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Cancer preventive screening: A cross-border comparison of United States and Canadian Chinese women

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Abstract

Objective—To compare screening mammography and Pap testing among Chinese women in Seattle, Washington to Vancouver, and British Columbia.

Methods—Using community-based sampling methods, trilingual female interviewers surveyed Chinese women in Seattle and Vancouver. Multiple preventive health behaviors and health care access variables were assessed. Mammography analysis included 409 women aged 50–74 years. Pap testing analysis included 973 women aged 20–69 years. Main outcome measures were ever use and use in the last 2 years of screening mammography and Pap testing.

Results—Chinese women in Vancouver were younger, more educated and fluent in English. Unadjusted rates of mammography and Pap testing were similar between the two cities. Provider type was consistently associated with screening in both cities; female providers had the highest rates and Chinese male providers the lowest. Adjusted logistic regression analysis demonstrated similar mammography use in the two cities. However, for Pap testing, women in Seattle had higher odds of screening compared to Vancouver.

Conclusion—Despite universal health care coverage and baseline characteristics typically associated with greater utilization of preventive screening services, Chinese women in Vancouver did not have higher rates of screening mammography and Pap testing compared to Chinese women in Seattle.

Keywords

Chinese; PAP testing; Mammography; Preventive screening; Universal health coverage

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Introduction

Cross-border comparison between Canada and the United States (US) is a potentially useful tool for understanding the effectiveness of health care delivery systems. In Canada, the universal health care system reimburses physicians on a fee-for service basis, whereas in the US, health care is accessed using a combination of private, public, and no health insurance. Estimates suggest that as many as 75 million Americans went without health insurance at some point during 2001 and 2002 [1]. This potentially compromises access to US health care, particularly non-emergent care such as preventive services.

Despite controversy surrounding screening mammography [2,3], preventive care for breast and cervical cancer with mammography and Pap testing is widely felt to decrease mortality among age appropriate women [4]. National efforts have promoted screening programs for these services in both Canada and the US [4–6]. At the time of this study, Canadian and US recommendations varied for similarly aged women; in Canada, screening mammography was recommended every 2 years and Pap testing every 3 years (after two negative annual exams) [7,8], while the US Preventive Services Task Force recommended screening mammography every 1–2 years and Pap testing every 1–3 years [9–11].

In Seattle, both screening mammography and Pap testing may or may not be covered by private or public insurance. Low-income women age 40 to 64 years without health insurance are eligible for the federal Breast and Cervical Health Program, which provides screening with no out-of-pocket costs. In contrast, British Columbia has the longest established screening programs in Canada for breast and cervical cancer [5,12,13]. Both tests are provided at no cost, and women may access screening mammography centers without a provider referral.

Multiple studies in both countries indicate that non-English speakers and immigrants, including Chinese women, are less likely than the general population to obtain these preventive tests [13–24]. Because Chinese women constitute a demographic group with potentially greater language and cultural barriers to accessing breast and cervical cancer screening, it is important to identify barriers and facilitators to their participation in screening. Cost is a potential barrier, and the Canadian universal health care system might be expected to be more accessible. Seattle, Washington, and Vancouver, British Columbia are excellent locations to investigate this relationship because the cities are geographically proximate with significant Chinese populations. This cross-border study examines factors affecting access to screening mammography and Pap testing to gain insight into the role universal health coverage might play in providing these services to Chinese immigrant women.

Methods

Our study was approved by the Human Subjects Review Board of Fred Hutchinson Cancer Research Center and University of British Columbia. The community-based survey was administered in Seattle and Vancouver from January to December 1999.

Study sample

We used the 1998 Vancouver telephone directory to randomly select households with common Chinese surnames from three neighborhoods with a high population density of Chinese [25–27]. In Seattle, we merged the 1998 Seattle telephone listing with a commercial list of Chinese households from the American List Council of New Jersey by street address to eliminate duplicates. Using a list of common Chinese surnames, households were then randomly selected in zip codes with high density Chinese [28]. These sampling methods are described in detail elsewhere [13,24,29].

An introductory letter printed in English and Chinese was sent to selected households. Women 20 years and older who spoke Cantonese, Mandarin, or English were eligible for participation. After obtaining informed consent, trilingual female interviewers conducted in-home interviews. Details of the selection process are described elsewhere [29,30]. A total of 828 households were approached in Seattle and 1098 households in Vancouver (Fig. 1).

Survey instruments

All survey questions were developed in English, translated into Chinese, back-translated to ensure lexical equivalence, reconciled, and pre-tested [31,32]. Items on screening mammography and Pap testing were adopted from the Pathways to Early Detection questionnaire that has been used successfully in Chinese populations [20,21,33]. Multiple preventive behaviors were assessed in this study. Thus, to minimize participant burden, we developed three versions of the survey and randomly assigned households to one version. All three versions included Pap questions; however, version 3 did not include health care access questions and was excluded in these analyses (Fig. 1). Only version 1 had screening mammography questions.

The survey also addressed sociodemographics, how many years the women had lived in North America, and whether they spoke English fluently. Information about health care access included whether they had: medical cost concerns; a regular provider (including the provider's ethnicity and gender and if they were able to communicate in Chinese); visited a physician or traditional healer in the past year; insurance coverage; and problems with getting an appointment, finding an interpreter, or obtaining transportation.

Data analysis

Mammography analyses included women aged 50 to 74 years, without a history of breast cancer or double mastectomy. Pap testing analyses included women aged 20 to 69 years without a history of cervical cancer or hysterectomy. In consideration of the different Canadian and US recommendations, we examined two outcome measures for each screening test: ever screened and screened in the last 2 years.

Chi-square tests (and Fisher's Exact Tests where necessary) compared baseline differences between Chinese women living in Seattle to those in Vancouver. Subsequent bivariate analyses compared women who had undergone a screening test to those who had not.

Unconditional logistic regression was performed to examine the effect of living in Seattle compared to living in Vancouver upon having had a screening test, both ever and in the last 2 years. This city effect was first modeled without any adjustments. Then, a second model assessed the same city effect while adjusting for potential demographic confounders previously identified as significant; age, place of birth, education, employment, housing type, marital status, proportion of life in North America, religion, and speaking English fluently [22,34–38]. Final models examined the city effect with adjustment for demographic variables and factors associated with health care access including: medical cost concerns; communicate with provider in Chinese; ethnicity/gender of provider; doctor visit in the last year; problems with appointment, finding an interpreter, or transportation; traditional healer visit in last year; and private insurance (additional private insurance to national coverage in Vancouver).

Results

Participant characteristics

Response rates among contacted households with eligible women were 72% in Seattle and 63% in Vancouver (Fig. 1). Chinese women in Seattle were older than their Vancouver

counterparts and more likely to be born in Mainland China (Table 1). Compared to Vancouver, the women in Seattle were also less educated, more likely to be employed, reported more health care cost concerns, and had more problems finding an interpreter and securing transportation for medical visits. Fewer Chinese women in Seattle were fluent in English, had visited a traditional healer in the last year, had identified their regular physician as a Chinese male provider or were able to communicate with their provider in Chinese.

Preventive screening

No significant differences were found between crude ratios of screening mammography and Pap testing in Seattle and Vancouver. Among Chinese women, 66% in Seattle and 65% in Vancouver reported a mammogram in the last 2 years, and 66% in Seattle and 62% in Vancouver reported a Pap test in the last 2 years (Fig. 2 and Table 2). The proportions for both breast and cervical cancer screening were lower for Seattle's Chinese women compared to estimates from a national sample of the general US population (73% for mammogram and 83% for Pap test, in the last 2 years) [39]. In Vancouver, screening mammography rates were comparable to, and higher than, Canadian national estimates from the National Population Health Survey 1996–7 for ever tested (79%) and tested in the last 2 years (54%), respectively [8,40]. However, Pap testing by Chinese Canadian women was below the National Population Health Survey rates (87% for ever had, 72% for Pap test in last 2 years) [8,41] (Fig. 2).

Bivariate analyses—Screening mammography

Characteristics positively associated with screening mammography in both Seattle and Vancouver included not communicating with provider in Chinese, having a regular provider and having a female provider (Table 2). In both cities, having a Chinese male provider was negatively associated with screening.

For Chinese women in Seattle, a greater proportion of life lived in North America, English fluency, and a physician visit in the last year were also associated with higher rates of screening mammography, while those reporting problems finding an interpreter had lower screening rates. In Vancouver, being employed, having greater income, being married, experiencing problems finding an interpreter, and having private insurance in addition to national coverage were positively associated with screening mammography.

Bivariate analyses—Pap screening

In both Seattle and Vancouver, not communicating with provider in Chinese, having a regular provider, and having a female provider were again positively associated with Pap testing, while having a Chinese male provider was negatively associated with screening (Table 2). Other factors associated with higher rates of Pap testing in both cities included: place of birth (Hong Kong or North America), owning a home, being married, and a greater proportion of life lived in North America.

In addition to these factors, Chinese women in Seattle who reported medical cost concerns were less likely to have received a Pap test, while those who had visited a physician in the last year had greater Pap testing rates. In Vancouver women who were younger, had a higher income, reported no difficulty with transportation to medical visits, visited a traditional healer in the last year, and had private insurance in addition to national health insurance were all more likely to report a recent Pap test.

Multiple regression analyses

Logistic regression analyses demonstrated no significant differences between Seattle and Vancouver for screening mammography (Table 3). After adjustment for demographic and

health care access variables, Chinese women in Seattle had a greater likelihood, although non-significant, of ever having received screening mammography.

The crude odds ratio of having a Pap test was similar in both cities. However, after adjusting for demographic and health care access variables, the odds of Pap testing, ever or in the last 2 years, were higher for women in Seattle compared to Vancouver.

Discussion

Population-based interviews in the US and Canada regularly assess self-reported screening mammography and Pap testing. Cross-border comparisons have shown historically higher screening mammography rates in the US compared to Canada [12,42,43]. For cervical cancer, international differences in screening rates have been less apparent: similar screening rates were demonstrated using population-based survey data in 1990 in the US and Ontario [42]. However, crude comparisons of national population samples suggest that screening mammography and Pap testing may be lower in Canada (Fig. 2) [39–41]. Thus, for the general population, universal health coverage has not clearly resulted in greater breast and cervical cancer screening in Canada compared to the US. Our study suggests that this is also true for the Chinese immigrant populations.

Fig. 2 suggests greater discrepancies in screening rates between US and Canadian national estimates than between Seattle and Vancouver's Chinese women. At the time of this study, Canadian recommendations consisted of screening mammography every 2 years and Pap testing every 3 years (after two negative annual exams) [8], whereas the US Preventive Services Task Force recommended screening mammography every 1 to 2 years and Pap testing every 1 to 3 years [11]. In fact, multiple US agencies supported annual screening mammography and Pap testing among variously described age-appropriate women [9,10]. US physicians and patients may therefore strive for shorter screening intervals.

Prospective Canadian National Breast Screening Study data suggest that annual detailed physical breast examination with breast self-examination teaching is an alternative to mammography [44]. Although controversial, these results may influence Canadian physician practice patterns more than US providers, for whom malpractice concerns of missed cancer diagnoses may also be significant. Thus, within the general population, physician support for screening in the two countries may differ. Based upon these apparent national trends, it is perhaps surprising that the screening rates among Chinese women in Seattle and Vancouver are so similar.

This finding may be the result of national and provincial programs promoting breast and cervical cancer screening in both countries. Seattle has been a site for the Breast and Cervical Health Program since 1994 with goals to reduce disparities in breast and cervical cancer screening for low-income populations. The Breast and Cervical Health Program works in conjunction with a network of community clinics caring for low-income populations and contracts with one of these clinics, serving predominantly Asians, to provide outreach to the Asian communities. In Vancouver, the Screening Mammography Program of British Columbia was established in 1988 and the Cervical Cancer Screening Program in 1955. Both programs aim to reach all age-eligible women in British Columbia. Furthermore, to address the higher rates of invasive cervical cancer among Chinese women, in 1994 Vancouver's Asian Women's Health Clinic was established. Staffed by Chinese-speaking female providers, the clinic performs breast and cervical health services and education and provides results to women's assigned primary care providers [45]. Despite these programs, Chinese Canadian women in this study reported lower Pap testing rates than the national estimates (Fig. 2).

One might expect persons with lower socioeconomic status to have a disproportionate benefit from universal health coverage in terms of access to preventive screening; however, prior studies have not supported this hypothesis. Cross-border comparisons across socioeconomic strata demonstrated disparities in the use of these preventive screening procedures in Canada similar to those in the US [42,43]. Income, educational attainment, and being born in Asia have been consistently associated with lower screening mammography and Pap testing in Canadian National Population Health Survey data [8,40], suggesting additional barriers to preventive health services for the poor, beyond health insurance coverage. Our study demonstrated important differences in the sociodemographic and health care access characteristics between Seattle and Vancouver. This may be due to the influx of wealthy Chinese immigrants from Hong Kong and Taiwan to Canada in the 1980–90s following changes in Canadian immigration law that preceded the handover of Hong Kong to China in 1997 [46]. In our study, Chinese women in Seattle were more likely to have characteristics described as barriers to accessing preventive services in the general and Chinese populations [18,19,34]. Thus, Chinese women in Vancouver might be expected to utilize preventive screening more than women in Seattle; however, this was not the case.

Screening mammography rates were the same in Seattle and Vancouver. This equivalence is not expected based upon national estimates of the general population that suggest higher US screening rates (Fig. 2). One explanation is that British Columbia has one of the highest screening mammography rates in Canada [8,40]. Other explanations include the favorable baseline sociodemographic characteristics of our Vancouver cohort and Canada's universal health care. However, if these were primary factors, Pap testing rates should also be similar, yet Vancouver had lower Pap testing rates than Seattle.

Several factors may contribute to Seattle's favorable Pap testing rates. Combined with outreach by community clinic staff to underserved communities, the Breast and Cervical Health Program addresses multiple barriers to preventive care for low-income and limited English speaking women. This program's integration of coverage for preventive care with existing clinical services that are culturally and linguistically appropriate is unique. In contrast, although Vancouver has universal health coverage, women must first identify and select a primary care physician to access the health care system and the Asian Women's Health Clinic does not provide outreach services.

Although the Breast and Cervical Health Program clearly influenced Seattle's Pap testing rates, it does not explain all of the difference between the two cities. When we examined the age group covered by this program (40–64 years), Pap testing was similar in Seattle and Vancouver whereas Seattle women less than 40 and greater than 64 years reported more Pap tests than their Canadian counterparts.

As in previous studies, our analyses found a strong association between provider characteristics with screening mammography and Pap testing in both cities. Pap testing is a physician-dependent activity, while mammography may be independently obtained (particularly in BC where no physician referral is required), Vancouver's lower Pap testing and equivalent mammography utilization suggest that physician attitudes and practices play a significant role in screening access.

Our results suggest that communicating with a provider in Chinese was a barrier to screening. McPhee et al. have demonstrated similar findings in the Vietnamese American population [47]. However, an analysis examining language concordance with Chinese American providers and mammography screening showed that language concordance with Chinese female providers was positively associated with screening [23]. Additional analysis from this study supports the key role of the provider's gender: having Chinese and non-Chinese female

physicians were associated with higher rates of breast and cervical cancer screening in the US and Vancouver [48–51], while women with Chinese male physicians had the lowest screening rates. Of note, a majority of Chinese women in Vancouver, and significantly fewer in Seattle, reported that they had a Chinese male physician.

Several issues may contribute to our findings. First, cultural sensitivities and expectations of both Chinese women and Chinese physicians may deter Pap testing by Chinese male physicians [45,52–55]. Second, medical training outside of North America may focus more on treatment of acute illness rather than preventive screening tests. Third, structural differences in the health care systems must be considered. Our Vancouver qualitative data indicate that Chinese women from Asia are accustomed to and expect gynecologists rather than primary care physicians to perform Pap testing [13]. In Canada, referrals to specialists are required from the primary care physicians. This practice pattern would encourage primary care physicians (the majority being Chinese men) to perform Pap testing rather than gynecologists, conflicting with these women's expectations and presenting an additional barrier to screening for Chinese Canadian women.

Vancouver's lower Pap testing contrasts distinctly with the comparable screening mammography rates in Seattle and Vancouver. For screening mammography, physician–patient cultural barriers may be avoided in Vancouver, where self-referral is commonplace. In contrast, the requirement for physician interaction and referral in Seattle may deter some women.

Contrary to our expectations, problems finding an interpreter were associated with lower mammography screening in Seattle, but more screening in Vancouver. It is possible that, in Seattle, where only 32% of the women could communicate with their providers in Chinese, the role of interpretation is crucial to promoting mammography screening. In Vancouver, 88% of the women were able to communicate with their provider in Chinese, the role of an interpreter is therefore less important.

Strengths of this study include the community-based sampling method, identical survey and administrative methods in both cities, and the ability to adjust for many individual level factors known to influence preventive screening. Despite the detailed information available to us, it is difficult to measure all potential factors that may affect screening among Chinese women in Seattle and Vancouver. Unmeasured factors such as the role of historically higher rates of screening mammography in the US, more liberal reimbursement policies and higher reimbursement rates in the US, greater promotion of screening mammography by governmental and nonprofit agencies in the US, and differing guidelines for screening could all confound the relationship we have attempted to describe in this study. Thus, statements regarding the contribution of universal health coverage are limited and conjectural at best. Additional limitations include different sampling methods in the two cities, a higher response rate in Seattle, and self-reported screening tests that may be overly optimistic [56].

In summary, we found that despite baseline characteristics typically associated with lower preventive screening rates, Chinese women in Seattle were more likely to have a Pap test than women in Vancouver. Female providers were consistently associated with greater screening in both cities, and Chinese male providers were associated with lower screening. Yet, while universal health coverage promotes preventive screening for Chinese women in Vancouver, it appears that other factors appear to attenuate this.

Our findings indicate that several strategies would improve access to breast and cervical cancer screening for Chinese women in North America: providing culturally appropriate services by same-gender providers; addressing barriers to screening between Chinese women and Chinese male providers; and eliminating the requirement for physician referral for screening mammography (in Seattle). Our results also suggest that programs integrating health promotion

within existing community service networks and outreach, similar to the Breast and Cervical Health Program, merit additional study.

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Fig. 1.
Summary of survey version, cooperation rates* and sample sizes.

Fig. 2.

Unadjusted screening rates in Seattle and Vancouver. * From the National Population Health Survey 1996–1997: mammography data for women 50–69 yrs, Pap testing, women 18+ yrs. † From the Behavior Risk Factor Surveillance System 1999: mammography data for women 40–64 yrs, Pap testing, women 18+ yrs. ‡ Canadian national estimate (NPHS) for Pap test in last 3 yrs.

Table 1

Comparison of study participants: Chinese Women in Seattle and Vancouver

Screening mammography				Pap testing			
Seattle (n = 216)		Vancouver (n = 193)		Seattle (n = 422)		Vancouver (n = 551)	
	No. (%) ^a	No. (%) ^a	P value ^b		No. (%) ^a	No. (%) ^a	P value ^b
Sociodemographic variables							
Age, years				Age, years			
50–54	58 (27)	58 (30)	0.58	20–39	112 (27)	182 (33)	0.02
55–59	47 (22)	39 (20)		40–59	224 (53)	288 (52)	
60–64	42 (19)	33 (17)		60–69	86 (20)	81 (15)	
65–69	38 (18)	38 (20)					
70–74	36 (17)	25 (13)					
Place of birth							
Mainland China	175 (81)	112 (58)	<0.001	291 (69)	287 (52)	<0.001	
Hong Kong	14 (6)	62 (32)		40 (9)	197 (36)		
South East Asia, ^{b,c}	16 (7)	6 (3)		61 (14)	18 (3)		
N. America	7 (3)	1 (1)		23 (5)	13 (2)		
Other	4 (2)	12 (6)		7 (2)	36 (7)		
Education							
0–6 years	87 (41)	69 (36)	0.03	117 (28)	78 (14)	<0.001	
7–12 years	97 (45)	76 (40)		202 (48)	240 (44)		
13+ years	30 (14)	46 (24)		101 (24)	230 (42)		
Employed							
Yes	113 (53)	77 (40)	0.01	295 (70)	331 (60)	0.001	
Housing							
Owned	182 (86)	174 (94)	0.01	356 (86)	472 (87)	0.55	
Rented/subsidized	30 (14)	12 (6)		60 (14)	71 (13)		
Income							
Less than \$20,000	54 (25)	40 (21)	§	81 (19)	109 (20)	§	
\$20–29,000	22 (10)	29 (15)		63 (15)	96 (17)		
\$30–49,000	35 (16)	35 (18)		72 (17)	119 (22)		
\$50,000 or more	11 (5)	19 (10)		30 (7)	74 (13)		
Unknown	94 (44)	70 (36)		176 (42)	153 (28)		
Marital status							
Current	175 (81)	153 (79)	0.59	359 (85)	475 (86)	0.68	
Previous/never	40 (19)	40 (21)		62 (15)	76 (14)		
Proportion of life in North America							
0–24%	87 (40)	85 (44)	0.66	180 (43)	273 (50)	0.12	
25–49%	75 (35)	67 (35)		156 (37)	180 (33)		
50–100%	53 (25)	41 (21)		83 (20)	97 (18)		
Religion							
Buddhism/eastern	61 (29)	54 (28)	0.01	136 (33)	140 (26)	0.005	
Christianity	42 (20)	62 (32)		67 (16)	129 (24)		
None	109 (51)	76 (40)		208 (51)	280 (51)		
Speaks English fluently							
Yes	19 (9)	45 (23)	<0.001	67 (16)	221 (40)	<0.001	
Health care access variables							
Medical cost concerns							
Yes	56 (26)	13 (7)	<0.001	107 (25)	36 (7)	<0.001	
Communicate with provider in Chinese							
Yes	68 (32)	168 (88)	<0.001	94 (22)	442 (81)	<0.001	
No	101 (47)	15 (8)		210 (50)	68 (12)		
No regular provider	46 (21)	9 (5)		116 (28)	35 (6)		
Regular provider							

	Screening mammography			Pap testing		
	Seattle (<i>n</i> = 216)		<i>P</i> value ^b	Seattle (<i>n</i> = 422)		<i>P</i> value ^b
	No.	(%) ^d		No.	(%) ^d	
Chinese male	57	(27)	<0.001	75	(18)	<0.001
Chinese female	15	(7)		27	(6)	
Non-Chinese male	43	(20)		79	(19)	
Non-Chinese female	51	(24)		121	(29)	
No regular provider	46	(22)	0.88	116	(28)	0.59
MD visit in last year	162	(75)		295	(70)	
Problems getting appointment	67	(31)		129	(31)	
Yes	83	(38)		146	(35)	
Problems finding interpreter	43	(20)	<0.001	56	(13)	0.04
Yes	39	(18)		93	(22)	
Problems with transportation	21	(11)		72	(13)	
Visited traditional healer in last year	73	(38)		188	(35)	
Yes						

^aTotal number and % may not equal 100% due to missing values.

^bComparing differences between Seattle and Vancouver study samples.

[‡]Includes Cambodia, Laos, Malaysia, Myanmar (Burma), Thailand, Vietnam.

[§]Currencies not equivalent (US and Canadian dollars) and not compared between countries.

Table 2

Factors associated with preventive screening in the last 2 years

Mammogram in the last 2 years						Pap test in the last 2 years					
Seattle (n = 216)			Vancouver (n = 193)			Seattle (n = 422)			Vancouver (n = 551)		
No./total ^a	(%)	P value ^b	No./total ^a	(%)	P value ^b	No./total ^a	(%)	P value ^b	No./total ^a	(%)	P value ^b
143/216	(66)		125/193	(65)		280/422	(66)		342/551	(62)	
Sociodemographic variables											
Age, years						Age, years					
50–54	(62)	0.23	39/58	(67)	0.08	75/112	(67)	0.73	106/182	(58)	<0.001
55–59	(55)		30/39	(77)		151/224	(67)		205/288	(71)	
60–64	(76)		19/33	(58)		54/86	(63)		31/81	(38)	
65–69	(73)		26/38	(68)							
70–74	(69)		11/25	(44)							
Place of birth											
Mainland China	(67)	0.08	69/112	(62)	0.18	187/291	(64)	0.01	159/287	(55)	0.01
Hong Kong	(64)		41/62	(66)		32/40	(80)		134/197	(68)	
South East Asia ^c	(44)		6/6	(100)		39/61	(64)		11/18	(61)	
N. America	(100)		0/1	(0)		20/23	(87)		10/13	(77)	
Other	(50)		9/12	(75)		2/7	(29)		28/36	(78)	
Education											
0–6 years	(62)	0.26	38/69	(55)	0.10	72/117	(62)	0.31	44/78	(56)	0.20
7–12 years	(72)		53/76	(70)		135/202	(67)		159/240	(66)	
13+ years	(60)		33/46	(72)		72/101	(71)		138/230	(60)	
Employed											
Yes	(66)	0.87	58/77	(75)	0.01	196/295	(66)	0.99	213/331	(64)	0.20
No	(65)		67/116	(58)		83/125	(66)		129/219	(59)	
Housing											
Owned	(69)	0.35	115/174	(66)	0.35	247/356	(69)	0.01	307/472	(65)	0.001
Rented/subsidized	(60)		6/12	(50)		31/60	(52)		31/71	(44)	
Income											
Less than \$20,000	(65)	0.55	23/40	(58)	0.03	47/81	(58)	0.20	61/109	(56)	0.01
\$20–29,000	(82)		22/29	(76)		47/63	(75)		55/96	(57)	
\$30–49,000	(69)		29/35	(83)		48/72	(67)		80/119	(67)	
\$50,000 or more	(64)		13/19	(68)		23/30	(77)		58/74	(78)	
Unknown	(63)		38/70	(54)		115/176	(65)		88/153	(58)	
Marital status											
Current	(66)	0.83	107/153	(70)	0.003	247/359	(69)	0.02	319/475	(67)	<0.001
Previous/never	(68)		18/40	(45)		33/62	(53)		23/76	(30)	
Proportion of life in North America											
0–24%	(54)	0.01	58/85	(68)	0.38	101/180	(56)	<0.001	155/273	(57)	0.03
25–49%	(72)		39/67	(58)		113/156	(72)		122/180	(68)	
50–100%	(77)		28/41	(68)		65/83	(78)		65/97	(67)	
Religion											
Buddhism/Eastern Christianity	(61)	0.52	35/54	(65)	0.98	85/136	(63)	0.43	87/140	(62)	0.11
Christianity	(69)		41/62	(66)		44/67	(66)		90/129	(70)	
None	(69)		49/76	(64)		144/208	(69)		165/280	(59)	
Speaks English fluently											
Yes	(89)	0.02	32/45	(71)	0.31	48/67	(72)	0.32	146/221	(66)	0.11
No	(64)		93/148	(63)		232/355	(65)		196/330	(59)	
Health care access variables											
Medical cost concerns											
Yes	(57)	0.10	9/13	(69)	1.00	58/107	(54)	0.002	22/36	(61)	0.90

	Mammogram in the last 2 years				Pap test in the last 2 years			
	Seattle (<i>n</i> = 216)		Vancouver (<i>n</i> = 193)		Seattle (<i>n</i> = 422)		Vancouver (<i>n</i> = 551)	
	No./total ^a	(%)	No./total ^a	(%)	No./total ^a	(%)	No./total ^a	(%)
Total sample	143/216	(66)	125/193	(65)	280/422	(66)	342/551	(62)
No	111/160	(69)	116/180	(64)	221/314	(70)	320/515	(62)
Communicate with provider in Chinese								
Yes	44/68	(65)	109/168	(65)	59/94	(63)	272/442	(62)
No	80/101	(79)	13/15	(87)	172/210	(82)	50/68	(74)
	19/46	(41)	3/9	(33)	48/116	(41)	16/35	(46)
No regular provider								
Regular provider	35/57	(61)	79/130	(61)	42/75	(56)	166/305	(54)
Chinese male								
Regular Provider	14/15	(93)	33/41	(80)	25/27	(93)	127/166	(77)
Chinese female	31/43	(72)	5/7	(71)	61/79	(77)	14/20	(70)
Non-Chinese male	43/51	(84)	4/4	(100)	102/121	(84)	14/18	(78)
Non-Chinese female	19/46	(41)	3/9	(33)	48/116	(41)	16/35	(46)
No regular provider								
MD visit in last year	114/162	(70)	97/146	(66)	205/295	(69)	247/394	(63)
Yes	29/54	(54)	28/47	(60)	75/127	(59)	95/157	(61)
No								
Problems getting appointment	42/67	(63)	30/43	(70)	81/129	(63)	90/145	(62)
Yes	101/149	(68)	95/150	(63)	198/292	(68)	252/406	(62)
No								
Problems finding interpreter	47/83	(57)	18/21	(86)	93/146	(64)	43/72	(60)
Yes	96/133	(72)	107/172	(62)	186/275	(68)	299/479	(62)
No								
Problems with transportation	27/43	(63)	15/21	(71)	33/56	(59)	25/51	(49)
Yes	116/172	(67)	110/172	(64)	245/361	(68)	317/500	(63)
No								
Visited traditional healer in last year	25/39	(64)	52/73	(71)	63/93	(68)	130/188	(69)
Yes	116/173	(67)	73/120	(61)	212/323	(66)	208/357	(58)
No								
Private medical insurance	68/96	(71)	—	—	144/214	(67)	—	—
Yes	74/119	(62)	—	—	134/205	(65)	—	—
No								
Private insurance in addition to national insurance	—	—	25/30	(83)	—	—	108/154	(70)
Yes	—	—	100/162	(62)	—	—	234/395	(59)
No								

^aTotal number may not equal 100% of total sample due to missing values.

^b% obtaining screening test; *P* value for association with screening test in the last 2 years.

^cIncludes Cambodia, Laos, Malaysia, Myanmar (Burma), Thailand, Vietnam.

Odds of preventive screening among Chinese Women in Seattle, WA compared to Vancouver, BC

Table 3

City effect (Seattle compared to Vancouver)	Ever screened		Screened in last 2 years	
	Odds ratio	95% CI	P value	Odds ratio
Screening mammography, 50–74 years old (n = 409)	1.2	(0.7, 1.9)	0.48	1.1
	1.5	(0.9, 2.8)	0.14	1.1
	Adjusted for demographic variables ^a	(0.7, 3.8)	0.26	1.0
Adjusted for all demographic and health care access variables ^b	1.6	(0.7, 3.8)	0.26	1.0
	1.2	(0.9, 1.7)	0.25	1.2
	Adjusted for demographic variables ^a	(1.1, 2.3)	0.02	1.5
PAP Testing, 20–69 years old (n = 973)	1.2	(0.9, 1.7)	0.25	1.2
	1.6	(1.1, 2.3)	0.02	1.5
	Adjusted for all demographic and health care access variables ^b	(1.0, 2.9)	0.05	1.5

^aDemographic variables include: age, place of birth, education, employment, housing type, marital status, proportion of life in North America, religion, and speaking English fluently.

^bIncludes demographic variables as above and: medical cost concerns, communicate with provider in Chinese, ethnicity/gender of provider, doctor visit in the last year, problems with appointment, finding an interpreter, or transportation, traditional healer visit in last year and private insurance (additional private insurance to national coverage in Vancouver).