Title

Ethnically diverse patients perceptions of clinician computer use in a safety-net clinic.

Journal

Journal of Health Care for the Poor and Underserved, 24(4)

Authors

Barton, Jennifer
Hettema, Jennifer
Lum, Paula
et al.

Publication Date

2013-11-01

DOI

10.1353/hpu.2013.0188

Peer reviewed

HHS Public Access

Author manuscript

J Health Care Poor Underserved. Author manuscript; available in PMC 2015 August 31.

Published in final edited form as:

J Health Care Poor Underserved. 2013 November ; 24(4): 1542–1551. doi:10.1353/hpu.2013.0188.

Ethnically diverse patients' perceptions of clinician computer use in a safety-net clinic

Dr. Neda Ratanawongsa, MD, MPH,
Assistant Professor in the Department of Medicine at the University of California, San Francisco and the UCSF Center for Vulnerable Populations at San Francisco General Hospital

Dr. Jennifer L. Barton, MD,
Assistant Professor in the Department of Medicine at the University of California, San Francisco

Dr. Dean Schillinger, MD,
Professor in the Department of Medicine at the University of California, San Francisco and the UCSF Center for Vulnerable Populations at San Francisco General Hospital

Dr. Edward H. Yelin, PhD, MCP,
Professor in the Department of Medicine and Institute for Health Policy Studies at the University of California, San Francisco

Dr. Jennifer E. Hettema, PhD, and
Assistant Professor in the Department of Psychiatry and Neurobehavioral Sciences at the University of Virginia

Dr. Paula J. Lum, MD, MPH
Associate Professor in the Department of Medicine at the University of California, San Francisco

Abstract

Electronic health record (EHR) implementation may affect patient-clinician communication for diverse safety-net populations. We conducted a cross-sectional survey of English-, Spanish-, and Cantonese-speaking patients in a public hospital clinic with a basic EHR. We examined multivariate associations of patient race/ethnicity, language, and education with perceptions of primary-care provider (PCP) computer use. Among 399 respondents, 25% had less than a high school education, 22% preferred Spanish, and 17% Cantonese. Asian (AOR 3.1), non-English-speakers (AOR 3.6) were more likely to report that PCPs used the computer half or more of the visit. Asians were more likely to report that computers helped PCPs remember patient concerns (AOR 5.6). Non-English-speakers had lower odds of reporting that PCPs listened less carefully to them because of computers (AOR 0.3). Patients at risk for communication barriers may perceive advantages of PCP computer use. Safety-net clinics should consider EHR impact on communication disparities.

Corresponding Author: Neda Ratanawongsa, MD, MPH, Assistant Professor of Medicine, Division of General Internal Medicine, UCSF Center for Vulnerable Populations at San Francisco General Hospital and Trauma Center, 1001 Potrero Avenue, Box 1364, San Francisco CA 94110, Phone: 415-206-3188, Fax: 415-206-5586, ratanawongsan@medsfgh.ucsf.edu.

SAMHSA and Pfizer had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; or preparation, review, or approval of the manuscript.

The authors have no conflicts of interest to disclose.

Keywords

Health information technology; electronic health records; limited English proficiency; health communication; health care disparities

Safety-net clinics in the U.S. – publicly-funded facilities providing care for socioeconomically disadvantaged populations – disproportionately serve patients with limited English proficiency (LEP) and limited health literacy (LHL). Patient-provider communication barriers may contribute to health inequities disfavoring these patients in access to care, receipt of preventive services, treatment adherence, adverse safety events, and health outcomes.[1–11]

Incentives from the 2009 Health Information Technology for Economic and Clinical Health Act have triggered widespread implementation of electronic health record systems (EHRs) in U.S. safety-net clinics previously reliant on paper charting.[12,13] Prior research suggests that EHR use may both facilitate and inhibit communication depending on clinicians' baseline communication skills, their clinical expertise, and the style of computer use.[14–16] Meanwhile, computers can actively shape the opening of encounters, triggering the clinician with clinical reminders and modifying the visit agenda.[17] However, studies to date have not included diverse patient populations.[14–17] Given the complexities of triadic patient-clinician-computer communication,[18] it is important to consider the positive and negative ways safety-net EHR implementation may affect communication with LEP and LHL patients.

We conducted this study to elicit patient attitudes toward computer use in a safety-net clinic and to examine whether clinician computer use is experienced differently across patient race/ethnicity, language, and education.

Methods

We conducted this study at an internal medicine clinic in an academically-affiliated public hospital in San Francisco, California. The clinic population is divided almost equally across Latinos, African Americans, Whites, and Asian Pacific Islanders, and 40% have a primary language other than English. The clinic uses a basic EHR,[19] which includes patient demographic characteristics; medications and allergy lists; some hospital and outpatient specialty notes; laboratory and diagnostic reports / images; and electronic prescribing *via* fax to regional pharmacies. Primary care providers (PCPs) – faculty and resident physicians and nurse practitioners – electronically document all visit notes and submit computerized referrals for specialty care and radiologic imaging.[20–22] The EHR is not fully functional, lacking computerized ordering of lab testing and alerts for guideline-based interventions or screening tests.[19]

In June–August 2011, we conducted a brief cross-sectional, anonymous, self-administered written questionnaire using convenience sampling of English-, Spanish-, and Cantonese-speaking adults receiving primary care. We trained bilingual research assistants to recruit patients consecutively in the waiting room and administer the written questionnaires.

Because our population includes patients with limited literacy, research assistants were trained to ask and assess whether patients preferred or needed assistance and to administer the survey to patients who could not read or complete questionnaires independently. Research assistants translated questionnaires into Spanish and Cantonese, and other research assistants independently verified the accuracy and clarity of translation. Six items assessed patients' perceptions of computer use by their "main doctor or primary care provider." First, patients answered, "When we are together in the room, my provider spends ___ on the computer," with responses of "no," "a little," "half," "most," or "all of the time." Then, patients rated agreement ("strongly agree" to "strongly disagree") about whether the computer: "helped my provider understand my health issues," "remember my concerns," or "take better care of me" or made the provider "listen to me less carefully" or "look less at me." The 5 response options ranged from "strongly agree" to "strongly disagree."

Patients answered three items from the Consumer Assessment of Healthcare Providers and Systems (CAHPS), assessing in the last 12 months how often providers explained things in a way that was easy to understand, listened carefully, and showed respect for what patients had to say.[23]

Respondents reported their age, gender, highest educational attainment, race/ethnicity, and type of primary care provider (nurse practitioner, resident physician, or faculty physician). They also responded to a question that we used for this analysis as a marker for patient computer use: "Where do you normally go to use the Internet?" (responses: "home," "relative or friend's home," "library," "school," "other place," or "do not use the Internet"). We classified as non-users those who chose "do not use the Internet."

Data analyses

The dependent variables were patient perceptions of high computer use, agreement with other attitudinal items about clinician use, and the summary CAHPS score. For time "my provider spends on the computer," we categorized "high clinician computer use" as "half," "most," or "all of the time." We dichotomized patients' agreement with the other statements, combining "strongly agree" and "agree" vs. "strongly disagree," "disagree," or "neither agree nor disagree." We calculated a summary CAHPS score by linearly transforming each of these three items, then averaging and converting to a percent.[24–26] We dichotomized the CAHPS score as better (*vs*. poorer) communication for patients, with the maximum score of 100.

The primary independent variables were race/ethnicity, non-English language, and educational attainment less than high school. We used logistic regression to examine separately the associations between each independent variable and each dependent variable. We then conducted multivariate logistic regression analyses adjusting for patient age, gender, and Internet use and provider type.[15] The indicator for patients requiring assistance with questionnaires was collinear with patient language and not included in final models. Because patients were not asked to identify their specific PCP on the survey, analyses did not account for clustering by PCP. All analyses were conducted using Stata 11.0 (College Station, TX: StataCorp LP, 2009).

Results

Among 399 patients (Table 1), 31% were Latino, 29% Asian, 17% African American, and 18% White. The average age was 54.5 years, 56% were women, 22% preferred Spanish and 17% Cantonese. For education, 25% reported less than high school, and 37% required assistance to complete questionnaires. Half (51%) reported Internet use, and this differed by race/ethnicity, language, and educational attainment (79% White vs. 31–49% for non-White; 71% English vs. 23% for non-English speakers; 62% high school graduates vs. 16% patients with less than high school education, all $p<0.01$).

When asked how much time their PCPs spend on the computer during a visit, 58% of patients reported little or no time, 24% half the time, 11% most of the time, and 7% all the time.

Table 2 depicts respondents' perceptions of clinician computer use. Most patients agreed that the computer helped their providers understand the patients' health concerns (81%), remember the patients' concerns (76%), or take better care of them (74%). However, 20% stated that their providers listened less carefully because of the computer, and 13% agreed that their providers looked at them less because of the computer.

In unadjusted analyses (Table 3), patients who were Latino (OR 2.2, 95% CI 1.0 – 4.7), Asian (OR 10.8, 95% CI 4.9 – 23.8), non-English-speaking (OR 4.4, 95% CI 2.8 – 7.0), or had less than high school education (OR 5.0, 95% CI 2.9 – 8.9) were more likely to report that PCPs used the computer half or more of the time. Non-English-speaking patients were more likely to report that the computer helped PCPs understand their health issues (OR 3.4, 95% CI 1.7 – 6.9), and Asian patients were more likely to report computers helped their PCPs remember their concerns (OR 2.5, 95% CI 1.1 – 5.8). Non-English-speaking patients (OR 0.4, 95% CI 0.2 – 0.7) and patients with less than high school education (OR 0.5, 95% CI 0.2 – 0.9) had lower odds of reporting PCPs listened less carefully. Those requiring assistance with completing the survey were more likely to report high clinician computer use (OR 6.5, 95% CI 4.0 – 10.5) and that the computer helped PCPs take better care of them (OR 1.7, 95% CI 1.1 – 2.8), while having lower odds of reporting that their PCPs listened less to them (OR 0.4, 95% CI 0.2 – 0.7) (data not shown).

In adjusted analyses (Table 2), patients who were Asian (AOR 3.1, 95% CI 1.1 – 6.1), non-English-speaking (AOR 3.6, 95% CI 1.2 – 10.6) had higher odds of reporting that PCPs used the computer half or more of the time. Asian patients had higher odds of reporting computers helped their PCPs remember their concerns (AOR 5.6, 95% CI 1.6 – 19.4), and non-English-speaking patients had lower odds of reporting that their PCPs listened less carefully to them because of the computer. (AOR 0.3, 95% CI 0.1 – 0.9).

On the CAHPS score, 70% had the maximum score of 100, and this was not associated with patient perceptions of amount or effects of PCP computer use (not shown).

Discussion

Prior research has found that patients feel computers improve quality of care while remaining satisfied with their PCPs' communication.[15,27,28] Our study adds to this emerging literature by examining differences across an ethnically and linguistically diverse population. Although our findings suggested that some minority and LEP patients are more likely to perceive high PCP computer use, this was not associated with poorer perceptions of communication. Rather, Asian patients perceived computers helped their PCPs remember their concerns, and non-English-speaking patients were less likely to feel computers made their PCPs listen less carefully to them. Thus, patients at high risk for communication barriers may actually recognize advantages of their clinicians' computer use.

Patients from low-income, minority, and non-English-speaking backgrounds face disadvantages in communication, reporting lower comprehension of medical information and less patient-centered communication and decision-making.[29] Clinicians may use computers to overcome traditional communication barriers faced by LEP patients, e.g., educating patients about tests or medications given by providers in other medical settings or counseling patients using images. Patients in safety-net settings may perceive that their clinicians are using computers to help overcome their communication gaps. Although this study cannot address this question, videorecorded interaction analysis could elucidate whether patient-centered clinicians do have communication behaviors that allow them to use computers as a tool to reduce communication disparities for LEP patients.[14, 30]

Although we did not directly measure health literacy, lower educational attainment and assistance in questionnaire completion were associated with perceptions of high PCP computer use and reduced odds of PCPs listening less in unadjusted analyses. Given LHL patients' documented communication challenges and health risks,[5, 31–35] future studies should examine the impact of clinician EHR use with this vulnerable population.[9, 36]

The study limitations should be noted. First, half of the clinic's interpreted patient encounters use video medical interpretation, and positive attitudes towards this form of interpretation may have affected our results if perceived as a "computer."[37] Second, the item to quantify amount of clinician computer use and the categorization of "high computer use" as half or more of the visit are not validated against objective measures of clinician computer use or with other communication outcomes; a mixed methods study could provide this validation and help elucidate the importance of perceptions of computer use intensity in diverse populations. Third, we cannot calculate a response rate or assess differences from those who declined participation, although measured demographics are similar the overall clinic population. Fourth, unmeasured patient, provider, or relationship characteristics could have confounded measured associations. Although we controlled for patient Internet use, this item may not capture adequately patient comfort with computer use, which could have confounded associations with race/ethnicity or language. Fifth, analyses were unable to account for clustering by PCP, and our patients may have difficulty accurately reporting their type of PCP. Sixth, the surveys were self-administered for some patients, while others received assistance. Although this was done to increase the representativeness of our sample population, we could not assess the effect of the different administration methods, since this

was collinear with language. Seventh, this cross-sectional study cannot be used to determine causality. Lastly, these results from an urban safety-net clinic may not be generalizable to other patient populations.

In summary, patients at high risk for communication barriers perceived both high levels of clinician computer use as well as advantages to computer use. Future mixed-methods studies throughout the phases of EHR implementation can explore how patient-clinician-computer interactions affect care differentially within diverse populations. Safety-net clinics adopting EHRs should measure the potential impacts on disparities in communication and care for their diverse populations.[38]

Acknowledgments

This research was supported by Grant #5U79TI020296-04 from the Center for Substance Abuse Treatment of the Substance Abuse and Mental Health Services Administration (SAMHSA). Drs. Ratanawongsa and Barton are fellows supported by the Pfizer Medical Academic Partnership Fellowship in Health Literacy, under the mentorship of Drs. Schillinger and Yelin. “Dr. Ratanawongsa is supported by the Hellman Faculty Award, UCSF Research Evaluation and Allocation Committee, and the Health Delivery Systems Center for Diabetes Translational Research (CDTR) [NIDDK grant 1P30-DK092924].

References

1. Wilson E, Chen AH, Grumbach K, et al. Effects of limited English proficiency and physician language on health care comprehension. J Gen Intern Med. 2005 Sep; 20(9):800–6. [PubMed: 16117746]
2. Lopez-Quintero C, Berry EM, Neumark Y. Limited English proficiency is a barrier to receipt of advice about physical activity and diet among Hispanics with chronic diseases in the United States. J Am Diet Assoc. 2009 Oct; 109(10):1769–74. [PubMed: 19782177]
3. DuBard CA, Gizlice Z. Language spoken and differences in health status, access to care, and receipt of preventive services among US Hispanics. Am J Public Health. 2008 Nov; 98(11):2021–8. [PubMed: 18799780]
4. Jacobs EA, Karavolos K, Rathouz PJ, et al. Limited English proficiency and breast and cervical cancer screening in a multiethnic population. Am J Public Health. 2005 Aug; 95(8):1410–6. [PubMed: 16043670]
5. Kripalani S, Jacobson TA, Mugalla IC, et al. Health literacy and the quality of physician-patient communication during hospitalization. J Hosp Med. 2010 May-Jun;5(5):269–75. [PubMed: 20533572]
6. Wolf MS, Davis TC, Osborn CY, et al. Literacy, self-efficacy, and HIV medication adherence. Patient Educ Couns. 2007 Feb; 65(2):253–60. [PubMed: 17118617]
7. Sarkar U, Karter AJ, Liu JY, et al. Hypoglycemia is more common among type 2 diabetes patients with limited health literacy: The Diabetes Study of Northern California (DISTANCE). J Gen Intern Med. 2010 May 18; 25(9):962–8. [PubMed: 20480249]
8. Schillinger D, Grumbach K, Piette J, et al. Association of health literacy with diabetes outcomes. JAMA. 2002 Jul 24–31; 288(4):475–82. [PubMed: 12132978]
9. Dewalt DA, Berkman ND, Sheridan S, et al. Literacy and health outcomes: A systematic review of the literature. J Gen Intern Med. 2004 Dec; 19(12):1228–39. [PubMed: 15610334]
10. Sanders LM, Federico S, Klass P, et al. Literacy and child health: A systematic review. Arch Pediatr Adolesc Med. 2009 Feb; 163(2):131–40. [PubMed: 19188645]
11. Fernandez A, Schillinger D, Warton EM, et al. Language barriers, physician-patient language concordance, and glycemic control among insured latinos with diabetes: The Diabetes Study of Northern California (DISTANCE). J Gen Intern Med. 2011 Feb; 26(2):170–6. [PubMed: 20878497]

12. Jha AK. Meaningful use of electronic health records: The road ahead. JAMA. 2010 Oct 20; 304(15):1709–10. [PubMed: 20959581]
13. Cebul RD, Love TE, Jain AK, et al. Electronic health records and quality of diabetes care. N Engl J Med. 2011 Sep 1; 365(9):825–33. [PubMed: 21879900]
14. Frankel R, Altschuler A, George S, et al. Effects of exam-room computing on clinician-patient communication: A longitudinal qualitative study. J Gen Intern Med. 2005 Aug; 20(8):677–82. [PubMed: 16050873]
15. Rouf E, Whittle J, Lu N, et al. Computers in the exam room: Differences in physician-patient interaction may be due to physician experience. J Gen Intern Med. 2007 Jan; 22(1):43–8. [PubMed: 17351838]
16. Margalit RS, Roter D, Dunevant MA, et al. Electronic medical record use and physician-patient communication: An observational study of Israeli primary care encounters. Patient Educ Couns. 2006 Apr; 61(1):134–41. [PubMed: 16533682]
17. Pearce C, Kumarpeli P, de Lusignan S. Getting seamless care right from the beginning - integrating computers into the human interaction. Stud Health Technol Inform. 2010; 155:196–202. [PubMed: 20543329]
18. Ventres WB, Frankel RM. Patient-centered care and electronic health records: It's still about the relationship. Fam Med. 2010 May; 42(5):364–6. [PubMed: 20455111]
19. Hsiao, CJ.; Hing, E.; Socey, TC., et al. Electronic medical Record/Electronic health record systems of office-based physicians: United States 2009 and preliminary 2010 state estimates. Atlanta, GA: CDC National Center of Health Statistics; 2010.
20. Chen AH, Kushel MB, Grumbach K, et al. Practice profile. A safety-net system gains efficiencies through 'eReferrals' to specialists. Health Aff (Millwood). 2010 May; 29(5):969–71. [PubMed: 20439891]
21. Kim Y, Chen AH, Keith E, et al. Not perfect, but better: Primary care providers' experiences with electronic referrals in a safety net health system. J Gen Intern Med. 2009 May; 24(5):614–9. [PubMed: 19308334]
22. Kim-Hwang JE, Chen AH, Bell DS, et al. Evaluating electronic referrals for specialty care at a public hospital. J Gen Intern Med. 2010 Oct; 25(10):1123–8. [PubMed: 20512531]
23. Agency for Healthcare Research and Quality. CAHPS clinician & group 12-month survey. 2011; 2012(January 29)
24. Morales LS, Elliott MN, Weech-Maldonado R, et al. Differences in CAHPS adult survey reports and ratings by race and ethnicity: An analysis of the national CAHPS benchmarking data 1.0. Health Serv Res. 2001 Jul; 36(3):595–617. [PubMed: 11482591]
25. Fongwa MN, Cunningham W, Weech-Maldonado R, et al. Reports and ratings of care: Black and white Medicare enrollees. J Health Care Poor Underserved. 2008 Nov; 19(4):1136–47. [PubMed: 19029741]
26. Hays RD, Shaul JA, Williams VS, et al. Psychometric properties of the CAHPS 1.0 survey measures. Consumer Assessment of Health Plans Study. Med Care. 1999 Mar; 37(3 Suppl):MS22–31. [PubMed: 10098556]
27. Callen JL, Bevis M, McIntosh JH. Patients' perceptions of general practitioners using computers during the patient-doctor consultation. HIM J. 2005; 34(1):8–12. [PubMed: 18239223]
28. Garrison GM, Bernard ME, Rasmussen NH. 21st-century health care: The effect of computer use by physicians on patient satisfaction at a family medicine clinic. Fam Med. 2002 May; 34(5):362–8. [PubMed: 12038718]
29. United States. Dept. of Health and Human Services, United States. Agency for Healthcare Research and Quality. 2010 National Healthcare Disparities Report. Rockville, MD: U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality; 2010.
30. Arar N, McGrath J, Rosales J, et al. The role of electronic medical records in improving patient-centred care in outpatient encounters. Journal on Information Technology in Healthcare. 2004; 2:187, 187–202.
31. Katz MG, Jacobson TA, Veledar E, et al. Patient literacy and question-asking behavior during the medical encounter: A mixed-methods analysis. J Gen Intern Med. 2007 Jun; 22(6):782–6. [PubMed: 17431697]

32. Beach MC, Roter DL, Okelo SO, et al. Is health literacy associated with patient and physician communication behaviors? J Gen Intern Med. 2007 Apr.22:152–3.

33. Ishikawa H, Yano E, Fujimori S, et al. Patient health literacy and patient-physician information exchange during a visit. Fam Pract. 2009 Dec; 26(6):517–23. [PubMed: 19812242]

34. Roter DL, Erby LH, Larson S, et al. Assessing oral literacy demand in genetic counseling dialogue: Preliminary test of a conceptual framework. Soc Sci Med. 2007 Oct; 65(7):1442–57. [PubMed: 17614177]

35. Schillinger D, Bindman A, Wang F, et al. Functional health literacy and the quality of physician-patient communication among diabetes patients. Patient Educ Couns. 2004 Mar; 52(3):315–23. [PubMed: 14998602]

36. Berkman ND, Sheridan SL, Donahue KE, et al. Low health literacy and health outcomes: An updated systematic review. Ann Intern Med. 2011 Jul 19; 155(2):97–107. [PubMed: 21768583]

37. Napoles AM, Santoyo-Olsson J, Karliner LS, et al. Clinician ratings of interpreter mediated visits in underserved primary care settings with ad hoc, in-person professional, and video conferencing modes. J Health Care Poor Underserved. 2010 Feb; 21(1):301–17. [PubMed: 20173271]

38. Agency for Healthcare Research and Quality. About the CAHPS Health Information Technology Item Set. Washington, D.C: AHRQ; 2011.

Table 1

Characteristics of patients surveyed about primary care clinician computer use at an urban, hospital-based safety-net clinic (n=399)

Characteristic	
Age, years (SD)	54.5 (12.5)
Female, n (%)	195 (55.7)
Race/Ethnicity, n (%)	
White	60 (18.0)
African American	57 (17.1)
Latino	105 (31.4)
Asian	96 (28.7)
Native American, Hawaiian / Pacific-Islander, or Other	16 (4.8)
Preferred language, n (%)	
English	243 (60.9)
Spanish	87 (21.8)
Cantonese	69 (17.3)
Educational attainment, n (%)	
Less than high school	83 (25.2)
Some high school	34 (10.3)
High school graduate or GED	86 (26.1)
Some college or 2-year degree	73 (22.2)
4-year college graduate	29 (8.8)
More than 4-year college degree	24 (7.3)
Internet use, n (%)	
User	160 (50.8)
Non-user	155 (49.2)
Primary care provider, n (%)	
Faculty physician	95 (23.8)
Nurse practitioner	56 (14.0)
Resident physician	134 (33.6)
Unsure / no response	114 (28.6)

Table 2

Patient perceptions of primary care clinician computer use at an urban, hospital-based safety-net clinic (n=399)

	No time	A little time	Half of the time	Most of the time	All of the time
When we are together in the room, my provider spends ___on the computer.	10%	48%	24%	11%	7%
	Strongly agree	**Agree**	**Neither**	**Disagree**	**Strongly disagree**
The computer in the room helped my provider understand my health issues.	44%	37%	9%	1%	1%
The computer in the room helped my provider remember my concerns.	41%	36%	10%	3%	2%
My provider listened to me less carefully because of the computer in the room.	9%	11%	14%	31%	26%
My provider looked less at me because of the computer in the room.	4%	10%	16%	32%	29%
The computer in the room helped my doctor take better care of me.	39%	35%	11%	3%	3%

Table 3

Associations of race/ethnicity, language, and education with patient perceptions of primary care clinician computer use at an urban, hospital-based safety-net clinic (n=399)*

	When we are together in the room, my provider spends ___ the time on the computer? (half or more)		The computer in the room helped my provider understand my health issues. (agree or strongly agree)		The computer in the room helped my provider remember my concerns. (agree or strongly agree)		My provider listened to me less carefully because of the computer in the room. (agree or strongly agree)		My provider looked less at me because of the computer in the room. (agree or strongly agree)		The computer in the room helped my provider take better care of me. (agree or strongly agree)	
	OR (95% CI)	AOR† (95% CI)	OR† (95% CI)	AOR† (95% CI)	OR (95% CI)	AOR† (95% CI)	OR (95% CI)	AOR† (95% CI)	OR (95% CI)	AOR† (95% CI)	OR (95% CI)	AOR † (95% CI)
African American	1.3 (0.5, 3.0)	1.1 (0.4, 3.2)	1.2 (0.5, 2.8)	1.7 (0.6, 4.9)	1.2 (0.5, 2.8)	1.5 (0.6, 3.9)	1.3 (0.6, 2.9)	1.8 (0.7, 5.1)	1.8 (0.7, 5.1)	2.9 (0.8, 10.0)	0.6 (0.3, 1.4)	1.0 (0.4, 2.7)
Latino	2.2 (1.0, 4.7) ‡	0.5 (0.1, 1.6)	1.3 (0.6, 3.0)	3.4 (0.9, 13.0)	1.1 (0.6, 2.3)	2.7 (0.8, 9.0)	0.5 (0.2, 1.0)	0.9 (0.3, 2.9)	0.9 (0.3, 2.4)	0.9 (0.3, 3.7)	0.7 (0.3, 1.4)	0.8 (0.3, 2.2)
Asian	10.8 (4.9, 23.8) ‡	3.1 (1.1, 6.1) ‡	1.9 (0.8, 4.6)	3.7 (1.0, 14.4)	2.5 (1.1, 5.8) ‡	5.6 (1.6, 19.4) ‡	0.6 (0.3, 1.4)	0.9 (0.3, 2.8)	1.6 (0.6, 4.2)	1.5 (0.4, 5.8)	1.3 (0.6, 2.8)	1.5 (0.5, 4.3)
Other	1.3 (0.4, 4.8)	1.5 (0.3, 6.2)	1.9 (0.4, 9.6)	4.8 (0.5, 42.7)	1.8 (0.4, 6.8)	2.8 (0.5, 14.4)	1.0 (0.3, 3.6)	1.0 (0.2, 4.2)	0.5 (0.1, 4.4)	0.6 (0.3, 4.1)	2.1 (0.4, 10.5)	5.3 (0.6, 46.6)
Limited English Proficiency	4.4 (2.8, 7.0) ‡	3.6 (1.2, 10.6) ‡	3.4 (1.7, 6.9) ‡	1.1 (0.3, 2.4)	1.0 (0.6, 1.7)	0.8 (0.3, 2.9)	0.4 (0.2, 0.7) ‡	0.3 (0.1, 0.9) ‡	0.8 (0.4, 1.4)	0.4 (0.1, 1.7)	1.1 (0.7, 1.8)	1.9 (0.7, 5.0)
Less than high school education	5.0 (2.9, 8.9) ‡	2.2 (0.9, 5.1)	1.2 (0.6, 2.4)	0.8 (0.3, 2.2)	0.9 (0.5, 1.6)	0.6 (0.3, 1.6)	0.5 (0.2, 0.9) ‡	1.1 (0.3, 3.5)	0.5 (0.2, 1.2)	0.4 (0.1, 1.7)	1.1 (0.6, 2.0)	0.9 (0.4, 2.2)

*References are White, English, and high school or higher educational attainment for analyses, respectively.

†Logistic regression controlling for patient age, gender, and Internet use and type of primary care provider (faculty physician, resident physician, or nurse practitioner).

‡p-value statistically significant (<0.05).