

# Changes in cervical cancer screening behavior for women attending Pap Test Week clinics

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**Objective:** This retrospective study of all women who accessed the 2006 Manitoba Pap Test Week clinics was designed to determine factors associated with inadequate cervical cancer screening and changes in cervical cancer screening behavior.

**Methods:** Data were acquired using the CervixCheck Manitoba registry and an ancillary database of demographic information collected from clinic attendees.

**Results:** The study included 1124 women. Of these, 53% (n = 598) were under-screened (no Pap test in the previous 2 years) prior to accessing the clinics. Logistic regression analyses demonstrated that older age (odds ratio [OR] = 1.02, 95% confidence interval [CI] 1.01–1.03), no doctor (OR = 1.4, 95% CI 1.05–1.54), and living in Canada < 1 year (OR = 5.5, 95% CI 2.73–11.12) were associated with being under-screened prior to accessing the Pap Test Week clinics. Thirty-seven percent (n = 223) of under-screened women demonstrated improved screening status subsequent to the 2006 Pap Test Week (had a subsequent Papanicolaou [Pap] test performed within 2 years) and these women were more likely to live in an urban setting ( $P = 0.003$ ), be younger ( $P < 0.001$ ), originate outside Canada ( $P = 0.006$ ), have lived in Canada for less than 1 year ( $P = 0.006$ ), and have had an abnormal Pap test result in 2006 ( $P < 0.001$ ). Previously under-screened women were less likely to become adequately-screened subsequent to 2006 if they had a Pap test performed at a Pap Test Week clinic compared to having a Pap test performed elsewhere (37% versus 60%,  $P < 0.001$ ).

**Conclusion:** This study identified a subset of under-screened women accessing Pap Test Week clinics whose screening status might be most modifiable.

**Keywords:** health promotion campaign, prevention, cervical cancer, risk assessment, public screening program

## Introduction

Cervical cancer accounts for over 250,000 deaths per year worldwide.<sup>1</sup> Women in developed countries, such as Canada, have benefited from a dramatic decline in the incidence and mortality rates for cervical cancer over the past half-century, owing in large part to the advent of cervical cancer screening, specifically, the Papanicolaou (Pap) test. While it can boast much success, the Pap test has only moderate sensitivity and, as such, its ability to detect precursors to cervical cancer relies on women presenting for repeat testing at regular intervals. In Manitoba, a province in central Canada, approximately 70% of women aged 20–69 participate in routine Pap test screening.<sup>2</sup> This is comparable to other Canadian provinces where the percentage of women screened regularly ranges from 64%–80%.<sup>3</sup> Barriers to adequate cancer screening are multi-factorial but recent immigration, language other than English, and

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financial constraints have been identified as important risk factors for inadequate screening.<sup>4-11</sup>

To promote awareness of cervical cancer screening, CervixCheck Manitoba introduced “Manitoba Pap Test Week” in 2003. This initiative takes place yearly over the course of one week in October. Numerous medical clinics throughout Manitoba open their doors for women to have a Pap test without an appointment. Of note, health care in Manitoba is publically funded and there is no charge to users for participation in Pap Test Week clinics. Advertising for Manitoba Pap Test Week utilizes community-based ethnic media, a strategy that has been effective in other such outreach campaigns.<sup>12</sup> This campaign combines education about cervical cancer with increased access to cervical cancer screening. Over the past 8 years, CervixCheck Manitoba has consistently found that over half of the women who had a Pap test during Manitoba Pap Test Week were previously under-screened (ie, had not had a Pap test in 2 years).

Few studies in international literature explore whether an outreach campaign of this kind promotes a change in subsequent health behavior.<sup>13</sup> As such, the objectives of this study were to describe the population characteristics of women attending Manitoba Pap Test Week clinics, determine the factors associated with women being under-screened prior to attending these clinics, and discover whether under-screened women attending these clinics are more likely to be rescreened in the future compared to a cohort population.

## Methods

### Data sources

The CervixCheck registry is a provincial registry, established in 2001, that compiles all cytology results from Pap tests and all histology results from colposcopic biopsies performed within the province.

Participants in the Manitoba Pap Test Week campaign were asked to complete a questionnaire that collected demographic information, opinions regarding Pap test accessibility, and factors motivating attendance (Table 1 and Supplementary Figure 1). Participants completed the questionnaire on a voluntary basis and the resulting data were entered into an Excel database (Microsoft Corporation, Redmond, WA, USA).

### Population

The first part of this study was a retrospective review of all women who attended the 2006 Manitoba Pap Test Week Clinics. The Pap Test Week Participant Database and the CervixCheck Registry were linked to determine factors associated with previous inadequate screening (Table 1), as well

**Table 1** Summary of information acquired through the questionnaire completed by women attending 2006 Manitoba Pap Test Week clinics

Demographic questions and information	Reasons for attending a Pap Test Week Clinic (participant could check all that applied)
Can you speak English with your doctor or nurse?	I have no doctor or nurse
If not, what language do you prefer?	My doctor or nurse doesn't do Pap tests
What is your racial/ethnic background?	Family or friends were coming to this clinic
In what country were you born?	I heard or saw an ad
If you were not born in Canada, how long have you lived in Canada?	No appointment was needed
What are the first 3 digits of your postal code?	I was able to get child care
	I prefer to have a woman do my Pap test
	Family or friends told me to come to this clinic
	I went to a talk about Pap test
	With clinic hours, I didn't have to miss work
	It's time for my Pap test
	It was easy to get here

as with changes in screening status subsequent to attending a 2006 Pap Test Week Clinic.

The second part of the study was a retrospective cohort study to assess whether having attended a Pap Test Week Clinic, given the enhanced focus on education, improved future screening participation. We compared two cohorts of under-screened women for improvements in subsequent cervical cancer screening behavior: women who attended the 2006 Pap Test Week Clinics (study cohort) and women who had a 2006 Pap performed elsewhere (control cohort).

### Inclusion and exclusion criteria

The study population included women aged 24 years or older who had a Pap test between October 23–27, 2006 (Pap Test Week) at a Pap Test Week clinic. Women were excluded if the date of birth was not available. Individuals selected for the control cohort included all previously under-screened women aged 24 years or older who had a 2006 Pap test performed between January–August 2006; this time frame was chosen to minimize the influence of Manitoba Pap Test Week advertising on the control cohort.

### Definitions

For the purposes of this study, screening adequacy was defined in accordance with CancerCare Manitoba's screening Guidelines at the time of the study.<sup>14</sup> For instance, a patient

was considered to be under-screened subsequent to 2006 if she had no other Pap test or colposcopy result recorded in the CervixCheck registry within an appropriate time subsequent to the 2006 Pap result (the appropriate time varies depending on the Pap result obtained in 2006 but consistently follows the recommendations from CervixCheck Manitoba, Table 2).

## Ethics

Ethical approval was obtained from the University of Manitoba Research Ethics Board (H2010:149, approved June 7, 2010) and the Research Resource Impact Committee at CancerCare Manitoba (RRIC #29-2010, approved June 9, 2010).

## Statistical analysis

Given the retrospective design, the study comprised all available women who met the above noted inclusion and exclusion criteria and a power calculation was not performed. Descriptive statistics were used to explain the characteristics of the study participants. Non-parametric data was analyzed using the Chi-squared statistical test. Parametric data was analyzed using two sided *t*-tests. A logistic regression model was used to test the strength of associations. Significance was set at  $P < 0.05$ . Data analysis was performed using SAS version 9.2 (SAS Institute Inc, Cary, NC, USA).

## Results

### Demographics

Of the 1578 women who attended the 2006 Pap Test Week clinics, 1124 (71.3%) met the inclusion criteria. The mean age of women who attended the clinics was 49.5 years (range 24.0–85.5 years). The majority of women (59.4%,  $n = 655$ ) lived in an urban setting. Of women who attended the clinics,

77.0% ( $n = 829$ ) were born in Canada, 15.0% ( $n = 159$ ) had lived in Canada for fewer than 10 years, and 5.6% ( $n = 60$ ) had lived in Canada for less than 1 year. Table 3 illustrates the ethnic makeup of the study population in comparison to that of Manitoba. A minority of women reported that they could not communicate with their health care provider in English (3.6%). However, 9.1% of respondents did not answer this question.

### Screening status prior to 2006 Pap Test Week

With respect to screening status upon presentation to the 2006 Pap Test Week clinics, 53.2% ( $n = 598$ ) of the women who attended the clinics were under-screened prior to 2006. Factors found to be significantly associated with a woman presenting to the 2006 Pap Test Week clinics under-screened are illustrated in Table 4 and factors that remained significant after inclusion in a multivariable logistic model are demonstrated in Table 5. The mean age for women presenting to the 2006 Pap Test Week clinics adequately-screened was 48.5 years (range 24.0–83.5 years, 95% confidence interval [CI] 47.34–49.66) while the mean age for women who were previously under-screened was 50.4 years (range 24.0–85.5 years, 95% CI 49.33–51.42) ( $P = 0.02$ ). The factor most strongly associated with being under-screened prior to presenting to the 2006 Pap Test Week clinics was having lived in Canada for less than 1 year. Over 60% of the women who had lived in Canada for less than 1 year self-identified as being of Asian ethnicity.

### Cytology results from 2006 Pap Test Week

The majority (93%) of the Pap tests performed at the 2006 Pap Test Week clinics were reported as negative, thus mandating routine screening (ie, another Pap test within 2 years) for follow-up to be considered complete. Cytology results and the actions required for follow-up to be considered complete can be found in Tables 2 and 6. The distribution

**Table 2** Recommended follow-up actions for Pap test results according to the CervixCheck Manitoba guidelines at the time of the study<sup>14</sup>

Pap result	CervixCheck Manitoba screening recommendation	Reasonable time frame to qualify for adequate screening/follow-up <sup>a</sup>
Normal	Pap test every 2 years	Pap test within 2.5 years
Unsatisfactory	Repeat Pap test in 3 months	Pap test within 5 months
ASCUS or LSIL	Repeat Pap test in 6 months	Pap test within 9 months
HSIL, ASC-H, AGC, AIS, malignant neoplasm	Colposcopy	Colposcopy within 3 months

**Note:** <sup>a</sup>Defined by study investigators and applied consistently throughout the study.  
**Abbreviations:** AGC, atypical glandular cells; AIS, adenocarcinoma in situ; ASC-H, high grade atypical squamous cells; ASCUS, atypical squamous cells of undetermined significance; HSIL, high-grade squamous intraepithelial lesion; LSIL, low-grade squamous intraepithelial lesion.

**Table 3** Ethnicity of Pap Test Week participants compared to the Manitoba population

Self-reported ethnicity	Study population % (n)	Population in Manitoba % <sup>a</sup>
Caucasian	59.6 (610)	79.3
Aboriginal	14.6 (149)	8.7
Métis	6.6 (67)	6.3
Black	3.4 (35)	1.4
Asian	14.0 (140)	5.4
Arabic	0.6 (6)	0.4
Hispanic	1.0 (10)	0.6
East Indian	0.6 (6)	1.5

**Note:** <sup>a</sup>According to 2006 Canadian census data (Statistics Canada, 2009).<sup>20</sup>

**Table 4** Factors associated with a woman being under-screened prior to the 2006 Pap Test Week clinics

Factor	P-value
<b>Factors significantly associated with being under-screened prior to 2006 Pap Test Week</b>	
Older age <sup>a</sup>	0.02
English competency	<0.01
Ethnicity	0.01
Originating outside of Canada	0.01
Years residing in Canada <sup>a</sup>	<0.01
No doctor or nurse <sup>a</sup>	0.03
Able to get child care to attend Pap Test Week clinic	0.03
<b>Factors not associated with being under screened prior to 2006 Pap Test Week</b>	
Urban or rural living	0.51
No fixed address	0.35
Prefers a woman practitioner	0.50
Not having to miss work to attend Pap Test Week clinic	1.00
Usual doctor or nurse does not do Pap tests	0.58
Ease of access (geographically or logistically) to Pap Week clinic	0.12

**Note:** <sup>a</sup>Factors that remained significantly associated with being under-screened prior to 2006 Pap Test Week after integration into a multivariable logistic regression model.

of cytology results was not different for participants who were previously under-screened compared to those who were adequately-screened prior to the 2006 Pap Test Week clinics ( $P = 0.30$ ).

### Screening status subsequent to 2006 Pap Test Week

For participants who were adequately-screened prior to 2006, 60.6% remained adequately-screened. However, of those who were under-screened prior to presenting to the 2006 Pap Test Week clinics, 37.3% became adequately-screened. Factors significantly associated with improved screening status subsequent to the 2006 Pap Test Week clinics (for previously under-screened women,  $n = 597$ ) are illustrated in Table 7. Women who had an abnormal 2006 Pap result were significantly more likely to become adequately-screened subsequent to attending a 2006 Pap Test Week clinic (odds ratio [OR] = 20.04, 95% CI 6.02–66.7, Figure 1). In fact, 100% of women who required colposcopy and 83.9% of women who required a

**Table 5** Results of the multivariable logistic model testing for the likelihood of being under-screened prior to the 2006 Pap Test Week clinics

Factor	Odds ratio (95% confidence interval)
Older age	1.02 (1.01–1.03)
No family doctor or nurse	1.34 (1.05–1.54)
Living in Canada < 1 year	5.51 (2.73–11.12)

**Table 6** Results from the Pap tests performed at the 2006 Pap Test Week clinics

Cytology result	Percent frequency % (n)	2006 provincial frequency %
Negative	92.8 (1039)	92.1
Unsatisfactory	2.9 (32)	2.0
ASCUS	1.7 (19)	3.7
LSIL	1.1 (12)	2.6
Organisms	0.6 (7)	n/a
HSIL	0.5 (6)	1.36
ASC-H	(s) <sup>a</sup>	n/a
AGC	(s) <sup>a</sup>	0.15

**Note:** <sup>a</sup>Cells that were suppressed because  $n < 6$  as per Manitoba Health recommendations.

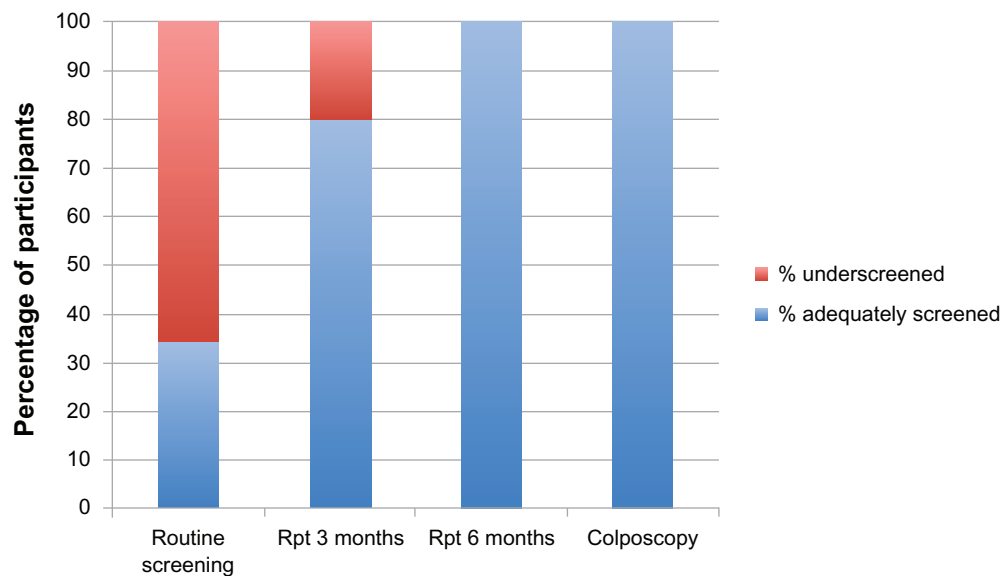
**Abbreviations:** AGC, atypical glandular cells; AIS, adenocarcinoma in situ; ASC-H, high grade atypical squamous cells; ASCUS, atypical squamous cells of undetermined significance; HSIL, high-grade squamous intraepithelial lesion; LSIL, low-grade squamous intraepithelial lesion.

repeat Pap test in 6 months had documented follow-up within an appropriate timeline outlined in Table 2. In contrast, only 45% of women who required routine screening had a repeat Pap test documented within the next 2.5 years. Younger women (mean 47.6 years compared with 52.0 years) were also more likely to have improved screening status subsequent to attending a 2006 Pap Test Week clinic (OR = 1.03, 95% CI 1.01–1.04). The mean age for under-screened women with improved screening status subsequent to attending the 2006 Pap Test Week clinics was 47.6 years (range 24.0–84.1, 95% CI 45.96–49.33) while the mean age for women who

**Table 7** Factors associated with a previously under-screened woman becoming adequately-screened subsequent to attending a 2006 Pap Test Week clinic

Factor	P-value
<b>Factors associated with improved screening status subsequent to 2006 Pap Test Week</b>	
Younger age <sup>a</sup>	<0.01
Country of origin	0.01
Years in Canada	0.01
2006 Pap result	<0.01
Action required for the 2006 Pap test <sup>a</sup>	<0.01
Urban vs rural	<0.01
<b>Factors not associated with improved screening status subsequent to 2006 Pap Test Week</b>	
English competency	0.07
Ethnicity	0.09
No fixed address	0.19
No doctor or nurse	0.76
Prefers a female practitioner	0.36
Did not have to miss work	0.33
Usual doctor or nurse does not do Pap test	0.98
Ease of access	0.48
Able to get child care	0.29

**Note:** <sup>a</sup>Factors found to be significant in the logistic model.



**Figure 1** Screening status subsequent to attending the 2006 Pap Test Week clinics as a function of type of follow-up required.  
**Abbreviation:** Rpt, repeat.

remained under-screened was 52.0 years (range 24.7–85.5, 95% CI 50.70–53.31) ( $P < 0.01$ ).

### Change in screening status of women attending Pap Test Week compared to the general population

The second part of the study included 598 under-screened women who participated in Pap Test Week 2006 (study cohort) and 18,047 under-screened women who had a Pap test performed elsewhere in 2006 between January and August of 2006 (control cohort). The control group was significantly younger than the study group (mean ages of 46.8 years and 50.5 years respectively,  $P < 0.01$ ). Also, a higher proportion of women in the control group lived in an urban setting compared to the study group (63.6% and 51.3%;  $P < 0.01$ ). In terms of accessing appropriate screening or follow-up for the 2006 Pap test result, 60.3% of under-screened women from the control cohort had appropriate follow-up action documented in the CervixCheck Registry compared to only 37.3% in study cohort ( $P < 0.001$ ). This relationship remained significant even after adjusting for age and area of residence ( $P < 0.001$ ).

### Discussion

The Pap Test Week initiative organized annually by CervixCheck Manitoba aims to provide access and education to all women, but especially to those who do not normally participate in cervical screening. We found that 53% of the 1124 women who attended 2006 Pap Test Week clinics were under-screened at the time of their clinic visit. This

represents a higher proportion of under-screened women compared to the provincial average (~30%). As such, publicity for the clinics, based on the strategy of ethnically community-based media, is effective in targeting Manitoban women who were not previously participating in routine cervical cancer screening. This conclusion is supported by other research that has highlighted the effectiveness of using cultural knowledge and networks to increase participation in cancer screening.<sup>15</sup>

The factor most significantly associated with a woman who attended these clinics being previously under-screened is having lived in Canada for less than 1 year. Some women who have lived in Canada for less than 1 year may not have a Pap test result recorded in the CervixCheck registry but may have had a recent Pap test done elsewhere. However, many of these women may have immigrated from countries where organized cervical cancer screening programs are not available. Moreover, our results corroborate those of other Canadian studies that have demonstrated that visible minority women who are recent immigrants are one of the highest risk groups for not ever having had a Pap test.<sup>16,17</sup> Additionally, Woltman and Newbold demonstrated significant between-neighborhood variation in uptake of Pap testing and significant association between cultural origin and ever having had a Pap test.<sup>17</sup> These findings further support Manitoba Pap Test Week's strategy of using ethnic and community-based media and emphasize that such advertising should continue to target communities with a high proportion of new immigrants.

Our data show that not having a regular doctor or nurse is also associated with being under-screened. While not a



novel finding,<sup>18</sup> it reaffirms that community-screening programs should target populations that are under-served in terms of primary well-woman care. CervixCheck is working actively in Manitoba to address this barrier to care by training nurses who work in remote northern communities to perform Pap tests and by developing an online learning module to improve the comfort of all practitioners in providing Pap tests (available at: [http://www.cancercare.mb.ca/home/prevention\\_and\\_screening/general\\_public\\_screening\\_programs/manitoba\\_cervical\\_cancer\\_screening\\_program/view\\_cervical\\_cancer\\_screening\\_videos/the\\_pap\\_test/](http://www.cancercare.mb.ca/home/prevention_and_screening/general_public_screening_programs/manitoba_cervical_cancer_screening_program/view_cervical_cancer_screening_videos/the_pap_test/)).

The final objective was to determine whether attending a Manitoba Pap Test Week Clinic improved future screening status for under-screened women more effectively than having a routine Pap test. While the women attending the 2006 Pap Test Week clinics elected to attend the clinics specifically to have a Pap test, they may have done so as a result of advertising or because of ease of accessibility. We found that the cohort of under-screened women who attended a Pap Test Week clinic were less likely to become adequately-screened subsequent to the 2006 Pap compared to the cohort of under-screened women who had a Pap test performed in 2006 outside Pap Test Week (37% vs 60%, respectively). This difference might be explained by barriers to access that motivate a woman to attend Pap Test Week clinics in the first place such as not having a family practitioner. While Pap Test Week can overcome the barrier of no family practitioner for one Pap test, it does not constitute a permanent infrastructure that can surmount this barrier for additional screening outside of Pap Test Week. With this in mind, CervixCheck Manitoba is actively encouraging Pap test clinics to be offered year-round throughout Manitoba. As well, similar campaigns in other Canadian provinces utilize novel strategies such as online reminder systems to promote continued participation in cervical cancer screening.<sup>19</sup> The implementation of similar strategies may benefit women who do not have access to a regular primary care physician.

This study is subject to a number of limitations. The retrospective design cannot provide information about causation and some confounding factors may not have been included in the logistic regression models. Also, we were limited in our ability to distinguish between a patient who is lost to follow-up and one who no longer has need of cervical cancer screening, as in the case of total hysterectomy, age above 70 with negative Pap history, or in the case of patient demise. Finally, at the time of data acquisition, the most recent Pap test results in the CervixCheck Registry were those of

September 2010. This allowed for only one complete 2.5 year screening period subsequent to 2006. As such, we have no information about the possible long-term improvement in screening behavior.

While initiatives similar to the Pap Test Week organized by CervixCheck Manitoba take place in several other Canadian provinces such as the Live Aware Create Empowerment Campaign in British Columbia,<sup>19</sup> this is the first study to report on the cohort of women attending a Pap Test Week initiative. The findings from this study will help build similar programs nationally and internationally and provide more information about the key risk factors to identify women at high risk of being under-screened. Future research includes determining whether the difference between the study and control populations of under-screened women persists over time and to further examine the low rate of improved screening status in women attending Pap Test Week clinics. One important avenue of future research would be to direct the advertising strategies employed by the Manitoba Pap Test Week to year-round drop-in Pap clinics available in Manitoba to see if this helps to enhance Pap test participation by under-screened women.

Increasing cervical cancer screening in under-screened populations will continue to improve the status of women's health and continues to be a significant public health concern on a global scale.

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## Disclosure

The authors AA and RL have both received honorariums from Merck for presentations related to human papillomavirus vaccines. The authors report no other conflicts of interest in this work.

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# Supplementary materials

**Questions about you:** *We ask these questions to help us with our research. Your answers are confidential.*

1. a) Can you speak English with your doctor or nurse?  Yes  No

b) If No, what language do you prefer (check one box)?

Amharic  Arabic  Cantonese  Cree  Dinka  Farsi  French  German  Hindi  Italian  
 Mandarin  Mitchif  Ojibwe  Polish  Punjabi  Serbo-Croatian  Spanish  Tagalog  
 Ukrainian  Portuguese  Russian  Urdu  Vietnamese  
 Other: \_\_\_\_\_

2. What is your racial/ethnic background?

Caucasian  Black  Asian  Arabic  First Nations Status  First Nations Non-status  Inuit  Metis  
 Other: \_\_\_\_\_

3. In what country were you born (please print)? Canada

4. If you were not born in Canada, how long have you lived in Canada? \_\_\_\_\_ Years

5. What are the first 3 letters of your postal code? R2W no fixed address or postal code

**Questions about us:**

6. Why did you choose this Pap clinic? Check as many as apply.

I have no doctor or nurse  I prefer to have a woman do my Pap test  
 My doctor or nurse doesn't do Pap tests.  Family or friends told me to come to this clinic.  
 Family or friends were coming to this clinic.  I went to a talk about Pap tests.  
 I heard/saw an ad.  With the clinic hours, I didn't have to miss work.  
 No appointment was needed.  It's time for my Pap test.  
 I was able to get child care.  It was easy to get here.

7. How did you learn about this Pap clinic?

Friend or family  Radio  Leisure Guide  Poster  Came last year  Talk or presentation  
 Newspaper  T.V.  Newsletter  Health Links  Staff at this clinic told me about the day  
 Other: \_\_\_\_\_

8. How can we make the day better?

Longer hours  Different place  More advertising Other: \_\_\_\_\_

Figure S1 Questionnaire.

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