Published in final edited form as:
J Cancer Educ. 2013 September ; 28(3): 527–534. doi:10.1007/s13187-013-0498-5.

Do Better-rated Navigators Improve Patient Satisfaction with Cancer-Related Care?

Pascal Jean-Pierre, PhD, MPH[1], **Paul C. Winters, MS**[2], **Jack A. Clark, PhD**[3], **Victoria Warren-Mears, PhD, RD**[4], **Kristen J. Wells, PhD, MPH**[5], **Douglas M. Post, PhD**[6], **Nancy LaVerda, MPH**[7], **Mary Ann Van Duyn, PhD, MPH, RD, LD**[8], **Kevin Fiscella, MD, MPH**[2], and **Patient Navigation Research Program Group**[9]

[1]University of Notre Dame, Department of Psychology, Notre Dame, IN

[2]University of Rochester Medical Center, Department of Family Medicine, Rochester, NY

[3]Center for Health Quality, Outcomes, and Economic Research – VA HSR&D, Boston University School of Public Health, Boston, MA

[4]Northwest Portland Area Indian Health Board, Tribal Epidemiology Center, Portland, OR

[5]University of South Florida College of Medicine, Center for Evidence-based Medicine and Health Outcomes Research, Tampa, FL

[6]Ohio State Wexner Medical Center, Department of Family Medicine, Columbus, OH

[7]George Washington University (GWU) Cancer Institute, GWU Medical Center, Washington, DC

[8]Center to Reduce Cancer Health Disparities, National Cancer Institute, Rockville, MD

[9]the Patient Navigation Research Program group.

Abstract

Background—Patient navigation has emerged as a promising strategy for addressing racial-ethnic and socioeconomic disparities in cancer-related care. However, little is known about the impact of patients' perception of the quality of navigation on patient outcomes. We examined the impact of better-rated navigators on patients' satisfaction with cancer related care.

Methods—The sample included 1,593 adults (85.8% with abnormal cancer screening and 14.2% with confirmed cancer diagnosis) who received patient navigation. We defined better-rated navigators as those scoring above the first quartile of mean scores on the Patient Satisfaction with Interpersonal Relationship with Navigator (PSN-I) scale. We defined patient satisfaction based on scores above or below the median of the Patient Satisfaction with Cancer-Related Care scale (PSCC). We controlled for patient and site characteristics using backward selection logistic regression analyses.

Results—Among patients with abnormal screening, having a better-rated navigator was associated with higher score on the PSCC (p<0.05). After controlling for other bivariate predictors

Corresponding author: Pascal Jean-Pierre, PhD, MPH University of Notre Dame Department of Psychology 109 Haggar Hall, Notre Dame, IN 46556 Tel: (574) 631-2589 PJeanPierre@ND.edu.

The Patient Navigation Research Program Group consists of *Steven R. Patierno, PhD*, Duke Cancer Institute, Duke University Medical Center, Durham, NC; *Richard G. Roetzheim, MD, MSPH*, H. Lee Moffitt Cancer Center & Research Institute, Tampa, FL; *Peter C. Raich, MD, FACP*, Denver Health & Hospital Authority, Denver, CO; *Electra Paskett, PhD, MPH*, The Ohio State University, Columbus, OH; *Karen Freund, MD, MPH*, Institute for Clinical Research & Health Policy Studies, Tufts Medical Center, Boston, MA; *Donald J. Dudley, MD*, and Jennifer Quinlan, MPH; University of Texas Health Science Center, San Antonio, TX; *Steve Rosen, MD*, Northwestern University, Chicago, IL.

Financial Disclosure(s): The authors have no financial disclosures to make. No conflict of interest.

of satisfaction (e.g., age, race, income, and household size), navigation by better-rated navigators was associated with a greater likelihood of having higher patient satisfaction (Odds Ratio [OR]: 1.38, 95% Confidence Interval [CI]: 1.05-1.82). Similar findings between better-rated navigators and score on the PSCC were found for participants with diagnosed cancer (OR: 3.06, 95% CI: 1.56-6.0).

Conclusions—Patients navigated by better-rated navigators reported higher satisfaction with their cancer-related care.

Keywords

Patient Navigation; Cancer Disparities; Patient Satisfaction with Interpersonal Relationship with Navigators; Patient Satisfaction with Cancer-related Care

INTRODUCTION

Disparities in cancer-related care based on race-ethnicity, socioeconomic status, or medical insurance have been extensively documented.[1-2] To date, however, there are few effective strategies for addressing these disparities. Too often, patients from underserved racial-ethnic minority groups and those who are poor or uninsured experience disparities in timely access and the quality of cancer-related care they received (e.g., well-timed screening, follow-up of abnormal test findings, definitive diagnosis, delivery of quality standard cancer care, and regular follow-up after completion of cancer treatment).[1-4]

Many efforts have been undertaken to address cancer disparities and improve the cancer-related care experience for individuals from medically underserved racial-ethnic minority and poor populations.[5-9] In recent years, patient navigation (PN) has emerged as a promising tool to address cancer disparities.[10-15] The National Cancer Institute's Center to Reduce Cancer Health Disparities funded a large, multisite collaborative Patient Navigation Research Program (PNRP) to implement and rigorously evaluate PN interventions to reduce disparities in cancer-related care for medically underserved populations. Other organizations and institutions (e.g., the American Cancer Society, AstraZeneca, the Centers for Medicare and Medicaid Services, the Centers for Disease Control and Prevention, Harlem Hospital Center, the Clinical Directors Network, Long Island College Hospital, and Pfizer, in cooperation with the Healthcare Association of New York) have also implemented PN programs to improve cancer-related care for underserved racial-ethnic minorities and the poor.[16]

PN involves the provision of support and guidance by a trained navigator (lay or professional) to individuals with an abnormal cancer screening or a confirmed cancer diagnosis to help them overcome barriers to obtaining effective cancer-related care, access available cancer care resources, and receive timely and quality cancer care within a culturally sensitive milieu.[17] Typically, patient navigators work with individuals across the cancer care continuum to identify and overcome barriers to optimal cancer care in order to promote adherence to screening recommendations, timely diagnostic resolution and successful treatment outcomes (e.g., from screening to diagnosis, to initiation of treatment, and finally to completion of cancer treatment).[8,17-19]

Little is known about the impact of patients' perceptions of navigator quality on their satisfaction with cancer-related care. PN is fundamentally a relational process that involves establishment of rapport, exchange of information, and provision of emotional support in addition to more tangible help (e.g., assisting with transportation or insurance needs). PN involves inherent psychological principles of social cognition and social interaction. As such, the interpersonal aspects of navigation are expected to affect patients' health care

experiences. Specifically, the interpersonal dimension of navigation may affect patients' experience of cancer-related care directly in so far as the navigator is viewed as part of the health care system. This is similar to how the interpersonal aspect of nursing care strongly influences a patient's experience with hospitalization.[20] In other words, patients' favorable views of the navigator might positively affect their experience with the healthcare system. Additionally, better interpersonal navigation may also have indirect effects. Conceivably, this could provide a better foundation for other aspects of navigation that could impact a patient's health care experience. For example, if the patient has greater trust in the navigator, he or she might be more likely to call on the navigator for assistance or heed the navigator's suggestions. Further, both patients and navigators bring to the navigation dyad their personal sets of adaptive psychosocial beliefs and values that are intrinsic parts of their humanity. These different beliefs and values will likely affect how they perceive, influence, and act with and upon each other in a one-on-one navigation dyad, and in other kinds of social interactions (e.g., social interface involving many people such as nurses, doctors, insurance personnel, and other persons involved in facilitating cancer care) throughout the navigation process.

The present study uses data from the Patient Navigation Research Program PNRP to test the hypothesis that patients who are assigned navigators with higher mean ratings on the Patient Satisfaction with Interpersonal Aspects of Navigator (PSN-I) will report higher satisfaction with cancer-related care. We test this hypothesis among patients with an abnormal cancer screening who were navigated to diagnostic resolution, and also among patients with a confirmed cancer diagnosis who received navigation during their cancer treatment.

MATERIALS AND METHODS

Participants

The PNRP enrolled adult participants (18 years and older) based on two primary criteria: 1) abnormal screening requiring diagnostic follow-up or 2) cancer diagnosis. Patients were excluded if they had previous cancer within the past five years or previous navigation experience. Participants were assigned to receive either navigation or standard care. The present study examined the subsample of participants who received navigation and excluded those participants allocated to comparison group who did not receive PN (i.e., Did not work with a patient navigator).

The abnormal screening group included 1,367 participants (137 males and 1,230 females). The cancer diagnosis group included 226 adult individuals (23 males and 203 females). The mean age for the total sample was 56 years, with a standard error of 1.08. Most participants (94%) worked with a single navigator, and only 6% worked with a second navigator (i.e., had more than one navigator during their participation in the PNRP). Nevertheless, there were no statistically significant difference in PSN-I scores between those who worked with a single navigator and those who worked with a second navigator. Each study from the nine participating PNRP sites was reviewed and approved by the specific site's local Internal Review Board.

Measures

We determined better-rated navigators based on mean scores above the first quartile for the Patient Satisfaction with Navigation-Interpersonal (PSN-I). Adjusting for cancer type (CT), we used Patient Satisfaction with Cancer Care (PSCC) to predict Patient Satisfaction with Navigation (PSN-I) with lognormal regression models. Separate models were developed for each subject-navigator combination. Each model included all PSN-I ratings for the specific navigator and excluded the specific subject's own PSN-I score. For a specific k^{th} subject

with navigator *i* and *j* number of subjects nested within, the model is defined as: $PSN\text{-}I_k = PSN\text{-}I_{ij\text{-}k} + CT_{ij\text{-}k}$. This was done separately for the abnormal screen and cancer diagnosis group to address the non-independence between a subject's satisfaction rating of cancer care and navigation as well as the differences between cancer types. The PSN-I is a psychometrically validated 9-item measure designed to assess patients' satisfaction with their interpersonal relationships with their navigators.[21] Responses to each item of the PSN-I were collected using a 5-point Likert scale that ranged from "1 = not satisfied" to "5 = very satisfied", with a possible total scale score between 9 and 45. The PSN-I explained 76.6% of the variance in satisfaction with interpersonal relationships with navigators, and demonstrated high internal consistency reliability as indicated by Cronbach coefficient alphas ranging between 0.95 and 0.96.[21] We calculated the total scale score for the PSN-I by summing scores on all the individual items. Mean PSN-I ratings were calculated in a standard fashion, by navigator. For each navigator, the PSN-I ratings were summed and then divided by the number of subjects who rated that particular navigator. Less than 10% of the navigators had fewer than 20 subjects' ratings. We conducted a sensitivity analysis in which the 9.56% of navigators with fewer that 20 subjects' PSN-I ratings were excluded and found no statistically significant difference ($p>0.05$). The mean subjects' rating was 40.1 for abnormal screens and 42.0 for cancer diagnosis. For the mean PSN-I score that was calculated over navigators, the coefficient of skewness was -0.65 for the abnormal screening group and -1.57 for the cancer diagnosis group. Given the negative skewness of satisfaction, we classified the mean of all PSN-I ratings a navigator received as better-rated (PSN-I >50th percentile [pctl.]) or not (PSN-I < 50th pctl.).

We assessed satisfaction with cancer-related care using the Patient Satisfaction with Cancer Related Care (PSCC) scale. This PSCC is a psychometrically validated 18-item measure designed to assess patients' satisfaction with the cancer care they received.[22] Response options for each item ranged from "1 = not satisfied" to "5 = very satisfied", with a possible total scale score range of 18 to 90. The PSCC explained 62.0% of the variance in satisfaction with cancer-related care, and demonstrated high internal consistency reliability as indicated by Cronbach coefficient alphas ranging between 0.95 and 0.96.[22] We calculated the total scale score for the PSCC by summing the scores on all the individual items. Due to the negative skewness of the data, we grouped scores in half, comparing those above the median to those below the median The PSCC and the PSN-I were administered to participants from the definitive cancer group within 3 months of initiation of cancer treatment and to participants from the abnormal cancer-screening group within 3 months of receiving an abnormal screening test for cancer.

Data Analysis

Description of Covariates—We controlled for the following patient covariates: sex (male, female); age (< 40 years, 40 - 49 years, 50 - 59 years, 60+ years); race-ethnicity (Hispanic, Non-Hispanic White, Non-Hispanic Black, and "other" race including multi-racial); primary language (English, other); country of birth (US, other); education (< high school, high school or general equivalency diploma, some college, vocational, training or associate degree, college graduate or professional degree); median household income by zip code (< $30k, $30k - < $40k, $40k - < $50k, $50k+); insurance status (uninsured, public or private insurance); employment status (unemployed, part-time or full-time employment); housing status (renting, own, or other); distance from clinic in miles (<1.5, 1.5 - < 4.0, 4.0 - < 8.5, 8.5+); cancer type for those with abnormal screening and definitive cancer diagnosed (breast, cervix, colorectal, prostate) and stage at diagnosis for those with a cancer diagnosis group.

Median household income by zip code was based on the 2000 United States census data.[23] We calculated the distance from clinic as the distance in miles from the centroid of the zip code in which a subject resides to the centroid of the zip code of the clinic. Additionally, stage of cancer was determined through clinical chart review. All other information on demographic covariates was obtained through self-report questionnaires.

Description of Statistical Methods—Data from the abnormal screening group were analyzed separately from those of the cancer diagnosis group. We calculated the percentages of participants who responded to the PSCC and provided data on the selected demographic variables. Statistically significant associations were determined using chi-square tests. Odds ratios for the adjusted models were obtained using logistic regression. All models included sex, age, and race-ethnicity. The final models were obtained using backward elimination of variables with the highest *p*-value one-at-a-time beginning with a full model that included all covariates. Statistical variance was calculated using the Taylor-Series Linearization Method, with study site as the stratum and clinic as the primary sampling unit. A *p*-value of 0.05 or less was considered to be statistically significant. All analyses were conducted using SAS-callable SUDAAN Version 11.0 and SAS Version 9.3 on a Windows 7 32-bit platform.

RESULTS

Participants in the abnormal screening group had a mean PSN-I of 40.1 (standard deviation [SD] = 1.80) and a mean PSCC of 75.8 (SD = 10.61). Participants with a cancer diagnosis had slightly higher scores (i.e., mean PSN-I = 42.0, SD = 4.72; and mean PSCC = 78.8, SE = 11.14).

Table 1 shows the percentages of participants with satisfaction scores above and below the 50th percentile for both groups. In the abnormal screening group, participants with better-rated navigators reported a higher satisfaction with cancer-related care ($p < 0.05$). Other predictors of higher satisfaction included older age, white race, higher household income, and larger household size (all *p*-values <0.05).

Table 2 shows the findings from adjusted models of higher patient satisfaction with cancer-related care. Patients who were navigated by better-rated navigators were more likely to report better satisfaction. This finding held for participants in both the abnormal screening group (Odds Ratio [OR]: 1.38, 95% Confidence Interval [CI]: 1.05-1.82) and for the confirmed cancer diagnosis group (OR: 3.06, 95% CI: 1.56-6.00). Other predictors among participants in the abnormal screening group included being older, white, and having higher income. For the cancer diagnosis group, predictors of satisfaction included race/ethnicity, primary language, cancer type, and stage of cancer.

DISCUSSION

Our findings suggest that the quality of navigation matters. The findings confirm our hypothesis that patients who receive PN from better-rated navigators would report better satisfaction with their cancer-related care. Specifically, our analysis revealed that navigators with more highly rated interpersonal relationships with patients yield improved outcomes for these patients in terms of their experience with cancer-related care. Effects were significantly greater for men and African Americans. To our knowledge, this represents a novel contribution to the burgeoning science of PN. PN is a promising tool to address disparities in cancer-related care.[10-15] Finding ways to enhance the effectiveness of PN might yield stronger effects on patient outcomes.

Understanding the dynamics of the relationship in the navigator-navigated participant dyad is particularly important in the context of cancer-related care, especially because psychological distress (e.g., anxiety, fear, depression, and anger) and uncertainty may complicate thought processes, and intrapersonal and interpersonal interactions. Additionally, human beings do not live nor function in a psychosocial vacuum. Social cognitions and interactions constitute important sets of actions that are essential to our daily lives.

The strengths of the present study include data from a large number of patients and PNRP sites that employed different types of navigators from diverse geographical areas and cancer clinics across the United States. We used psychometrically validated measures (e.g., PNS-I and PSCC)[21-22] to determine participants' satisfaction with interpersonal relationships with navigators and the cancer-related care they received. We controlled for a range of potentially confounding patient factors. The primary study limitation is that our findings are based on observational associations. We cannot completely exclude the potential for confounding by unmeasured factors. Further study is needed to replicate these important findings.

Our findings have important implications for recruitment and training of patient navigators. Specifically, the findings underscore the need to recruit navigators with strong interpersonal skills and to provide training that will reinforce and maintain these skills. Doing so could improve patients' experience of cancer-related care, particularly for men and African Americans. While the logistical aspects of PN are of obvious importance, our findings highlight the role of the interpersonal dimension in shaping patients' experiences with their cancer-related care for patients with abnormal cancer screening results and those diagnosed with cancer.

Acknowledgments

Dr. Pascal Jean-Pierre wishes to acknowledge the support of the Walther Cancer Foundation.

Funding Sources: This study was supported by grants from the National Cancer Institute Center to Reduce Cancer Health Disparities (3U01CA116924-03S1, U01 CA116924 01, 1R25CA10261801A1, U01CA116892, U01CA117281, U01CA116903, U01CA116937, U01CA116885, U01CA116875, and U01CA116925) and the American Cancer Society (SIRSG-05-253-01).

REFERENCES

1. American Cancer Society. Cancer Facts & Figures 2012. American Cancer Society; Atlanta: 2012.
2. Freeman HP. Poverty, culture, and social injustice: determinants of cancer disparities. CA Cancer J Clin. Mar-Apr;2004 54(2):72–77. [PubMed: 15061597]
3. Luckett T, Goldstein D, Butow PN, Gebski V, Aldridge LJ, McGrane J, Ng W, King MT. Psychological morbidity and quality of life of ethnic minority patients with cancer: a systematic review and meta-analysis. Lancet Oncol. Dec; 2011 12(13):1240–8. [PubMed: 21996168]
4. Tanne JH. US ethnic minorities are less likely to be screened for cancer, study finds. BMJ. Jan 30.2012 344:e754. doi: 10.1136/bmj.e754. [PubMed: 22290296]
5. Freeman HP. Patient navigation: a community centered approach to reducing cancer mortality. J Cancer Educ. 2006; 21(1 Suppl):S11–4. Spring. [PubMed: 17020496]
6. Robinson-White S, Conroy B, Slavish KH, Rosenzweig M. Patient navigation in breast cancer: a systematic review. Cancer Nurs. Mar-Apr;2010 33(2):127–40. Review. [PubMed: 20142736]
7. Wells KJ, Meade CD, Calcano E, Lee JH, Rivers D, Roetzheim RG. Innovative approaches to reducing cancer health disparities: the Moffitt Cancer Center Patient Navigator Research Program. J Cancer Educ. Dec; 2011 26(4):649–57. [PubMed: 21573740]
8. Jean-Pierre P, Hendren SK, Fiscella K, Loader S, Rousseau S, Schwartzbauer B, Sanders M, Carroll J, Epstein R. Understanding Processes and Domains of Patient Navigation for Cancer Care: Perspectives of Patient Navigators from the Field. J Cancer Education. 2011; 26(1):111–120.

9. Fiscella K, Ransom S, Jean-Pierre P, Cella D, Stein K, Bauer JE, Crane-Okada R, Gentry S, Canosa R, Smith T, Sellers J, Jankowksi E, Walsh K. Patient-reported outcome measures suitable to assessment of patient navigation. Cancer. 2011; 117(S15):3630–3617. DOI: 10.1002/cncr.26260. [PubMed: 21319152]
10. Freeman HP, Rodriguez RL. History and principles of patient navigation. Cancer. Aug; 2011 117(15 Suppl):3539–42. doi: 10.1002/cncr.26262. Review. [PubMed: 21780088]
11. Natale-Pereira A, Enard KR, Nevarez L, Jones LA. The role of patient navigators in eliminating health disparities. Cancer. Aug; 2011 117(15 Suppl):3543–52. doi: 10.1002/cncr.26264. Review. [PubMed: 21780089]
12. Lasser KE, Murillo J, Lisboa S, Casimir AN, Valley-Shah L, Emmons KM, Fletcher RH, Ayanian JZ. Colorectal cancer screening among ethnically diverse, low-income patients: a randomized controlled trial. Arch Intern Med. May 23; 2011 171(10):906–12. [PubMed: 21606094]
13. Calhoun EA, Whitley EM, Esparza A, Ness E, Greene A, Garcia R, Valverde PA. A national patient navigator training program. Health Promot Pract. Mar; 2010 11(2):205–15. Epub 2008 Dec 30. [PubMed: 19116415]
14. Petereit DG, Molloy K, Reiner ML, Helbig P, Cina K, Miner R, Spotted Tail C, Rost C, Conroy P, Roberts CR. Establishing a patient navigator program to reduce cancer disparities in the American Indian communities of Western South Dakota: initial observations and results. Cancer Control. Jul; 2008 15(3):254–9. [PubMed: 18596678]
15. Paskett ED, Harrop JP, Wells KJ. Patient navigation: an update on the state of the science. CA Cancer J Clin. Jul-Aug;2011 61(4):237–49. doi: 10.3322/caac.20111. Epub 2011 Jun 9. Review. [PubMed: 21659419]
16. Hede K. Agencies look to patient navigators to reduce cancer care disparities. J Nat. Cancer Institute. 2006; 98(3):157–159.
17. Freund KM, Battaglia TA, Calhoun E, Dudley DJ, Fiscella K, Paskett E, Raich PC, Roetzheim RG, Patient Navigation Research Program Group. National Cancer Institute Patient Navigation Research Program: methods, protocol, and measures. Cancer. Dec 15; 2008 113(12):3391–9. [PubMed: 18951521]
18. Carroll JK, Humiston SG, Meldrum SC, Salamone CM, Jean-Pierre P, Epstein RM, Fiscella K. Patients' experiences with navigation for cancer care. Patient Education and Counseling. 2009 [Epub ahead of print] PMID: 20006459.
19. Freund, et al. The NCI Patient Navigation Research Program Methods, Protocol and Measures. Cancer. 2010; 15113(12):3391–3399.
20. Schoenfelder T, Klewer J, Kugler J. Factors associated with patient satisfaction in surgery: the role of patients' perceptions of received care, visit characteristics, and demographic variables. J Surg Res. Nov; 2010 164(1):e53–9. Epub 2010 Sep 16. [PubMed: 20863521]
21. Jean-Pierre P, Fiscella K, Winters PC, Post D, Wells KJ, McKoy JM, Battaglia T, Simon M, Kilbourn K, Taylor E, Roetzheim RG, Patierno SR, Dudley DJ, Raich PC, Freund KM. Psychometric Development and Reliability Analysis of a Patient Satisfaction with Interpersonal Relationship with Navigator Measure: A Multi-Site Patient Navigation Research Program Study. Psycho-Oncology. Jun 17.2011 Doi: 1002/PON.2002. [Epub ahead of print]. PMID: 21681995.
22. Jean-Pierre P, Fiscella K, Freund KM, Clark J, Darnell J, Holden A, Post D, Patierno SR, Winters PC, Patient Navigation Research Program Group. Structural and Reliability Analysis of a Patient Satisfaction with Cancer-Related Care Measure: A Multi-Site Patient Navigation Research Program Study. Cancer. 2011; 117(4):854–861. [PubMed: 20922802]
23. DeNavas-Walt, C.; Cleveland, RW.; Webster, BH, Jr.. Income in the United States: 2002 – Current Population Reports. US Department of Commerce, Economics and Statistics Administration; Issued September 2003

Condensed Abstract

Patient navigation has emerged as a promising tool for addressing racial-ethnic and socioeconomic disparities in cancer-related care. Results of our analysis showed that patients navigated by better-rated navigators reported higher satisfaction with their cancer-related care.

What is known on the topic:

- Patient navigation is a promising tool that can be used to systematically reduce racial-ethnic and socioeconomic disparities in cancer-related care.
- The impact of patients' perception of the quality of navigation on their reported satisfaction with cancer-related care is not known.

What this study adds to the literature:

- Interpersonal aspects of navigation may affect patients' health care experiences.
- Patients navigated by better-rated navigators reported higher satisfaction with their cancer-related care.
- Benefits of patient navigation are greater for African Americans and men in the present sample.

Table 1

High Satisfaction with Care (median cut-off) by Demographics

	Abnormal Screen			Cancer Diagnosis		
Independent Variable	**High (n=705) % (n)**	**Low (n=662) % (n)**	***p*-value Chi-square**	**High (n=111) % (n)**	**Low (n=115) % (n)**	***p*-value Chi-square**
Overall PSN-I			0.0486			0.0628
Below 1st quartile	42.7 (158)	57.3 (212)		30.0 (15)	70.0 (35)	
Above 1st quartile	54.9 (547)	45.1 (450)		54.6(96)	45.4 (80)	
Gender			0.1147			0.6177
Female	53.1 (653)	46.9 (577)		50.3 (102)	49.7 (101)	
Male	38.0 (52)	62.0 (85)		39.1 (9)	60.9 (14)	
Age category (years)			0.0449			0.5319
< 40	45.4 (210)	54.6 (253)		34.8 (8)	65.2 (15)	
40 - < 49	58.4 (194)	41.6 (138)		42.0 (21)	58.0 (29)	
50 - < 60	51.2 (155)	48.8 (148)		50.0 (36)	50.0 (36)	
60+	53.8 (143)	46.2 (123)		56.8 (46)	43.2 (35)	
Race/ethnicity			0.0127			0.1456
Black	52.1 (219)	47.9 (201)		41.0 (25)	59.0 (36)	
White	62.2 (270)	37.8 (164)		54.9 (67)	45.1 (55)	
Hispanic	42.3 (208)	57.7 (284)		45.7 (16)	54.3 (19)	
Other	38.1 (8)	61.9 (13)		37.5 (3)	62.5 (5)	
Primary language			0.0356			0.2349
English	44.6 (545)	55.4 (439)		48.1 (100)	51.9 (108)	
Other	41.3 (157)	58.7 (223)		61.1 (11)	38.9 (7)	
Birth country			0.0581			0.5938
outside of US	44.1 (173)	55.9 (219)		46.4 (13)	53.6 (15)	
US	55.5 (463)	44.5 (371)		49.2 (97)	50.8 (100)	
Education			0.0948			0.7870
Less than high school	41.8 (135)	58.2 (188)		52.2 (24)	47.8 (22)	
High school diploma (including equivalency)	54.2 (150)	45.8 (127)		51.2 (22)	48.8 (21)	
Some college/vocational	53.7 (183)	46.3(158)		49.3 (36)	50.7(37)	
College graduate/Graduate or professional	60.6 (166)	39.4(108)		45.2 (28)	54.8(34)	
Median Household Income by ZIP			0.0357			0.3131
$29,999 or less	50.8 (133)	49.2 (129)		58.0 (29)	42.0 (21)	

	Abnormal Screen			Cancer Diagnosis		
Independent Variable	**High (n=705) % (n)**	**Low (n=662) % (n)**	***p*-value Chi-square**	**High (n=111) % (n)**	**Low (n=115) % (n)**	***p*-value Chi-square**
$30,000 to $39,999	45.0 (232)	55.0 (283)		43.8 (32)	56.2 (41)	
$40,000 to $49,999	50.0 (114)	50.0 (114)		42.1 (16)	57.9 (22)	
$50,000 or more	64.2 (195)	35.8 (117)		55.0 (33)	45.0 (27)	
Insurance status			0.0313			0.6470
uninsured	44.4 (179)	55.6 (224)		37.5 (12)	62.5 (20)	
public	46.4 (227)	53.6 (262)		49.3 (36)	50.7 (37)	
private	63.3 (292)	36.7 (169)		51.7 (62)	48.3 (58)	
Employment Status			0.2456			0.7169
No current employment	49.3 (303)	53.7 (312)		51.9 (70)	48.1 (65)	
Part-time employment	53.1 (112)	46.9 (99)		37.0 (10)	63.0 (17)	
Full-time employment	56.1 (229)	43.9 (179)		47.6 (30)	52.4 (33)	
Household Size			0.1293			0.1510
1	49.8 (119)	50.2 (120)		38.0 (19)	62.0 (31)	
2	55.9 (179)	44.1 (141)		56.5 (48)	43.5 (37)	
3+	54.0 (304)	46.0 (259)		47.8 (43)	52.2 (47)	
Housing Status			0.0782			0.1331
Rent	48.6 (242)	51.4 (259)		41.3 (38)	58.7 (54)	
Own	60.3 (289)	39.7 (181)		54.1 (60)	45.9 (51)	
Other	49.2 (73)	50.8 (81)		52.4 (11)	47.6 (10)	
Dependents			0.2702			0.4575
0	56.1 (268)	43.9 (210)		53.6 (59)	46.4 (51)	
1	51.7 (105)	48.3 (98)		47.7 (21)	52.3 (23)	
2+	59.9 (170)	40.1 (114)		52.9 (18)	47.1 (16)	
Distance			0.2217			0.3912
< 1.5	49.4 (128)	50.6 (142)		50.0 (7)	50.0 (7)	
1.5 - < 4.0	52.1 (137)	47.9 (122)		45.8 (27)	54.2 (32)	
4 - < 8.5	47.4 (161)	52.6 (184)		54.3 (38)	45.7 (32)	
8.5+	52.9 (186)	47.1 (165)		48.7 (37)	51.3 (39)	
Type of Health Care Setting			0.6263			0.5244
Neighborhood health center	42.1 (115)	57.9 (158)		40.0 (4)	60.0 (6)	
Public hospital ambulatory care	55.7 (380)	44.3 (302)		44.8 (47)	55.2 (58)	
Private hospital ambulatory care	51.6 (63)	48.4 (59)		100.0 (1)	0.0 (0)	

J Cancer Educ. Author manuscript; available in PMC 2014 September 01.

	Abnormal Screen			Cancer Diagnosis		
Independent Variable	**High (n=705) % (n)**	**Low (n=662) % (n)**	***p*-value Chi-square**	**High (n=111) % (n)**	**Low (n=115) % (n)**	***p*-value Chi-square**
Other	50.5 (145)	49.5 (142)		53.6 (59)	46.4 (51)	
Size of care site			0.1845			0.4320
<12,000	45.1 (114)	54.9 (139)		44.8 (13)	55.2 (16)	
12,000-<40,000	58.0 (309)	42.0 (224)		54.6 (77)	45.4 (64)	
40,000-<200,000	50.3 (99)	49.7 (98)		50.0 (1)	50.0 (1)	
200,000+	37.8 (99)	62.2 (163)		32.4 (12)	67.6 (25)	
Racial/Ethnic Distribution of Patient Population - Hispanic			0.0389			0.2673
< 25%	55.9 (354)	44.1 (279)		49.3 (71)	50.7 (73)	
25%+	40.4 (186)	59.6 (274)		32.4 (12)	67.6 (25)	
Racial/Ethnic Distribution of Patient Population - Non-Hispanic White			0.5089			0.1105
< 25%	47.1 (226)	52.9 (254)		32.8 (21)	67.2 (43)	
25%+	51.2 (314)	48.8 (299)		53.0 (62)	47.0 (55)	
Racial/Ethnic Distribution of Patient Population - Non-Hispanic Black			0.7418			0.2412
< 25%	48.1 (286)	51.9 (308)		48.8 (69)	51.1 (72)	
25%+	50.9 (254)	49.1 (245)		35.0 (14)	65.0 (26)	
Cancer Site			0.1758			0.1315
breast	55.0 (466)	45.0 (381)		49.7 (87)	50.3 (88)	
cervix	50.7 (173)	49.3 (168)		37.5 (6)	62.5 (10)	
colorectal	33.3 (23)	66.7 (46)		63.0 (17)	37.0 (10)	
prostate	39.1 (43)	60.9 (67)		12.5 (1)	87.5 (7)	
Stage						0.0474
Stage 0				34.8 (8)	65.2 (15)	
Stage 1				62.7 (42)	37.3 (25)	
Stage 2				54.3 (38)	45.7 (32)	
Stage 3				45.9 (17)	54.1 (20)	
Stage 4				30.0 (3)	70.0 (7)	
CIN2 or CIN3				37.5 (3)	62.5 (5)	

p-value for Chi-square test of association from SUDAAN PROC CROSSTAB with site as stratum and clinic as PSU.

Table 2

Logistic Regression results with High Satisfaction with Care (median cut-off) as the Dependent Variable.

	Abnormal Screen				Cancer Diagnosis			
Independent Variable	**Odds Ratio**	**Lower 95% Confidence Limit**	**Upper 95% Confidence Limit**	***p*-value Wald F**	**Odds Ratio**	**Lower 95% Confidence Limit**	**Upper 95% Confidence Limit**	***p*-value Wald F**
Overall PSN-I Rating of Navigator				< 0.0001				0.0014
Higher (above 1st quartile)	1.38	1.05	1.82		3.06	1.56	6.00	
Lower (below 1st quartile)	1.00	1.00	1.00		1.00	1.00	1.00	
Gender				0.7596				0.5414
Female	1.00	1.00	1.00		1.00	1.00	1.00	
Male	1.17	0.33	4.17		0.53	0.07	4.09	
Age Category (years)				0.0125				0.5187
< 40	1.00	1.00	1.00		1.00	1.00	1.00	
40 - < 50	1.69	1.25	2.30		1.34	0.44	4.13	
50 - < 60	1.28	0.84	1.95		1.50	0.41	5.56	
60+	1.60	1.04	2.46		2.38	0.61	9.22	
Race/Ethnicity				0.0113				< 0.0001
Black	0.81	0.59	1.10		0.76	0.51	1.14	
White	1.00	1.00	1.00		1.00	1.00	1.00	
Hispanic	0.54	0.39	0.74		0.58	0.11	3.12	
other	0.44	0.21	0.92		0.29	0.17	0.50	
Primary Language								0.0008
English					1.00	1.00	1.00	
Other					4.61	1.92	11.09	
Median Household Income by ZIP				< 0.0001				
Less than $30,000	0.82	0.56	1.18					
$30,000 to $39,999	0.58	0.46	0.73					
$40,000 to $49,999	0.70	0.50	0.99					
$50,000 or more	1.00	1.00	1.00					
Cancer Site				0.0011				0.0002
breast	2.42	0.57	10.23		0.87	0.02	30.76	
cervix	2.88	0.71	11.59		0.59	0.01	31.73	
colorectal	0.91	0.28	2.99		5.26	0.39	71.17	
prostate	1.00	1.00	1.00		1.00	1.00	1.00	

	Abnormal Screen				Cancer Diagnosis			
Independent Variable	**Odds Ratio**	**Lower 95% Confidence Limit**	**Upper 95% Confidence Limit**	***p*-value Wald F**	**Odds Ratio**	**Lower 95% Confidence Limit**	**Upper 95% Confidence Limit**	***p*-value Wald F**
Stage								< 0.0001
0					0.28	0.10	0.81	
1					0.79	0.36	1.74	
2					0.53	0.22	1.29	
3					0.24	0.11	0.53	
4					0.11	0.02	0.70	
CIN2 or CIN3					1.00	1.00	1.00	

p-value for Chi-square test of association from SUDAAN PROC CROSSTAB with site as stratum and clinic as PSU.