cancer screening among 10,058 women and colorectal cancer screening among 15,091 patients.

Racial and/or ethnic concordance between patient and physician was the main independent variable for this analysis. Respondents identified themselves as either Hispanic/Latino or non-Hispanic. Respondents were similarly also asked about their race and ethnicity: white, black/African American, and other. The following mutually exclusive racial and ethnic categories were created: Hispanic, NHW, NHB/African American; other racial or ethnic groups were omitted due to low numbers. Respondents were similarly asked about the race and ethnicity of their provider with the three categories being Hispanic, white, and black/African American. Respondents were also asked about the gender of their usual source of care provider.

### Other covariates

Age, highest education level achieved (no degree, high school/GED, college degree, graduate or professional degree), the percentage of family income as compared with Federal Poverty Level (<100%, 100%–124%, 125%–199%, 200%–399%, >400%), type of insurance coverage (private, public, none), marital status (never married, married, or divorced/separated/widowed), employment status (employed or unemployed), self-rated physical and mental health, history of chronic disease (diabetes, hypertension, asthma, stroke, or heart disease), rural versus urban residence, and language of survey completion (English vs. Spanish) were obtained as potential confounders. The covariates were selected on the basis of known prior associations and the availability of the variables from the MEPS data.

**Statistical analysis**

Demographic characteristics of patients by receipt of cancer screening using sample frequencies, means, and standard deviations were examined. Cancer screening rates were calculated for each of the three cancers and compared between the comparison groups using the $\chi^2$ test. The analysis was also stratified by patient race (NHB, NWH, Hispanic). For measuring the cancer screening rates by race and/or ethnic concordance, the analysis was stratified by gender concordance as well as the language of survey completion and insurance type. Multilevel logistic analysis was performed for measuring the effect of gender as well as race and/or ethnic concordance on cancer screening. All analyses were adjusted for patient sociodemographic characteristics (patient age, marital status, education level, household income level, employment status, rural/urban residence and health insurance status), patient health-related characteristics (self-reported physical and mental condition, comorbidities). Analysis was also adjusted for MEPS panel year, included as a categorical variable as well as the language of survey completion. Associations were considered significant at the $P < 0.05$ level. Data were analyzed using SAS version 9.2 statistical software (SAS Institute Inc.)

## Results

For the years 2003 to 2010, breast cancer screening was assessed among 12,561 women, cervical cancer screening among 10,058 women, and colorectal cancer screening among 15,091 patients. Demographic characteristics of participants stratified by receipt of cancer screening are displayed in Table 1. More than 60% of the patients were NHW in the three groups, and about 15% were NHB. Remaining patients were of Hispanic ethnicity. Patients adherent to breast, cervical, and colorectal cancer screening were more likely to be younger, better educated, married, employed, wealthier, and with private insurance. Higher proportions of screening-adherent patients also reported better physical and mental health. NHW patients had higher rates of adherence with colorectal cancer screening compared with Hispanic patients. Similarly, having a white provider (compared to Hispanic provider) was associated with a higher rate of colorectal cancer screening (54% vs. 45%) in all patients. There was no significant difference in cancer screening rates between NHW patients compared with NHB patients, as well as white providers compared with Hispanic providers.

Cancer screening rates by gender concordance between patients and providers are displayed in Table 2. Gender concordance with their physician was significantly associated with a higher rate of cancer screening for all of the cancers being studied. The significant association of gender concordance with higher screening rates was unchanged on stratifying by patient race or ethnicity as well as patient insurance status. On stratifying by race and/or ethnicity, the lowest rate of screening was reported in Hispanic patients for colorectal cancer screening who had a different gender from their provider (39% compared to 44% in Hispanic patients with gender-concordant provider and 57% in NHW patients with gender-concordant provider). Cancer screening rates by race and /or ethnic concordance between patients and providers are displayed in Table 3. Racial and/or ethnic concordance between patients and provider was significantly associated with a higher rate of cancer screening for colorectal cancer (55% vs. 50%) but not for breast or cervical cancer screening.

Adjusted odds ratios for cancer screening rates for discordant pairs, relative to concordant pairs, are displayed in Table 4. After adjusting for confounders including racial and/or ethnic concordance between patients and providers, gender-discordant pairs had lower odds of screening for breast cancer (OR 0.83, 95% CI, 0.76–0.90), cervical cancer (OR 0.83, 95% CI, 0.76–0.91), and colorectal cancer (OR 0.84, 95% CI, 0.79–0.90).

On adjusted analysis, colorectal cancer screening was not positively associated with racial and/or ethnic concordance (OR 1.00, 95% CI, 0.92–1.08). Interestingly, on stratified analysis by patient ethnicity, Hispanic patients with ethnic-discordant providers demonstrated higher rates of breast cancer screening (58% vs. 52%) as well as colorectal cancer screening (45% vs. 39%, Table 3). These associations were significant on adjusted analysis also in Table 4. Analysis stratified by the language of survey completion found no significant interaction of language (English or Spanish) with the effect of ethnic concordance on cancer screening.

## Discussion

Our study is the largest cross-sectional study to date that evaluated the effect of patient–provider racial or ethnic and gender concordance on screening rates for breast, cervical and colorectal cancers. There was no significant difference in rates of screening for these cancers by patient–provider gender concordance. Patients with providers of the same gender had higher rates of breast, cervical, and colorectal cancer screenings. Hispanic patients seen by Hispanic providers received breast and colorectal cancer screening at significantly lower rates than Hispanic patients seen by non-Hispanic providers. However, there was no significant association between racial concordance on cancer screening rates among NHW and NHB patients.

It is well recognized that patient–provider communication, as well as the quality of the relationship between patient and provider, plays a role in patient satisfaction and adherence to cancer screening (28, 29). In a national study using MEPS data, respondents who rated their providers' communication higher, reported greater utilization of preventive services (30). Similarly, women who reported being satisfied with the interactions with their providers and trust their providers were more likely to be screened by mammography than those who did not (31, 32). Patient–provider communication may be influenced by language as well as gender and racial or ethnic concordance (33). On the basis of these previous observations, in our analysis of a nationally representative sample, a higher rate of cancer screening was expected if female providers screened female patients as it has been shown that rates of health services utilization are enhanced when patients share social and cultural values with their physicians (34). In our study, a significant association between patient–provider gender concordance and higher rates of cancer screening was observed. This is consistent with the results reported by Jerant and colleagues that women with female physicians were more likely to report up-to-date mammography (23). Another retrospective study conducted in 10,001 patients in Switzerland reported that female physicians provided significantly more preventive care services than male physicians to both female (66.7% vs. 63.6%) and male patients (73.4% vs. 70.7%) but found no evidence of gender concordance on cancer screening (35). However, that study did not include cervical cancer screening (using Pap tests) and was done in a university primary care setting where

**Table 1.** Distribution of demographic characteristics, insurance status, and health status by cancer screening in 2003–2010 MEPS Cancer Screening Eligible Respondents

| | Breast cancer screening ($n = 12,561$) | | Cervical cancer screening ($n = 10,058$) | | Colorectal cancer screening ($n = 15,091$) | |
|---|---|---|---|---|---|---|
| | Yes ($n = 7,106$) | No ($n = 5,455$) | Yes ($n = 6,466$) | No ($n = 3,592$) | Yes ($n = 7,957$) | No ($n = 7,134$) |
| Patient's race | | | | | | |
| White | 68.1 | 66.4[a] | 61.4 | 62.6[a] | 74.2 | 68.4[a] |
| Black | 17.4 | 16.6 | 17.9 | 15.9 | 15.0 | 14.5 |
| Hispanic | 14.5 | 17.0 | 20.7 | 21.5 | 10.9 | 17.1 |
| Provider's race | | | | | | |
| White | 80.7 | 79.2[a] | 78.7 | 78.7 | 83.6 | 79.4[a] |
| Black | 7.0 | 6.7 | 7.5 | 6.7 | 5.6 | 5.9 |
| Hispanic | 12.3 | 14.1 | 13.9 | 14.6 | 10.8 | 14.8 |
| Age range | | | | | | |
| 40–49 | 23.8 | 29.7[a] | 17.7 | 15.7[a] | 0.0 | 0.0[a] |
| 50–59 | 29.6 | 24.5 | 24.8 | 21.5 | 35.3 | 46.5 |
| 60–69 | 23.1 | 17.6 | 26.6 | 26.3 | 34.9 | 26.5 |
| 70–79 | 16.2 | 13.9 | 22.2 | 25.1 | 21.7 | 17.0 |
| ≥80 | 7.4 | 14.3 | 8.7 | 11.4 | 8.1 | 10.0 |
| Education | | | | | | |
| No degree | 9.4 | 14.9[a] | 5.7 | 9.2[a] | 10.9 | 13.9[a] |
| HS or GED | 34.3 | 34.5 | 31.1 | 34.9 | 33.5 | 31.5 |
| Some college | 11.2 | 8.3 | 14.4 | 11.7 | 12.3 | 8.1 |
| Graduate | 12.7 | 8.9 | 14.6 | 10.9 | 14.0 | 8.8 |
| Unknown | 32.5 | 33.5 | 34.2 | 33.4 | 29.3 | 37.6 |
| Marital status | | | | | | |
| Married | 59.0 | 49.0[a] | 61.5 | 54.8[a] | 65.4 | 59.7[a] |
| Divorced/separated/widowed | 33.9 | 43.0 | 18.3 | 23.9 | 29.5 | 33.8 |
| Never married | 7.1 | 8.1 | 20.2 | 21.3 | 5.2 | 6.5 |
| Employment status | | | | | | |
| Employed | 53.0 | 46.4[a] | 77.0 | 68.8[a] | 46.2 | 49.6[a] |
| Unemployed | 47.0 | 53.6 | 23.0 | 31.2 | 53.8 | 50.4 |
| Family income as % of poverty level | | | | | | |
| <100% | 10.8 | 16.6[a] | 12.0 | 15.7[a] | 9.9 | 13.9[a] |
| 100%–124% | 4.4 | 6.3 | 3.6 | 4.8 | 4.1 | 5.9 |
| 125%–199% | 13.2 | 17.9 | 12.1 | 14.8 | 12.1 | 15.4 |
| 200%–399% | 28.2 | 31.5 | 31.2 | 33.4 | 27.3 | 28.7 |
| 400%+ | 43.4 | 27.6 | 41.0 | 31.2 | 46.6 | 36.1 |
| Health insurance coverage | | | | | | |
| Private | 74.0 | 60.1[a] | 79.7 | 69.2[a] | 73.5 | 64.7[a] |
| Public | 21.9 | 30.9 | 12.9 | 15.7 | 24.1 | 27.7 |
| Uninsured | 4.1 | 9.0 | 7.5 | 15.1 | 2.5 | 7.6 |
| Physical health (self-reported) | | | | | | |
| Excellent | 19.1 | 15.1[a] | 25.4 | 21.8[a] | 17.7 | 16.1[a] |
| Very good | 31.2 | 26.3 | 34.8 | 30.2 | 30.0 | 27.7 |
| Good | 31.8 | 31.7 | 28.4 | 31.1 | 30.9 | 32.2 |
| Fair | 13.3 | 18.8 | 8.9 | 12.1 | 15.8 | 16.9 |
| Poor | 4.5 | 8.0 | 2.5 | 4.8 | 5.6 | 7.1 |
| Mental health (self-reported) | | | | | | |
| Excellent | 33.3 | 25.6[a] | 39.1 | 32.9[a] | 32.7 | 28.2[a] |
| Very good | 30.2 | 28.3 | 31.2 | 29.4 | 30.0 | 29.1 |
| Good | 28.0 | 32.6 | 23.4 | 28.0 | 28.1 | 30.8 |
| Fair | 7.2 | 10.4 | 5.4 | 7.8 | 7.6 | 9.4 |
| Poor | 1.3 | 3.1 | 0.9 | 1.9 | 1.6 | 2.5 |

[a]$P < 0.05$.

almost all patients were treated in the first instance by residents at the end of their postgraduate training. Therefore, these data may not be generalizable to community-based primary care physicians. One explanation for the association between patient–provider gender concordance and cancer screening could be due to two of the cancers studied (cervical and breast cancers) being female-specific cancers. However, we did find a significant association between gender concordance and colorectal cancer screening also.

Our study did not find a significant association between racial concordance and cancer screening among NHB patients. This could be from a heightened awareness among patients and the medical community of the increased risks of these cancers among NHB patients due to recent preventative efforts or the possibility that NHB patients who are medically underserved, from hard-to-reach communities, or speak languages other than English or Spanish are underrepresented in national surveys (36, 37). Our study also suggests that Hispanic-discordant pairs were more likely to receive breast and colorectal cancer screening as compared to concordant pairs. The study by Jerant and colleagues that examined the association between patient–provider gender, race or ethnicity, and dual

**Table 2.** Cancer screening rates by patient–provider gender concordance

| | Breast cancer screening | | Cervical cancer screening | | Colorectal cancer screening | |
|---|---|---|---|---|---|---|
| | Yes *N* (%) | No *N* (%) | Yes *N* (%) | No *N* (%) | Yes *N* (%) | No *N* (%) |
| All patients | | | | | | |
| Gender concordant | 2,103 (60.2) | 1,390 (39.8)[b] | 3,681 (61.9) | 2,269 (38.1)[b] | 4,345 (55.3) | 3,516 (44.7)[b] |
| Gender discordant | 5,003 (55.2) | 4,065 (44.8) | 8,685 (57.3) | 6,465 (42.7) | 3,612 (50.0) | 3,618 (50.0) |
| Stratified by race/ethnicity | | | | | | |
| Black patients | | | | | | |
| Gender concordant | 408 (62.0) | 250 (38.0)[a] | 433 (71.3) | 174 (28.7)[b] | 590 (56.0) | 465 (44.0)[a] |
| Gender discordant | 831 (56.0) | 653 (44.0) | 726 (64.6) | 397 (35.4) | 601 (51.4) | 569 (48.6) |
| White patients | | | | | | |
| Gender concordant | 1,390 (60.2) | 920 (39.8)[b] | 1,317 (67.0) | 648 (33.0)[b] | 3,291 (57.3) | 2,457 (42.7)[b] |
| Gender discordant | 3,449 (56.1) | 2,703 (43.9) | 2,653 (62.4) | 1,600 (37.6) | 2,610 (51.9) | 2,423 (48.1) |
| Hispanic patients | | | | | | |
| Gender concordant | 305 (58.1) | 220 (41.9)[a] | 403 (66.2) | 209 (33.8) | 464 (43.9) | 594 (56.1)[a] |
| Gender discordant | 723 (50.5) | 709 (49.5) | 934 (62.3) | 564 (37.7) | 401 (39.0) | 626 (61.0) |
| Stratified by insurance status | | | | | | |
| Private insurance | | | | | | |
| Gender concordant | 1,578 (64.2) | 879 (35.8)[b] | 1,755 (70.0) | 752 (30.0)[b] | 3,291 (57.8) | 2,406 (42.2)[b] |
| Gender discordant | 3,682 (60.5) | 2,400 (39.5) | 3,398 (66.2) | 1,735 (33.8) | 2,554 (54.2) | 2,212 (45.8) |
| Public insurance | | | | | | |
| Gender concordant | 431 (52.8) | 385 (47.2)[b] | 252 (63.0) | 148 (37.0) | 955 (53.5) | 829 (46.5)[b] |
| Gender discordant | 1,126 (46.4) | 1,302 (53.6) | 579 (58.2) | 415 (41.8) | 959 (45.5) | 1,147 (54.5) |
| Uninsured | | | | | | |
| Gender concordant | 94 (42.7) | 126 (57.3)[a] | 146 (52.7) | 131 (47.3)[a] | 99 (26.1) | 281 (73.9) |
| Gender discordant | 195 (34.9) | 363 (65.1) | 336 (45.0) | 411 (55.0) | 99 (27.7) | 259 (72.3) |

[a]$P < 0.05$.
[b]$P < 0.01$.

concordance with healthcare measures also reported no evidence of overall clinical benefit resulting from race and/or ethnic concordance. However, that previous study did not evaluate screening rates across different racial/ethnic groups and therefore did not report the findings for Hispanic patients separately (23). Our study was guided by the conceptual framework by Bao and colleagues which refers to "within-physician" differences contributing to disparities in cancer screening as patients of different race/ethnicity or socio economic status receive different care from the same physicians

**Table 3.** Cancer screening rates by patient–provider race and/or ethnic concordance

| | Breast cancer screening | | Cervical cancer screening | | Colorectal cancer screening | |
|---|---|---|---|---|---|---|
| | Yes *N* (%) | No *N* (%) | Yes *N* (%) | No *N* (%) | Yes *N* (%) | No *N* (%) |
| All patients | | | | | | |
| Concordant | 5,510 (56.8) | 4,184 (43.2) | 4,765 (61.9) | 2,674 (38.1) | 6,365 (55.3) | 5,606 (44.7)[a] |
| Discordant | 1,596 (55.7) | 1,271 (44.3) | 1,701 (57.3) | 918 (42.7) | 1,592 (50.0) | 1,528 (50.0) |
| Stratified by race/ethnicity | | | | | | |
| Black patients | | | | | | |
| Concordant | 395 (58.9) | 276 (41.1) | 378 (69.1) | 169 (30.9) | 356 (53.1) | 315 (46.9) |
| Discordant | 844 (57.4) | 627 (42.6) | 781 (66.0) | 402 (34.0) | 835 (53.7) | 719 (46.3) |
| White patients | | | | | | |
| Concordant | 4,550 (57.3) | 3,386 (42.7) | 3,735 (63.9) | 2,116 (36.1) | 5,537 (54.8) | 4,561 (45.2) |
| Discordant | 289 (54.9) | 237 (45.1) | 235 (64.0) | 132 (36.0) | 364 (53.3) | 319 (46.7) |
| Hispanic patients | | | | | | |
| Concordant | 565 (52.0) | 522 (48.0)[a] | 652 (62.6) | 389 (37.4) | 472 (39.3) | 730 (60.7)[a] |
| Discordant | 563 (58.0) | 407 (42.0) | 685 (64.1) | 384 (33.9) | 393 (44.5) | 490 (55.5) |
| Stratified by gender concordance | | | | | | |
| Gender concordant | | | | | | |
| Concordant | 1,575 (60.3) | 1,039 (39.7) | 1,576 (71.3) | 735 (28.7) | 3,514 (56.0) | 2,776 (44.0)[a] |
| Discordant | 528 (60.1) | 351 (39.9) | 577 (64.6) | 296 (35.4) | 831 (51.4) | 740 (48.6) |
| Gender discordant | | | | | | |
| Concordant | 3935 (60.2) | 3,145 (39.8) | 3,189 (67.0) | 1,939 (33.0) | 2,851 (57.3) | 2,830 (42.7) |
| Discordant | 1,068 (56.1) | 920 (43.9) | 1,124 (62.4) | 622 (37.6) | 761 (51.9) | 788 (48.1) |
| Stratified by survey language | | | | | | |
| English | | | | | | |
| Concordant | 5,102 (57.3) | 3,803 (42.7) | 4,356 (70.0) | 2,412 (30.0) | 6,017 (57.8) | 5,080 (42.2)[a] |
| Discordant | 1,449 (55.9) | 1,145 (44.1) | 1,519 (66.2) | 821 (33.8) | 1,467 (54.2) | 1,362 (45.8) |
| Spanish | | | | | | |
| Concordant | 334 (53.8) | 287 (46.2) | 332 (63.0) | 185 (37.0) | 287 (53.5) | 408 (46.5) |
| Discordant | 100 (52.6) | 90 (47.4) | 120 (58.2) | 68 (41.8) | 87 (45.5) | 115 (54.5) |

[a]$P < 0.05$.

**Table 4.** Multilevel logistic regression model of patient–provider concordance associated with cancer screening (OR and 95% CI)

| | Breast cancer screening | | Cervical cancer screening | | Colorectal cancer screening | |
|---|---|---|---|---|---|---|
| | Unadjusted OR (95% CI) | Adjusted OR (95% CI) | Unadjusted OR (95% CI) | Adjusted OR (95% CI) | Unadjusted OR (95% CI) | Adjusted OR (95% CI) |
| Gender concordant | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Gender discordant[a] | 0.81[c] (0.75–0.88) | 0.83[c] (0.76–0.90) | 0.81[c] (0.74–0.88) | 0.83[c] (0.76–0.91) | 0.81[c] (0.76–0.86) | 0.84[c] (0.79–0.90) |
| Race concordant | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Race discordant | 0.95 (0.88–1.04) | 1.07 (0.98–1.17) | 1.04 (0.95–1.14) | 1.11[b] (1.01–1.23) | 0.92[b] (0.85–0.99) | 1.00 (0.92–1.08) |

NOTE: Adjusted models include age, education, marital status, employment status, insurance status, self-reported physical and mental condition, history of chronic disease, MEPS survey year, rural/urban.

[a]Adjusted for racial and/or ethnic concordance also.

[b]$P < 0.05$.

[c]$P < 0.001$.

(38). Minority patients may be less likely to initiate discussion with their physician about cancer screening due to knowledge deficits or conversely, physicians may perceive minority patients to be less interested in cancer screening and/or less likely to adhere to screening (39).

Similar results have been noted in studies examining the role of language concordance between patients and physicians. In a retrospective study of 306 Spanish-speaking patients, the language-concordant group was less likely to be screened for colorectal cancer compared to the language-discordant group (RR 0.78; 95% CI, 0.61–0.99) (24). In another study that pooled data from the 2007 and 2009 California Health Interview Surveys to examine mammography and colorectal cancer screening use among Latino and Asian immigrants, language concordance did not facilitate mammography use (OR 1.02; 95% CI, 0.72–1.45) or colorectal cancer screening among Latinas (OR 0.85; 95% CI, 0.56–1.28) (25). A retrospective cohort study in 28,077 patients also reported that the language-concordant non-English–speaking group had similar colorectal cancer screening rates as English speakers. However, the non-English–speaking language-concordant group had lower screening (OR 0.57; 95% CI, 0.46–0.71) (40). These results suggest that language barriers do not fully account for cancer screening rate disparities in these populations. Other factors such as patient characteristics, provider cultural competence, quality of patient–provider communication, and the level of patient health literacy may also play a role (40). This has been confirmed by our study also where adjusting for language of survey completion did not modify our findings.

One possibility for the higher screening rate in Hispanic-discordant pairs may be that Hispanic physicians either recommend colonoscopy less frequently or they may experience some unrecognized obstacle for discussing colonoscopies with the ethnic concordant group. For example, it may be that a Spanish-speaking physicians may not feel as comfortable talking about an invasive procedure to a patient of the same ethnic and/or cultural background compared with a non-Spanish–speaking physician using a third-party interpreter. For example, prior research has suggested that ethnic-concordant physicians may not recommend specific preventive screenings due to sensitivity to modesty issues of male physicians caring for female patients, lack of knowledge to recommend preventive screenings, and physician perceptions of patient noncompliance and understanding of the purpose of preventive care services (41–43). Another possibility is the effectiveness of communication with the patient even if the patients and provider speak the same language and have the same cultural beliefs. Simon and colleagues explored patient perceptions of patient–provider communication in breast and cervical cancer-related care among low-income English- and Spanish-speaking women. They reported that although the perception of patient–provider communication may depend on the language spoken throughout the care continuum, jargon is lost when health information is communicated in Spanish (44). Hispanic patients with Hispanic physicians were more likely than those with non-Hispanic physicians to be very satisfied with health care overall, but not more likely to rate their physicians as excellent (45). In a cross-sectional study, among Latino patients, primarily of lower socioeconomic status, the degree to which patients perceived that physicians' encouraged colorectal cancer screening was more strongly associated with screening than with providing risk information, eliciting barriers, and responding to their concerns about screening (46).

Strengths of this study include the large, nationally representative sample, which made it possible to examine combinations of race and ethnic concordance categories. In addition, the use of survey data that included an oversampling of minorities, particularly Hispanics provided an opportunity to include this understudied group in our analyses. This study also has its limitations that should be considered. This is a cross-sectional analysis of self-reported survey data that precludes us from making any causal inferences. To the extent possible, within the constraints of the data available, analysis was adjusted for potential confounders of the hypothesized association, especially the effect of socioeconomic status and health insurance, two factors known to affect access to care and receipt of cancer screening. It is also possible that provider shortages in rural areas limited the ability of patients to choose a racially/ethnically concordant provider and the dynamics of patient–provider relationships may differ between residents of rural and urban regions and also between geographic regions (Northeast, Midwest, South, and West). Although this could be explored through a stratified analysis, the inclusion of these covariates resulted in cells with very few (weighted) observations. Another confounder not included in the analysis due to limitation of the data was prior high-risk behavior which may increase risk for cancer and influence decision to get screening such as multiple partners for cervical cancer or increased hormonal use for breast cancer. Media coverage can also influence providers' decision to recommend screening especially as some cancers such as breast cancer have received more coverage potentially leading to better screening rates. Also, our analytic cohort ended at 2010 for this study although data for more recent years is now available. This is because HPV DNA test was added to ACS screening guidelines in 2012 and for colorectal cancer screening; details about the stool DNA test such as interval for colorectal screening were specified in 2014. Inclusion in these recent years could have contributed to an

underestimation of cancer screening rates as data for these newer technologies is not available in MEPS data. However, our cohort is more recent than other similar analyses which have reported data only till 2007 (23). While the MEPS is unique in its detailed information available, it has some limitations such as potential misreporting due to lack of specific technical knowledge and exclusion of individuals in institutions such as nursing homes (26).

In conclusion, gender concordance between patients and providers was associated with a significantly higher rate of cancer screening and therefore patients should have access to both male and female providers. Also, increased awareness is needed in providers that their own demographic characeristics may influence the quality of prevention recommendations provided to patients. Moreover, we did not find an association between race and/or ethnicity concordance and higher screening rates among NHWs and NHBs. Therefore, it is unlikely that the racial or ethnic disparities seen in cancer screening are attributable to race and/or ethnic discordance between patients and providers. Surprisingly, among Hispanics, an inverse association between ethnic concordance and receipt of colorectal cancer screening was observed. This counter-intuitive finding among Hispanics requires further study to better understand cancer screening behaviors in relation to patient and provider factors.

## Disclosure of Potential Conflicts of Interest

Jyoti Malhotra is a consultant/advisory board member for Astra-Zeneca. No potential conflicts of interest were disclosed by the other authors.

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