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Predictors of timely follow-up after abnormal cancer screening among women seeking care at urban community health centers

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Abstract

Background—We sought to measure time and identify predictors of timely follow-up among a cohort of racially/ethnically diverse inner city women with breast and cervical cancer screening abnormalities.

Methods—Eligible women had an abnormality detected on a mammogram or Pap test between January 2004 and December 2005 in one of six community health centers in Boston, MA. Retrospective chart review allowed us to measure time to diagnostic resolution. We used Cox proportional hazards models to develop predictive models for timely resolution (defined as definitive diagnostic services completed within 180 days from index abnormality).

Results—Among 523 women with mammography abnormalities and 474 women with Pap test abnormalities, >90% achieved diagnostic resolution within 12 months. Median time to resolution was longer for Pap test than for mammography abnormalities (85 versus 27 days). Site of care, rather than any sociodemographic characteristic of individuals, including race/ethnicity, was the only significant predictor of timely follow up for both mammogram and Pap test abnormalities.

Conclusions—Site specific community based interventions may be the most effective interventions to reduce cancer health disparities when addressing the needs of underserved populations.

Keywords

Public health; Women's Health; Neoplasms; Health Services; Internal Medicine

Background

Despite increasing gains in cancer care,1 disparities in cancer outcomes are well documented for racial/ethnic minorities and those of low socioeconomic status.2 In

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Massachusetts, non-Hispanic Black women have higher mortality from breast cancer than their White counterparts (35.5 and 23.3 per 100,000, respectively).3 The age-adjusted cervical cancer incidence rates in Massachusetts are 5.8 per 100,000 for White women, 9.2 for Black, and 13.1 for Hispanic women.4 Differences in access to care along the entire cancer care continuum, from screening through diagnostic care to treatment and survivorship, and barriers to utilizing otherwise accessible care, may contribute to these disparities.

Parity in receipt of cancer screening has been achieved in many settings, including Massachusetts.5 The CDC funded National Breast and Cervical Cancer Early Detection Program provides millions of dollars annually to ensure that those most at risk have access to breast and cervical cancer screening.6 However, the prevention potential of cancer screening requires timely diagnostic follow-up once an abnormality has been detected. Delays in diagnosis and treatment as little as three months have been shown to increase recurrence7 and reduce survival rates.8, 9 The belief that these delays contribute to cancer disparities is evident in the emergence of innovative programs which aim to reduce delays in receipt of cancer care services. In 2005, the National Cancer Institute's Center to Reduce Cancer Health Disparities and the American Cancer Society funded nine programs to participate in a Cooperative Group (The Patient Navigation Research Program or PNRP)10–12 to evaluate patient navigation interventions to reduce time to diagnosis and treatment for at-risk underserved populations with abnormal cancer screening or newly diagnosed cancer.

The time it takes to complete diagnostic evaluation varies widely, with the uninsured or underinsured and racial/ethnic minorities often having the longest delays.13–18 Relevant literature is limited by a lack of consistency in reported outcomes. Most studies are small, limited to a single site of care and include diverse socioeconomic strata. Therefore, we sought to describe delays in receipt of diagnostic services for abnormal mammography and Pap test screening among inner city women seeking care at six community health centers in Boston, which serves as the baseline cohort for the Boston PNRP. These centers serve a high proportion of the city's racial and ethnic minority populations and those of lower socioeconomic status.

Methods

Study Design

This study was conducted to provide baseline estimates of time to diagnostic resolution for a prospective multi-site intervention study, the Boston Patient Navigation Research Program (PNRP). One of nine groups in the national PNRP Cooperative Group,10–12 Boston PNRP partnered with six independent community health centers (CHCs) in Boston to carry out the study. Concurrent baseline data were collected via retrospective medical chart review to determine time to diagnostic resolution for women with mammogram and Pap test abnormalities. The Boston University Medical Center IRB reviewed and approved this study.

Study population

Eligible subjects for the baseline PNRP cohort included adult women with an abnormality detected by a screening Pap test or mammogram performed between January 1, 2004 and December 30, 2005 at one of the six CHCs. Women were excluded if they were pregnant or under 18 years of age at the time of their abnormality. Eligible mammography results included any **B**reast **I**maging **R**eporting **A**nd **D**ata **S**ystem (BIRADS) score indicating need for follow-up (BIRADS 0, 3, 4 and 5). Eligible Pap test results included any cellular

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abnormality indicating need for follow-up. These include Atypical Squamous Cells of Undetermined Significance positive for Human Papilloma Virus (ASCUS/HPV+), Low Grade Squamous Intraepithelial Lesion (LGSIL), High Grade Squamous Intraepithelial Lesion (HGSIL) and Carcinoma. All subjects with 'high grade' abnormalities were included (BIRADS 4, 5 and HGSIL) while a random sample of 'low grade' abnormalities (BIRADS 0, 3; ASCUS/HPV+, LGSIL) were used to reach a sample of approximately 100 screened-positive women per site. At sites with fewer than 100 eligible cases, all eligible subjects were included.

Data collection

Chart abstraction began in July 2006. If an abnormality had not reached diagnostic resolution by the time of abstraction, the patient's chart was reviewed again, if necessary, at least 365 days after the index event to ascertain resolution. The majority of the abstraction was completed using the electronic medical record; occasionally, missing clinical data needed to be abstracted from the paper chart (approximately 4%). One of two authors (CS, SB) then reviewed data abstraction forms for completeness, accuracy and internal consistency, and then entered the data into a secure, password protected study database.

Study variables

Variables were selected based on both 1) availability in the medical record and 2) consistency with the data dictionary developed by the Design and Analysis Committee of the NCI PNRP, to enable future comparisons with data from other PNRP investigators.18

Independent variables—*Race/Ethnicity* was documented in the electronic medical record as mutually exclusive response values: White, Black/African American, Asian, Native Hawaiian/Pacific Islander, Native American/Alaskan Native, Hispanic Latino, or Other. With the exception of White, Black and Hispanic, the remaining race categories were collapsed into "Other" because there were too few subjects in the individual racial categories to yield meaningful analyses. For individuals in more than one category, only the first of Hispanic, Black, White or Other (in that order) was used. *Age* was calculated from month and year of birth to the date of the screening test. Different age categories were used for the two screening populations; each screening population was separately categorized into one of four clinically relevant age groups. *Primary Language* was categorized as English, Spanish or Other. *Primary care status* was determined by the presence of a named physician appearing in the electronic medical record. *Primary and secondary insurance* as documented in the electronic medical record were used to create the following 3 mutually exclusive categories: no health insurance, publicly financed health insurance only (Medicare and/or Medicaid as sole insurers), or some form of private health insurance.

Outcome variables—Our primary outcome of interest was time from index screening abnormality to diagnostic resolution. *Diagnostic resolution* was defined as definitive tissue diagnosis (biopsy with pathology report) or clinical evaluation (such as colposcopy) indicating no further need for evaluation, in concordance with PNRP.18 Clinical evaluation was included to account for variation in clinical practices. Due to the variability in the number of days to resolution, and the likelihood of outliers that would result in skewed data, we censored this outcome at a maximum of 180 days for outcomes analyses. Since there are clinical implications of delays as little as 90 days, the authors felt that a 180 day cutoff for timely resolution has adequate clinical significance.19, 20 Subjects were categorized as having "*timely resolution*" if their diagnostic resolution occurred within 180 days from the index abnormality. For subjects eligible due to a BIRADS 3 result, the earliest date for resolution or "time 0" began six months from the date of the index abnormality because

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clinical practice guidelines for follow-up call for a repeat mammogram six months after the index abnormality.21

Data analysis

Subjects with abnormal mammogram and Pap tests were analyzed separately. In addition to being two different clinical screening programs, the two study populations differed markedly by age, racial/ethnic distribution and proportion with a final diagnosis of cancer. Results are presented in parallel here to provide the opportunity to see whether particular CHCs are consistently better (or worse) than others on both types of cancer screening follow-up.

Descriptive statistics were performed to report the socio-demographic characteristics of the two study populations, and to determine median time to resolution and the rate of resolution at different time cut offs. We calculated p-values within CHC sites using ANOVA for continuous variables and Chi-square for categorical variables.

Univariate Cox-proportional hazard ratios were generated to test the association of each subject characteristic with “timely resolution” such that larger hazards ratios are associated with shorter time to resolution. For our multivariate analysis, we predicted “timely resolution” using Cox-proportional hazards modeling. In the final models, we included only those categorical variables for which the group had a significant p-value (< 0.05) under a univariate Cox model. The CHC site with the largest study enrollment was chosen as the referent group in both cohort regression models for ease of comparison. All analyses were conducted using SAS 9.1. A two-sided p-value <0.05 was considered statistically significant for reporting associations. We hypothesized that systems issues were extremely important, that is, CHC site was a key explanatory variable, not a confounder. To see if nesting with CHCs had confounded the relationship between patient factors (which differed substantially across CHCs) and timely resolution, we also performed regressions treating CHC as hierarchical clustering variable. Since these analyses did not change any of our findings, they are not reported. Thus, we did not conduct analyses within strata as defined by CHC site.

Results

A total of 997 women were included in the study (523 with mammogram and 474 with Pap test abnormality). Tables 1a and 1b display subject characteristics by CHC site for mammogram and pap test subjects, respectively. The different age distributions for each cohort reflect recommended screening guidelines for that cancer site. For both screening groups, the majority were non-White, with 19-27% Hispanic, 33-34% Black and 11-14% Other. Less than one third had private health insurance. In each screening group, about one third spoke a language other than English as their primary language; Spanish was the most common non-English language spoken (about 15%). The majority of screening abnormalities were ‘low grade’ in their suspicion for cancer, including BIRADS 0 (67%) and BIRADS 3 (25%) for mammogram and LGSIL (87%) for Pap test subjects.

Subjects across CHCs differed significantly on all demographic characteristics, reflecting the singular populations specific to the communities they serve. For example, the proportion of Black subjects ranged from 3% to 88% across the six CHCs. Those sites with largely White populations, as demonstrated by Health Center D, which had 92% White subjects, also had the lowest rate of private health insurance (9%), demonstrating a socioeconomically disadvantaged group. Though the data is not shown here, we know that this CHC serves a largely immigrant, Albanian population.

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During the one year of follow-up, 20 breast and 4 gynecological cancers were diagnosed from the abnormal screening tests. Most cancers occurred in patients whose index abnormality was a 'high grade' abnormality, including BIRADS 4 or 5 on mammography (11 breast cancers), and carcinoma on Pap test (all 4 gynecologic cancers). The remaining breast cancers occurred in women with a 'low grade' index mammogram result, including BIRADS 0 (8 cancers) and BIRADS 3 (1 cancer).

Time to diagnostic resolution by screening abnormality is displayed in Table 2. Overall, median time to resolution was shorter for mammogram abnormalities compared with Pap test abnormalities (median days 27 v. 85, respectively). Ninety-two percent of all mammogram abnormalities achieved diagnostic resolution by 180 days compared with only 65% of Pap test abnormalities. However, almost all abnormalities were resolved within 12 months (97% of mammogram and 93% of Pap test abnormalities). Time to resolution differed by screening abnormality; subjects with 'high grade' mammogram lesion (BIRADS 4,5) had the longest median time to resolution (36 days) followed by BIRADS 0 (28 days). This same pattern was not observed for high grade Pap test abnormalities; HGSIL had the shortest time to resolution (median days 56) compared with the lower grade Pap test lesions ASCUS/HPV+ and LGSIL (median days 89 and 84, respectively). We found little variability across CHCs in the time to diagnostic resolution for a breast abnormality (data not shown). Median time to resolution ranged from 24 to 30 days across CHCs. Minimal increase in proportion of resolved abnormalities was noted beyond 6 months for abnormal mammography screening; increases in diagnostic resolution rates from 6 to 12 months across CHCs ranged from 0% to 8%. In contrast, resolution of Pap test abnormalities was more variable across CHCs with a median time to resolution range of 59 to 181 days, with as many as an additional third of diagnostic resolution completed between 181 and 365 days after the index abnormality. Examination of differences in race showed greater variation by CHC than by racial category (data not shown).

Tables 3 and 4 present the univariate and multivariate findings from the Cox proportional hazard models predicting timely resolution for mammogram and Pat test abnormalities, respectively. Univariate analysis of subjects with abnormal mammograms found that CHC and BIRADS designation were significantly associated with timely resolution but neither composite variable was statistically significant in the multivariate (Table 3). However, there were still inter-group differences, with CHC C (HR=1.56, CI=1.02-2.38) and CHC F (HR=1.41, CI=1.02-1.95) more likely to have timely resolution compared with referent group CHC A, and BIRADS 0 abnormalities less likely to have timely resolution (HR=.79, CI=0.64-0.98) in comparison to BIRADS 3 abnormalities.

Univariate analysis of subjects with abnormal Pap tests found CHC, race, insurance status and language to be significantly associated with timely resolution (Table 4). In the multivariate model CHC was the only composite variable predicting timely resolution ($p<0.001$). Inter-group differences found three sites, CHC C (HR=0.39, CI=0.24, 0.64), CHC E (HR=0.53, CI=0.35, 0.81) and CHC F (HR=0.40, CI=0.26, 0.62), significantly less likely to have timely diagnostic resolution compared with referent group CHC A. Additionally, while insurance status was not significant as a composite predictor, those with no health insurance (HR=0.71 CI=0.51-0.98) were less likely to have timely follow-up compared to those with private insurance.

Discussion

This study describes delays in diagnostic resolution after an abnormal breast or cervical cancer screening test among a representative population of primarily minority, urban women from a homogeneous socioeconomic strata most at risk for adverse cancer outcomes. The

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diversity in race/ethnicity across the six CHCs is typical of the heterogeneity of populations who receive health care at urban safety net institutions.[22-24] After a full year of follow-up, diagnostic resolution for all cancer screening abnormalities reached over 90%, however, significant delays existed in those screening abnormalities most likely to lead to a breast cancer diagnosis. Site of care, rather than any sociodemographic characteristic of individuals including race/ethnicity, was the only significant predictor of delay in both cancer screening groups.

We found that any racial/ethnic differences in timely diagnostic resolution were explained by differences in site of care, suggesting that observed differences in timely follow-up may be primarily due to systems issues within each CHC rather than differences in the populations served. These findings are in contrast to much of the published literature which repeatedly report minority race/ethnicity to predict delays in diagnostic care.[8, 10, 12, 13, 15, 25-27] This inconsistency may be explained by the homogeneity in socioeconomic status of this cohort, as suggested by the low rates of private health insurance, even among White subjects – a factor that often confounds racial comparisons. Comparisons to this literature are thus limited by differences in study populations, such that many published studies include diverse socioeconomic strata with various methods of controlling for socioeconomic status. [8, 12, 13] One study did identify location of care as an important determinant of timely follow-up,[13] however, another study including exclusively uninsured and underinsured women did not include such analyses.[10]

In our study, CHCs with more timely resolution outcomes for one cancer screening test often had delayed resolution for the other cancer screening test. This reinforces the presence of systematic issues within CHCs such that a CHC may have systems to address one screening disease, but lack resources for another screening disease. This difference may reflect resource constraints of CHCs and how they prioritize their population's health care needs. While each of the six CHC sites had similar resources such as on-site screening mammography and colposcopy services, programmatic and staffing differences surely existed yet were not measured. Observed differences may reflect systems put in place to reach patients that are at highest risk for delayed follow-up (e.g. systems tailored to enhance follow-up of cervical cancer screening abnormalities). The same CHC may not be equipped to handle the systems issues for an older population of breast screening abnormalities.

An alternative explanation for differential outcomes by cancer screening site may be inherent differences in the clinical care for breast and cervical cancer screening. Women screened for breast cancer are willingly participating with forethought - the woman must come to the radiology facility, usually after having made an appointment. This may even be reinforced by the media attention paid to breast cancer screening. In contrast, cervical cancer screening may happen during another health care or family planning visit, and may not have been purposeful. In fact, the literature shows improved adherence with cervical cancer screening in vulnerable populations when the screening is done during urgent care visits,[28] yet finds longer delays in follow-up care after screening is done in these urgent care settings.[29]

Finally, subjects across CHCs may differ on their perceptions of cancer risk, this affecting their timely resolution of cancer screening. While some studies have found differences in the perception of cancer risk in the different ethnic populations,[30] survey data from the same health centers failed to identify differences in cancer risk perception (Battaglia TA et al, unpublished data).

We found socio-demographic characteristics of study subjects to differ substantially across CHCs reflecting the socio-cultural differences among populations served at health centers

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within the same zip code. Even within CHCs, we found differences in socio-demographic characteristics for the two cancer screening populations, reflecting generational shifts in the community populations given the changing composition of modern cities and immigration patterns. These findings are particularly important given the emerging role of the community health center model in caring for the country's most vulnerable populations.[22-24, 31] Our findings highlight the potential diversity both across and within CHCs, underscoring the need to understand the specific socio-demographics of the populations served.

Well over 90% of our subjects achieved diagnostic resolution, supporting the Institute of Medicine's 2002 recognition of the importance of CHCs in increasing access to care and in improving health outcomes for all patients, especially minorities.[32] Our findings also support the notion that absence of racial disparities may be related to CHCs' culturally sensitive practices and community involvement – features that other primary care settings may lack and speaks to the success of CHC models in improving health outcomes for these most vulnerable patients.[23, 33, 34]

It is important to note that we found the longest delays in follow-up occurred among those most likely to be diagnosed with breast cancer (BIRADS 0, 4/5), though this was not true for Pap test abnormalities. This may reflect inherent differences in perception of meaning for different cancer screening abnormalities, including fear of possible cancer. Alternatively, it may reflect system issues in accessing timely breast imaging. Although there is no consensus regarding how long a delay ultimately impacts outcomes, it is clinically feasible that these delays may be a mechanism for the persistent gap in cancer outcomes for vulnerable populations. As such, they speak to the need for community-based interventions targeting such at risk groups. Patient Navigation, an emerging model to address cancer health disparities, is one example of a promising community-based approach to address this gap.[17, 18]

This study has several limitations, principally that data were collected by retrospective chart review at a single institution for each subject. Specifically, we were limited by CHC record keeping for the years 04-06, therefore subjects who achieved diagnostic resolution outside the system will be misclassified as unresolved. In addition, other site-level measures, such as specific funding resources for site-specific cancer programs, were not available from the medical record review. Demographic information was collected at the time of chart abstraction, while the abnormality had occurred earlier; thus, for example, our insurance information may not reflect the status at the time the abnormality occurred. We are unaware of any major changes to health care coverage in the state during this time period. Provider-level cluster analyses were not performed as the study sites were not provider-specific systems.

Conclusion

This study found that delays in diagnostic resolution after an abnormal screening test in an urban safety net system are most strongly associated with site of care. Our data support the need for community-based interventions, such as Patient Navigation, which are culturally targeted, to close the gap in cancer health disparities.

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Table 1

Table 1a. Demographic Characteristics of Subjects with Abnormal Mammograms in the Boston PNRP Baseline Cohort by Study Site

	Community Health Center Site							
	All	**A**	**B**	**C**	**D**	**E**	**F**	**p[a]**
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Total	**523**	**71 (14)**	**107 (20)**	**36 (7)**	**106 (20)**	**99 (19)**	**104 (20)**	
Age								≤.001
30 - 40	23 (7)	8 (11)	10 (9)	2 (6)	7 (7)	0 (0)	8 (8)	
41 - 50	274 (52)	27 (38)	44 (41)	15 (42)	39 (37)	99 (100)	43 (41)	
51-64	161 (31)	25 (35)	40 (37)	14 (39)	33 (31)	0 (0)	40 (38)	
65+	65 (12)	11 (15)	13 (12)	5 (14)	27 (25)	0 (0)	13 (13)	
Race								≤.001
Hispanic	99 (19)	24 (34)	16 (15)	3 (8)	4 (4)	43 (44)	9 (8)	
Black	171 (33)	2 (3)	25 (23)	12 (33)	3 (3)	38 (38)	91 (88)	
White	195 (37)	38 (53)	43 (40)	10 (28)	98(92)	3 (3)	3 (3)	
Other[b]	58 (11)	7 (10)	23 (22)	11 (31)	1 (1)	15 (15)	1 (1)	
Language								≤.001
Spanish	75 (14)	16 (23)	11 (11)	2 (6)	3 (3)	37 (38)	6 (6)	
English	333 (64)	47 (66)	71 (66)	25 (69)	85 (80)	23 (32)	73 (70)	
Other[c]	115 (22)	8 (11)	25 (23)	9 (25)	18 (17)	30 (30)	25 (24)	
Insurance								≤.001
No Insurance	221 (42)	12 (17)	63 (59)	13 (36)	44 (42)	41 (42)	48 (46)	
Public	188 (36)	30 (42)	31 (29)	14 (39)	52 (49)	30 (30)	31 (30)	
Private	114 (22)	29 (41)	13 (12)	9 (25)	10 (9)	28 (28)	25 (24)	
BIRADS Score								≤.001
BIRADS 0	352 (67)	42 (59)	91 (85)	24 (67)	77 (72)	67 (68)	51 (49)	
BIRADS 3	130 (25)	16 (23)	15 (14)	8 (22)	23 (22)	21 (21)	47 (45)	
BIRADS 4,5	41 (8)	13 (18)	1 (1)	4 (11)	6 (6)	11 (11)	6 (6)	

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	Community Health Center Site							
	All	A	B	C	D	E	F	P[a]
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Total	**523**	**71 (14)**	**107 (20)**	**36 (7)**	**106 (20)**	**99 (19)**	**104 (20)**	

Table 1b. Demographic Characteristics of Subjects with Abnormal Pap tests in the Boston PNRP Baseline Cohort by Study Site

	Community Health Center Site							
	All	A	B	C	D	E	F	P[a]
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	
Total	474	86 (18)	50 (11)	49 (10)	92 (19)	98 (21)	99 (21)	
Age								0.10
18 - 21	92 (19)	14 (16)	11 (22)	11 (22)	16 (17)	17 (17)	23 (23)	
22 - 25	151 (32)	25 (29)	21 (42)	13 (27)	35 (38)	32 (33)	25 (25)	
26 - 35	130 (27)	27 (31)	15 (30)	7 (14)	25 (27)	28 (29)	28 (28)	
36+	101 (21)	20 (23)	3 (6)	18 (37)	16 (17)	21 (21)	23 (23)	
Race								≤.001
Hispanic	129 (27)	40 (46)	8 (16)	2 (4)	9 (10)	60 (61)	10 (10)	
Black	160 (34)	4 (5)	21 (42)	25 (51)	4 (4)	30 (31)	76 (77)	
White	121 (26)	23 (27)	12 (24)	6 (12)	75 (82)	1 (1)	4 (4)	
Other[b]	64 (14)	19 (22)	9 (18)	16 (33)	4 (4)	7 (7)	9 (9)	
Language								≤.001
Spanish	71 (15)	31 (36)	5 (10)	1 (2)	4 (4)	24 (25)	6 (6)	
English	317 (67)	44 (51)	34 (68)	36 (73)	73 (80)	51 (52)	79 (80)	
Other[c]	86 (18)	11 (13)	11 (22)	12 (25)	15 (16)	23 (23)	14 (14)	
Insurance								≤.001
No Insurance	210 (44)	6 (7)	29 (58)	22 (45)	36 (39)	71 (73)	46 (47)	
Public	129 (27)	24 (28)	9 (18)	18 (37)	46 (50)	15 (15)	17 (17)	

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	Community Health Center Site							
	All	**A**	**B**	**C**	**D**	**E**	**F**	**p[a]**
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	**N (%)**	
Total	**523**	**71 (14)**	**107 (20)**	**36 (7)**	**106 (20)**	**99 (19)**	**104 (20)**	
Private	135 (28)	56 (65)	12 (24)	9 (18)	10 (11)	12 (12)	36 (36)	
Cervical Abnormality								0.43
Low Grade[d]	414 (87)	71 (83)	46 (92)	45 (92)	80 (87)	83 (85)	89 (90)	
High Grade[e]	60 (13)	15 (17)	4 (8)	4 (8)	12 (13)	15 (15)	10 (10)	

[a] Each P-value is from a Chi-square test for independence between the distribution of the row categorical variable and CHC site

[b] Any race other than Hispanic, Black or White. Due to differences in race/ethnicity reporting, numbers for collapsed racial/ethnic categories unavailable. Assignment is to 1 category only, with each category dominating the one below it.

[c] Any language other than English or Spanish. Includes Albanian, Arabic, French, Greek, Italian, Polish, and Portuguese.

[a] Each P-value is from a Chi-squared test for independence between the distribution of the row categorical variable and CHC site

[b] Any race other than Hispanic, Black or White. Due to differences in race/ethnicity reporting, numbers for collapsed racial/ethnic categories unavailable. Assignment is to 1 category only, with each category dominating the one below it.

[c] Any language other than English or Spanish. Includes Arabic, Irish, Polish and Portuguese.

[d] Includes Pap test results: ASCUS/HPV+ and LGSIL

[e] Includes Pap test results: HGSIL, Carcinoma

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Table 2

Uncensored Time to Resolution By Type of Screening Abnormality in the Boston PNRP Baseline Cohort

Abnormality	N	Median # Days to Resolution (Q1,Q3)	% Resolved At 6 months	% Resolved At 12 months
Mammogram		27		
All	523	27 (15, 52)	92	97
BIRADS 0	352	28 (20, 56)	92	97
BIRADS 3	130	11 (2, 37)	89	94
BIRADS 4,5	41	36 (10, 57)	95	100
Pap Test		85		
All	474	82 (45, 174)	65	93
Low Grade	414	85 (47, 174)	65	93
High Grade	60	56 (34, 175)	65	92

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Table 3

Predictors of Timely Resolution of Mammography Abnormality[a] in the Boston PNRP Baseline Cohort

	Univariate Hazard Ratio (95% CI)	Multivariate Hazard Ratio (95% CI)	p[b]
Age			
30 – 40	1.05 (0.70, 1.59)		
41 – 50	0.78 (0.59, 1.02)		
51 – 64	0.79 (0.58, 1.06)		
65 + (ref)	--		
Race			
Hispanic	1.03 (0.28, 1.33)		
Black	1.11 (0.89, 1.38)		
White (ref)	--		
Other	1.22 (0.90, 1.66)		
Language			
Spanish	0.90 (0.79, 1.17)		
English (ref)	--		
Other	0.86 (0.69, 1.08)		
Insurance			
No Insurance	0.88 (0.68, 1.12)		
Public	0.98 (0.80, 1.20)		
Private (ref)	--		
BIRADS			
BIRADS 0	**0.79 (0.64, 0.98)**	**0.79 (0.64, 0.98)**	0.10
BIRADS 3 (ref)	--	--	
BIRADS 4,5	0.86 (0.60, 1.32)	0.94 (0.65, 1.36)	
CHC[c] site			
A (ref)	--	--	
B	1.27 (0.92,1.74)	1.34 (0.97, 1.86)	0.11
C	1.50 (0.99,2.28)	**1.56 (1.02, 2.38)**	
D	1.25 (0.91, 1.72)	1.28 (0.93, 1.77)	
E	1.04 (0.75, 1.43)	1.05 (0.76, 1.46)	
F	**1.42 (1.04, 1.96)**	**1.41 (1.02, 1.95)**	

[a] Larger hazards ratios are associated with shorter time to resolution.

[b] P value is from a Chi-square test for model fit between the row categorical variable with the outcome.

[c] CHC = community health center

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Table 4

Predictors of Timely Resolution of Pap Test Abnormality[a] in the Boston PNRP Baseline Cohort

	Univariate Hazard Ratio (95% CI)	Multivariate Hazard Ratio (95% CI)	P[b]
Age			
18 – 21	0.79 (0.55, 1.12)		
22 – 25	0.88 (0.64, 1.20)		
26 – 35	1.05 (0.77, 1.44)		
36+ (ref)	--		
Race/Ethnicity			0.35
Hispanic	1.20 (0.90, 1.61)	1.36 (0.87, 2.11)	
Black	**0.62 (0.46, 0.84)**	1.10 (0.74, 1.65)	
White (ref)	--	--	
Other	0.90 (0.63, 1.31)		
Language			0.24
Spanish	**1.82 (1.35, 2.45)**	1.35 (0.88, 2.08)	
English (ref)	--	--	
Other	1.18 (0.88, 1.59)	1.22 (0.89, 1.67)	
Insurance			0.09
No Insurance	0.84 (0.62, 1.12)	**0.71 (0.51, 0.98)**	
Public Insurance	**0.71 (0.54, 0.93)**	0.77 (0.58, 1.04)	
Private (ref)	--	--	
Pap Test			
Low Grade	--		
High Grade	1.2 (0.83, 1.63)		
CHC[c] site			<0.001
A (ref)	--	--	
B	**0.62 (0.41, 0.93)**	0.70 (0.44, 1.11)	
C	**0.37 (0.24, 0.57)**	**0.39 (0.24, 0.64)**	
D	**0.69 (0.49, 0.96)**	0.76 (0.52, 1.12)	
E	**0.55 (0.39, 0.77)**	**0.53 (0.35, 0.81)**	
F	**0.34 (0.24, 0.50)**	**0.40 (0.26, 0.62)**	

[a] Larger hazards ratios are associated with shorter time to resolution.

[b] P value is from a Chi-square test for model fit between the row categorical variable with the outcome.

[c] CHC = community health center