Published in final edited form as:

Cancer Causes Control. 2011 February ; 22(2): 199–206. doi:10.1007/s10552-010-9687-2.

Intention to receive cancer screening in Native Americans from the Northern Plains

Nancy Pandhi,

Department of Family Medicine, University of Wisconsin School of Medicine and Public Health, 800 University Bay Drive, Box 9445, Madison, WI 53705, USA

Department of Population Health Sciences, University of Wisconsin School of Medicine and Public Health, 707 WARF Building, 610 North Walnut Street, Madison, WI 53726, USA

B. Ashleigh Guadagnolo,

Department of Radiation Oncology, University of Texas M.D. Anderson Cancer Center, Houston, TX, USA

Shalini Kanekar,

John T. Vucurevich Cancer Care Institute, Rapid City, SD, USA

Daniel G. Petereit,

John T. Vucurevich Cancer Care Institute, Rapid City, SD, USA

Department of Human Oncology, University of Wisconsin School of Medicine and Public Health, 600 Highland Avenue, Madison, WI 53792, USA

Chitra Karki, and

Department of Population Health Sciences, University of Wisconsin School of Medicine and Public Health, 707 WARF Building, 610 North Walnut Street, Madison, WI 53726, USA

Maureen A. Smith

Department of Population Health Sciences, University of Wisconsin School of Medicine and Public Health, 707 WARF Building, 610 North Walnut Street, Madison, WI 53726, USA

Department of Family Medicine, University of Wisconsin School of Medicine and Public Health, 1100 Delaplaine Court, Madison, WI 53715, USA

Department of Surgery, University of Wisconsin School of Medicine and Public Health, 600 Highland Avenue, Madison, WI 53792, USA

Nancy Pandhi: nancy.pandhi@fammed.wisc.edu

Abstract

Background—Native Americans are disproportionately affected by cancer morbidity and mortality. This study examined intention to receive cancer screening in a large sample of Native Americans from the Northern Plains, a region with high cancer mortality rates.

Disclaimer

The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Indian Health Service, National Cancer Institute or the National Institutes of Health.

Methods—A survey was administered orally to 975 individuals in 2004–2006 from three reservations and among the urban Native American community in the service region of the Rapid City Regional Hospital. Data analysis was conducted in 2009.

Results—About 63% of the sample planned to receive cancer screening. In multivariate analyses, individuals who planned to receive cancer screening were women, responsible for four or more people, received physical examinations at least yearly and had received prior cancer screening. They also were more likely to hold the belief that most people would go through cancer treatment even though these treatments can be emotionally or physically uncomfortable. About 90% of those who did not plan to receive cancer screening would be more likely to intend to receive cancer screening if additional resources were available.

Conclusions—In an area of high cancer morbidity and mortality, over one-third of screening eligible individuals did not plan to receive cancer screening. Future research should evaluate the potential for improving cancer screening rates through interventions that seek to facilitate increased knowledge about cancer screening and access to cancer screening services in the community.

Keywords

Early detection of cancer; Intention; Vulnerable populations

Introduction

Cancer currently accounts for one out of every four deaths in the United States. Compared to other racial/ethnic population groups, Native Americans are disproportionately affected by cancer mortality [1–4] and have lower rates of cancer screening [1,5–10]. Moreover, they exhibit higher rates of advanced-stage disease at cancer diagnosis [1,2,11–13]. As a result, from 1975 to 2004, Native Americans were the only racial/ethnic group in the United States that did not experience a decline in cancer mortality [14]. In the Northern Plains, a region located in the Northern United States spanning eleven states and three Indian Health Service Areas, the mortality rate for cancers in which effective screening exists is 79% higher in Native Americans when compared to Whites [15].

Although several studies have documented facilitators and barriers to receipt of cancer screening for Native American populations [16–20], these studies have not focused on a critical step toward achieving cancer screening—an individual's future intention to be screened. Intention has been shown to be a predictor of future screening in a meta-analysis examining studies across multiple racial-ethnic groups and clinical settings [21]. Intention to get screened is influenced by diverse antecedent factors such as attitudes, beliefs, and social influences [22]. The few studies examining this issue in Native Americans have solely focused on breast and cervical cancer screening intention among Native American women. These studies have found that traditional beliefs and practices are a predictor of mammogram [23,24] and cervical cancer screening intention [25,26] along with other cancer knowledge, health system, and socio-demographic variables [26].

Understanding factors that predict intention to receive cancer screening in a sample of Native Americans from both genders is important because effective cancer screening exists for both genders. This is particularly critical for Native Americans residing in the Northern Plains who have the highest age-adjusted cancer mortality rates compared to other regions in the United States [27]. Examining the factors that are associated with cancer screening intention in this population can assist with designing targeted interventions that seek to improve cancer screening rates and shed light on potential causes of cancer screening disparities.

In this study, we specifically examine cancer beliefs, knowledge, socio-demographic, and health system factors as predictors of intention to undergo cancer screening. We use data from the Walking Forward Community Survey, one of the largest surveys about cancer screening ever conducted in a Native American population. We also examine the role of potentially providing additional resources for education about and access to cancer screening in increasing the intention to participate in cancer screening.

Methods

Sample and data collection

Participants were a convenience sample recruited at public events such as health fairs, via advertisements, and by word of mouth. They received a twenty dollar incentive for participation. Those eligible were age 21 or older and self-reported that they were enrolled tribal members. All eligible individuals were candidates for periodic cancer screening according to the American Cancer Society Screening Guidelines [28]. Data were not collected on the number of individuals who were approached to participate and declined. The final sample size was 975. The final sample differed from data in the 2000 census by having higher education (57% versus 41–42% with more than a high school education) and more women (61% versus 50–51%) [29]. The survey was orally administered by enrolled tribal members in 2004–2006 on three reservations located in South Dakota and among the urban/Rapid City Native American community in the service region of the Rapid City Regional Hospital also in South Dakota. Surveys approximately took one hour to complete.

Survey and variables

The survey was designed using community-based participatory methodology [30]. The research team started by identifying from the literature known barriers to cancer screening in underserved populations and then by developing questions about these barriers. Focus groups in the community examined these questions for cultural appropriateness and clarity of concept. After revision, the questions were then sent on to the tribal leadership and the Indian Health Service for comment and approval. Walking Forward staff who are also community members administered the survey and had input into interpretation of data via review and editing of final manuscripts. The final survey contained 65 questions. Questions covered demographics, logistical difficulties with accessing care, personal medical history, knowledge of cancer and clinical trials, perceptions and beliefs about cancer, and future intentions regarding cancer screening and treatment. IRB approval was obtained from all appropriate institutions including IHS and tribal health boards.

Intention to undergo cancer screening, the primary-dependent variable, was assessed by response to a question that asked about cancer screening in general, “I plan to obtain cancer screening?” No and I do not know responses were combined and compared to a yes response. Only individuals answering this question were included in the analyses ($n = 950$). Explanatory variables included information on cancer beliefs, cancer knowledge, socio-demographics, and health care. Cancer beliefs were assessed by asking respondents to place their perceptions and beliefs on a five-point scale between two opposing statements assessing cancer fatality, whether talking about cancer could cause cancer, quality of life prospects after cancer survival and the impact of discomfort caused by treatment on the decision to go through cancer treatment. Cancer knowledge was assessed by summing up the correct responses to three multiple choice questions. Correct answers were “cancer is a name for about 100 different diseases,” “a cancer screening test is a medical test that looks for cancer,” and “the chances of curing cancer are better if the cancer is found and treated early.”

Socio-demographic variables included age, gender, education, number of people for whom the respondent felt personally responsible including extended family and friends, the presence of reliable transportation and daily phone access. Health care questions asked about the presence of a medical condition requiring regular visits to a health care provider or facility, frequency of physical check-ups besides monitoring of an existing condition, first place seeking medical care when sick, one-way travel distance to regular health care provider, how medical bills are paid, whether a doctor or nurse ever recommended cancer screening, and ever having received cancer screening previously.

The number of additional access and knowledge resources requested was tallied from yes/no questions that asked if participants “would be more likely to go for cancer screening if: a person made a public presentation on it in my community, I knew more about cancer screening, a cancer screening clinic came to my community regularly, I had help with transportation, I had help making an appointment for the screening.”

Statistical analysis

Data were analyzed using Stata version 10.0. Using logistic regression, odds ratios (OR) and 95% confidence intervals (CI) were calculated comparing those who did not intend to those who did intend to receive cancer screening. Using a backward selection process, we manually eliminated those variables that were not significant at $p < .20$. All other variables were included in the model. Likelihood tests were conducted to determine the statistical significance for groups of indicator variables. Results were considered statistically significant at $p < 0.05$.

Results

Sample characteristics are described in Table 1. Over half of the sample was aged ^{21–40}, women and had at least a high school education. The majority had reliable transportation and phone access. Most had medical bills paid by and received health care first through the IHS. About 46% had medical conditions that required regular doctor visits, and 70% received physical examinations at least yearly. About 45% reported prior cancer screening. About 26% answered two or three cancer knowledge questions correctly. Five to eleven percent held negative perceptions and beliefs about cancer.

About 63% of the sample planned to obtain cancer screening. After adjustment, men (OR 0.69; 95% CI 0.47–0.98) were less likely to plan to receive cancer screening than women (Table 2). Individuals who were responsible for four or more people (1.69; 1.12–2.55) received physical examinations at least once a year (2.38; 1.04–3.49) or every 2–3 years (1.91; 1.08–2.33) or had been screened for cancer before (1.89; 1.26–2.83) were more likely to say yes, they did intend to obtain cancer screening. Individuals who said yes were also more likely to hold the belief that most people would go through cancer treatments even though the treatments can be emotionally or physically uncomfortable (1.28; 1.11–1.48). Age, education, reliable phone or transportation, travel distance to provider, payor of medical bills, first place seeking care, the presence of a medical condition requiring medical visits, a health care provider’s recommendation for cancer screening, cancer knowledge, and other negative cancer perceptions and beliefs were not significant predictors of cancer screening intention. Differences in beliefs or intention to receive cancer screening across tribes were not able to be analyzed due to inadequate study power.

Figure 1 shows the percent of individuals who reported that additional access and knowledge resources would make them more likely to receive cancer screening by the intent to obtain cancer screening. About 10% of those who did not intend to get screened for cancer reported not wanting any additional resources to improve their access to cancer

screening or knowledge about cancer screening. About 46% of those who did not intend to receive cancer screening reported being more likely to receive screening if they had all five resources suggested in these areas. In contrast, 73% of those who already intended to receive screening also reported wanting all five of these resources (p-value < .001).

Discussion

In this large sample of Native Americans from the Northern Plains, a region with high cancer mortality rates, we found that only 63% of screening eligible individuals planned to obtain cancer screening. Those who planned to receive cancer screening were more likely to be women, be personally responsible for four or more people, have frequent physical examinations, have had cancer screening in the past, and believe that people would go through cancer treatment despite the fact that these treatments can be uncomfortable.

Our findings highlight the importance of understanding which beliefs are relevant when designing interventions that seek to improve cancer screening rates. The only assessed belief in our study that was a significant predictor of cancer screening intention was a normative belief about the decision of others to undergo cancer treatment despite side effects. The importance of collective norms in Native American culture has been well documented [31,32].

Other research has discussed that Native American individuals who are diagnosed with cancer may choose not to widely disclose their diagnosis due to the negative stigma associated with cancer in the culture [33–35]. In fact, in a separate survey of cancer patients in this region, 40% of Native American patients already diagnosed with cancer agreed with the statement that “once someone is diagnosed with cancer, people in the community will treat that person in a way that makes him or her uncomfortable” [36]. A potential opportunity for intervention in our population may be to engage Native American community members who have received cancer treatment in the public health effort to increase education and awareness about cancer screening and its benefits [35,37]. Involving cancer survivors also has emerged as a strategy to improve cancer screening in other ethnic populations. For example, testimonials from prostate cancer survivors are known to influence the decision to get screened for prostate cancer among African American men [38]. Also, results from a focus group study among Hispanic and African American men revealed that their preferred method of receiving cancer screening education was through use of cancer survivors [39]. This approach could help mitigate fears about treatment itself as well as empower previously diagnosed individuals with a positive role in the community, thus countering some of the cultural stigma associated with cancer diagnosis.

Our findings also suggest that intention to receive cancer screening is associated with an individual's past decision to engage in preventive behaviors and less related to health care system factors. Similar to other studies, we found that having prior cancer screening and more frequent physical examinations was a significant positive predictor of cancer screening intention [40,41]. Interestingly, unlike what has been found with actual receipt of cancer screening, the place where health care was received [42–44] and receiving a health care provider's recommendation for screening [45–52] did not predict cancer screening intention in our study. This finding also contrasts with results from the same survey that indicated that the strongest determinant of receiving cancer screening in this population was recommendation for screening by a doctor or nurse [53]. It is possible that a screening recommendation results in an immediate action leading to screening (e.g. scheduling an appointment), but intention to receive screening reflects a preference based on pre-existing attitudes and social influences [22] in which health care providers were not strong influences. Another possible explanation for the differing results found in this study when

compared to others is sample demographics. The majorities of our respondents were women aged 21–40 only currently eligible for cervical cancer screening. As they would not be eligible for other types of screening for up to two decades, there may have been different factors that influenced intention to receive cancer screening when compared to other study samples.

We also found that additional resources for cancer screening education and assistance with cancer screening in the community have potential to improve the intention for cancer screening. About 90% of individuals who originally did not plan to receive cancer screening stated they would be more likely to receive cancer screening if they had these resources. Our community-based program, Walking Forward, is further expanding cancer screening services through a more comprehensive patient navigation system. During the first phase of Walking Forward (2004–2009), community navigators were involved in educational outreach that emphasized the importance of cancer screening and early detection that could potentially lead to more successful cancer-related health outcomes if patients were diagnosed with early stages of cancer. In the next phase of Walking Forward, a cancer screening coordinator will work within the Indian Health Services (IHS) clinic to coordinate and facilitate cancer screenings, follow up on abnormal results, and refer newly diagnosed cancer patients for treatment in a timely fashion. The cancer screening coordinators will work in tandem with the community navigators, who will continue to conduct cancer educational modules in an effort to increasing screening rates. Through these interventions, it is the long-term goal of the program to lower cancer mortality rates among Native Americans in this region.

Our study results should be interpreted in light of certain study limitations. Because the study cohort was not a random sample, our results may not be generalizable to all Native Americans from the Northern Plains region nor perhaps to other Native American groups. The North American Native American population is comprised of multiple culturally heterogeneous and vulnerable sub-populations harboring unique socio-cultural concerns with respect to health care from region to region [18,19,24,54,55]. In particular, it is noteworthy that a greater proportion of patients surveyed for this study had completed high school or greater than high school education than what is observed for Native Americans nationally. As a lower educational level has been associated with decreased use of preventative health services and cancer screening in minority populations [7,54,56], our findings might overestimate the percentage of individuals who intend to receive cancer screening in this population.

In conclusion, in the Northern Plains, an area of high cancer morbidity and mortality, we found only approximately two-thirds of screening eligible individuals intended to receive cancer screening. Interventions that increase interaction with individuals already diagnosed with and treated for cancer may offer an opportunity to improve awareness of benefits of screening in this community. Also, efforts that facilitate increased knowledge about and access to cancer screening in this community show significant promise for improving the cancer screening rate. Future research should evaluate these potential types of interventions for effectiveness in reducing cancer mortality in this vulnerable population.

Acknowledgments

We acknowledge that this project was supported by the Community-Academic Partnerships core of the University of Wisconsin Institute for Clinical and Translational Research (UWICTR) funded through an NIH Clinical and Translational Science Award (CTSA), grant number 1 UL1 RR025011, as well as funds from the National Cancer Institute, under contract no. N01-CO-12400 (National Institutes of Health grant RFA 1U56CA9901001). In addition, Nancy Pandhi is supported by a National Institute on Aging Mentored Clinical Scientist Research Career

Development Award, grant number 1K08AG029527. This research was also supported in part by NTH/NCI grant number 5U56CA99010 (to Daniel G. Petereit).

References

1. Ward E, Jemal A, Cokkinides V, Singh GK, Cardinez C, Ghafoor A, et al. Cancer disparities by race/ethnicity and socio-economic status. *CA Cancer J Clin* 2004;54(2):278–293.
2. Clegg LX, Li FP, Hankey BF, Chu K, Edwards BK. Cancer survival among US whites and minorities: a SEER (Surveillance, Epidemiology, and End Results) Program population-based study. *Arch Intern Med* 2002;162(17):1985–1993. [PubMed: 12230422]
3. Li CI, Malone KE, Daling JR. Differences in breast cancer stage, treatment, and survival by race and ethnicity. *Arch Intern Med* 2003;163:49–56. [PubMed: 12523916]
4. Espey, DK.; Paisano, RE.; Cobb, N. Cancer mortality among American Indians and Alaska Natives: regional difference, 1994–1998. Rockville: Indian Health Service; 2003.
5. Giuliano A, Papenfuss M, de Zapien JD, Tilousi S, Nuvayestewa L. Breast cancer screening among southwest American Indian women living on-reservation. *Prev Med* 1998;27(1):135–143. [PubMed: 9465364]
6. Risendal B, DeZapien J, Fowler B, Papenfuss M, Giuliano A. Pap smear screening among urban Southwestern American Indian women. *Prev Med* 1999;29(6):510–518. [PubMed: 10600432]
7. Coughlin SS, Uhler RJ, Blackman DK. Breast and cervical cancer screening practices among American Indian and Alaska Native women in the United States, 1992–1997. *Prev Med* 1999;29(4):287–295. [PubMed: 10547054]
8. Swan J, Breen N, Coates RJ, Rimer BK, Lee NC. Progress in cancer screening practices in the United States—results from the 2000 National Health Interview Survey. *Cancer* 2003;97(6):1528–1540. [PubMed: 12627518]
9. Gilliland FD, Rosenberg RD, Hunt WC, Stauber P, Key CR. Patterns of mammography use among Hispanic, American Indian, and non-Hispanic White women in New Mexico, 1994–1997. *Am J Epidemiol* 2000;152(5):432–437. [PubMed: 10981456]
10. Eberth JM, Huber JC Jr, Rene A. Breast cancer screening practices and correlates among American Indian and Alaska native women in California, 2003. *Womens Health Issues* 2010;20(2):139–145. [PubMed: 20211430]
11. Li CI, Daling JR, Malone KE. Incidence of invasive breast cancer by hormone receptor status from 1992 to 1998. *J Clin Oncol* 2003;21(1):28–34. [PubMed: 12506166]
12. Petereit DG, Rogers D, Govern F, Coleman N, Osburn CH, Howard SP, et al. Increasing access to clinical cancer trials and emerging technologies for minority populations: The Native American Project. *J Clin Oncol* 2004;22(22):4452–4455. [PubMed: 15542797]
13. Rogers D, Petereit DG. Cancer disparities research partnership in Lakota Country: clinical trials, patient services and community education for the Oglala, Rosebud and Cheyenne River Sioux Tribes. *Am J Public Health* 2005;95(12):1–4.
14. Espey DK, Wu XC, Swan J, Wiggins C, Jim MA, Ward E, et al. Annual report to the nation on the status of cancer, 1975–2004, featuring cancer in American Indians and Alaska natives. *Cancer* 2007;110(10):2119–2152. [PubMed: 17939129]
15. Indian Health Service. 2000–2001 Trends in Indian Health. Rockville: U.S. Department of Health and Human Services, Indian Health Service, Office of Public Health, Division of Program Statistics; 2004.
16. Jerant AF, Fenton JJ, Franks P. Determinants of racial/ethnic colorectal cancer screening disparities. *Arch Intern Med* 2008;168(12):1317–1324. [PubMed: 18574089]
17. Ackerson K, Gretebeck K. Factors influencing cancer screening practices of underserved women. *J Am Acad Nurse Pract* 2007;19(11):591–601. [PubMed: 17970859]
18. Lillie-Blanton M, Roubideaux Y. Understanding and addressing the health care needs of American Indians and Alaska natives. *Am J Public Health* 2005;95(5):759–761. [PubMed: 15855447]
19. Call K, McAlpine DD, Johnson PJ, Beebe TJ, McRae J, Song Y. Barriers to care among American Indians in public health care programs. *Med Care* 2006;44(6):595–600. [PubMed: 16708009]

20. Schumacher MC, Slattery ML, Lanier AP, Ma KN, Edwards S, Ferucci ED, et al. Prevalence and predictors of cancer screening among American Indian and Alaska native people: the EARTH study. *Cancer Causes Control* 2008;19(7):725–737. [PubMed: 18307048]
21. Cooke R, French D. How well do the theory of reasoned action and theory of planned behaviour predict intentions and attendance at screening programmes? A meta-analysis. *Psychol Health* 2008;23:745–765.
22. Lechner L, de Vries H, Offermans N. Participation in a breast cancer screening program: influence of past behavior and determinants on future screening participation. *Prev Med* 1997;26(4):473–482. [PubMed: 9245669]
23. Canales MK, Rakowski W, Howard A. Traditionality and cancer screening practices among American Indian women in Vermont. *Health Care Women Int* 2007;28(2):155–181. [PubMed: 17364978]
24. Burhansstipanov L, Dignan MB, Bad Wound D, Tenney M, Vigil G. Native American recruitment into breast cancer screening: the NAWWA Project. *J Cancer Educ* 2000;15:29–33.
25. Arambula, STG. Psycho-social predictors of cervical cancer screening among young, American Indian women. The 128th Annual Meeting of APHA; 12–16; Boston, MA. 2000.
26. Arambula, STG.; Gottlieb, NH. Sociodemographic and health care system factors influencing cervical cancer screening among young American Indian women. Wicazo SA: Review; 2001. p. 31–46.
27. Centers for Disease Control and Prevention. Cancer mortality among American Indians and Alaska Natives–United States, 1994–1998. *Morb Mortal Wkly Rep* 2003;52(30):704–707.
28. American Cancer Society. American Cancer Society guidelines for the early detection of cancer. Atlanta, GA: 2008. [updated 2008 March 5, 2008; cited 2008 March 12]; Available from: http://www.cancer.org/docroot/PED/content/PED_2_3X_ACS_Cancer_Detection_Guidelines_36.asp
29. U.S. Census Bureau. American Indian and Alaska Native Summary File (AIANSF). U.S. Census Bureau; 2004. [updated 2004; cited 2009 October 27]. Available from: <http://www.census.gov/Press-Release/www/2004/AIANSF.html>
30. Minkler, M.; Wallerstein, N., editors. Community-based participatory research for health. San Francisco: Jossey-Bass; 2003.
31. Lowe J. Balance and harmony through connectedness: the intentionality of Native American nurses. *Holist Nurs Pract* 2002;16(4):4–11. [PubMed: 12060944]
32. Hill DL. Sense of belonging as connectedness, American Indian worldview, and mental health. *Arch Psychiatr Nurs* 2006;20(5):210–216. [PubMed: 17010824]
33. Canales MK, Geller BM. Moving in between mammography: screening decisions of American Indian women in Vermont. *Qual Health Res* 2004;14(6):836–857. [PubMed: 15200803]
34. Becker SA, Affonso DD, Blue Horse Beard M. Talking circles: Northern Plains tribes American Indian women's views of cancer as a health issue. *Public Health Nurs* 2006;23(1):27–36. [PubMed: 16460418]
35. Kaur J. The potential impact of cancer survivors on Native American cancer prevention and treatment. *Cancer* 1996;78(7):1578–1581. [PubMed: 8839574]
36. Guadagnolo BA, Cina K, Helbig P, Molloy K, Reiner M, Cook EF, et al. Assessing cancer stage and screening disparities among Native American cancer patients. *Public Health Rep* 2009;124(1):79–89. [PubMed: 19413030]
37. Kreuter MW, Buskirk TD, Holmes K, Clark EM, Robinson L, Si X, et al. What makes cancer survivor stories work? An empirical study among African American women. *J Cancer Survivorship* 2008;2(1):33–44.
38. Ford ME, Vernon SW, Havstad SL, Thomas SA, Davis SD. Factors influencing behavioral intention regarding prostate cancer screening among older African-American men. *J Natl Med Assoc* 2006;98(4):505–514. [PubMed: 16623062]
39. Meade C, Calvo A, Rivera M, Baer R. Focus groups in the design of prostate cancer screening information for Hispanic farmworkers and African American men. *Oncol Nurs Forum* 2003;30(6):967–975. [PubMed: 14603354]

40. Berglund G, Nilsson S, Nordin K. Intention to test for prostate cancer. *Eur J Cancer* 2005;41(7): 990–997. [PubMed: 15862747]
41. O'Neill SC, Bowling JM, Brewer NT, Lipkus IM, Skinner CS, Strigo TS, et al. Intentions to maintain adherence to mammography. *J Womens Health* 2008;17(7):1133–1141.
42. DeVoe JE, Fryer GE, Phillips R, Green L. Receipt of preventive care among adults: insurance status and usual source of care. *Am J Public Health* 2003;93(5):786–791. [PubMed: 12721145]
43. Mandelblatt JS, Gold K, O'Malley AS, Taylor K, Cagney K, Hopkins JS, et al. Breast and cervix cancer screening among multiethnic women: role of age, health, and source of care. *Prev Med* 1999;28(4):418–425. [PubMed: 10090871]
44. Baker LC, Phillips KA, Haas JS, Liang SY, Sonneborn D. The effect of area HMO market share on cancer screening. *Health Serv Res* 2004;39(6):1751–1772. [PubMed: 15533185]
45. Bazargan M, Ani C, Bazargan-Hejazi S, Baker RS, Bastani R. Colorectal cancer screening among underserved minority population: discrepancy between physicians' recommended, scheduled, and completed tests. *Patient Educ Couns* 2009;2(76):240–247. [PubMed: 19150198]
46. Friedman LC, Webb JA, Everett TE. Psychosocial and medical predictors of colorectal cancer screening among low-income medical outpatients. *J Cancer Educ* 2004;19(3):180–186. [PubMed: 15458875]
47. May DS, Kiefe CI, Funkhouser E, Fouad MN. Compliance with mammography guidelines: physician recommendation and patient adherence. *Prev Med* 1999;28(4):386–394. [PubMed: 10090868]
48. Taylor VM, Schwartz SM, Jackson JC, Kuniyuki A, Fischer M, Yasui Y, et al. Cervical cancer screening among Cambodian-American women. *Cancer Epidemiol Biomarkers Prev* 1999;8(6): 541–546. [PubMed: 10385145]
49. O'Malley AS, Gonzalez RM, Sheppard VB, Huerta E, Mandelblatt J. Primary care cancer control interventions including Latinos—a review. *Am J Prev Med* 2003;25(3):264–271. [PubMed: 14507536]
50. Bazargan M, Bazargan SH, Farooq M, Baker RS. Correlates of cervical cancer screening among underserved Hispanic and African-American women. *Prev Med* 2004;39(3):465–473. [PubMed: 15313085]
51. Bazargan M, Bazargan SH, Calderon JL, Husaini BA, Baker RS. Mammography screening and breast self-examination among minority women in public housing projects: the impact of physician recommendation. *Cell Mol Biol* 2003;49(8):1213–1218. [PubMed: 14983989]
52. Skinner CS, Champion VL, Gonin R, Hanna M. Do perceived barriers and benefits vary by mammography stage? *Psychology. Health Med* 1997;2(1):65–75.
53. Pandhi N, Guadagnolo BA, Kanekar S, Petereit DG, Smith MA. Cancer screening in Native Americans from the Northern Plains. *Am J Prev Med* 2010;38(4):389–395. [PubMed: 20307807]
54. Seals BF, Burhansstipanov L, Satter DE, Chia YJ, Gatchell M. California American Indian and Alaska Natives tribal groups' care access and utilization of care: policy implications. *J Cancer Educ* 2006;21(1):S15–S21. [PubMed: 17020497]
55. Michalek AM, Mahoney MC, Burhansstipanov L, Tenney M, Cobb N. Urban-based Native American cancer-control activities: services and perceptions. *J Cancer Educ* 1996;11(3):159–163. [PubMed: 8877576]
56. Cornelius LJ, Smith PL, Simpson GM. What factors hinder women of color from obtaining preventive health care? *Am J Public Health* 2002;92(4):535–539. [PubMed: 11919046]

Fig. 1.
Number of access and knowledge resources requested by intent to obtain cancer screening

Table 1

Sample characteristics (n = 950)

	%	n
Age		
21–40	51	482
41–60	37	348
61+	12	115
Female	61	581
Education		
<High school	23	201
High school	20	178
>High school	57	505
Reliable transportation	59	554
Daily phone access	93	885
Number of people personally responsible for		
0 or 1	38	351
2 or 3	35	316
4+	27	247
One-way travel distance to regular provider		
0–25 miles	75	705
26–50 miles	16	151
51+ miles	9	88
Payor of medical bills		
IHS ^a only	40	376
IHS and medicare	24	227
IHS and other	17	156
Medicare	15	137
Self-pay and other	4	38
First place seeking medical care		
IHS Clinic	90	841
Other	10	91
Medical condition requiring regular visits	46	437
Frequency of physical examinations		
Every year or more than once a year	70	642
Every 2–3 years	9	87
Never/only when I need to	21	193
Doctor or nurse recommended cancer screening	29	274
Ever had cancer screening	45	415
Correct Answers to Cancer Knowledge Questions		
0	3	32
1	70	654
2 or 3	26	246

	%	n
Cancer perceptions and beliefs ^b		
Good chance you die from cancer no matter what	5	43
Talking about cancer can cause cancer	9	77
Many cancer survivors are not able to live a good life anymore	8	67
Many would not go through cancer treatment because it can be uncomfortable	11	95

^aIHS Indian Health Service

^bThose indicating their perception/belief was in the two categories closest to this response

Table 2

Adjusted Odds Ratios and 95% Confidence Intervals for Planning to obtain cancer screening comparing those saying yes (n = 602) to no/I don't know (n = 348)

	OR	95% CI
Male	0.68*	(0.47, 0.98)
Number of people personally responsible for		
2 or 3	1.04	(0.72, 1.5)
4+	1.69*	(1.12, 2.55)
One-way travel distance to regular provider		
26–50 miles	1.34	(0.85, 2.13)
51+ miles	1.49	(0.85, 2.62)
Frequency of physical examinations		
Every year or more than once a year	2.38*	(1.04, 3.49)
Every 2–3 years	1.91*	(1.08, 2.33)
Doctor or nurse recommended cancer screening	1.43	(0.94, 2.16)
Ever had cancer screening	1.89**	(1.26, 2.83)
Correct Answers to Cancer Knowledge Questions		
One question answered correctly	0.64	(0.22, 1.85)
Two or three questions answered correctly	0.62	(0.21, 1.86)
Cancer perceptions and beliefs		
Many people who have survived cancer are able to live a good life	0.88	(0.76, 1.03)
Many people would go through cancer treatments even though the treatments can be emotionally or physically uncomfortable	1.28***	(1.11, 1.48)

Baseline category for comparison is women; personally responsible for 0–1 persons; 0–25 miles; never did physical examination or only when needed; did not answer any cancer questions correctly; believe that many cancer survivors are not able to live a good life anymore; many would not go through cancer treatment because it would be uncomfortable

* $p \leq 0.05$;

** $p \leq 0.01$;

*** $p \leq 0.001$