

Who has screening mammography?

Results from the 1994-1995 National Population Health Survey

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ABSTRACT

OBJECTIVE To determine the characteristics of Canadian women aged 35 to 49 who receive screening mammograms not recommended by the Canadian Task Force on the Periodic Health Examination.

DESIGN Secondary data analysis of the 1994-1995 National Population Health Survey.

SETTING Patients' homes.

PARTICIPANTS From a full national representative sample of 17 626 Canadian residents, we selected 2053 women aged 35 to 49 with no breast problems.

MAIN OUTCOME MEASURES Age, education, employment status, marital status, immigrant status, region of residence, self-reported health status, having a regular doctor, smoking status, alcohol consumption, and having a confidant.

RESULTS Of the 2053 women in the sample, 825 (40.2%) had had a screening mammogram as part of a regular medical checkup; 1228 (59.8%) had never had one. Logistic analysis showed that respondents who were approaching age 50, had higher incomes, lived in Quebec, and had regular medical doctors were more likely to have screening mammograms. Statistical trends indicated that heavy drinkers were less likely and immigrants more likely to have mammograms (not significant at $P < .01$: $P = .012$ and $P = .02$, respectively).

CONCLUSIONS Most of these findings are consistent with those of other studies of women 50 and younger. The findings suggest that the patient variables associated with having mammograms in those younger than 50 might be similar to those in women older than 50. An important next step is to determine whether this pattern of use has more to do with younger patients' demand for screening or with physicians' ordering of tests. Further research is also needed to understand the dynamics of the doctor-patient relationship in this situation.

RÉSUMÉ

OBJECTIF Déterminer les caractéristiques des Canadiennes âgées de 35 à 49 ans qui subissent des mammographies de dépistage, même si ce n'est pas recommandé par le Groupe d'étude canadien sur l'examen médical périodique.

CONCEPTION L'analyse de données secondaires tirées de l'Enquête nationale sur la santé de la population de 1994-1995.

CONTEXTE Le domicile des patientes.

PARTICIPANTES À partir d'un échantillon national entièrement représentatif de 17 626 résidents canadiens, nous avons choisi 2 053 femmes de 35 à 49 ans ne souffrant d'aucune maladie du sein.

PRINCIPALES MESURES DES RÉSULTATS L'âge, l'éducation, la situation d'emploi, l'état civil, le statut d'immigrant, la région de résidence, l'état de santé autosigné, le fait d'avoir un médecin régulier, le tabagisme, la consommation d'alcool et le fait d'avoir un confident.

RÉSULTATS Au nombre des 2 053 femmes de l'échantillonnage, 825 (40,2%) avaient déjà subi une mammographie de dépistage dans le contexte de leur examen médical régulier; 1 228 (59,8%) n'en avaient jamais subi. L'analyse logistique a démontré que les répondantes qui approchaient l'âge de 50 ans, qui avaient un revenu plus élevé, qui habitaient au Québec et qui avaient un médecin régulier étaient davantage susceptibles de subir une mammographie de dépistage. Les tendances statistiques indiquaient que celles qui consommaient beaucoup d'alcool étaient moins susceptibles et les immigrantes plus susceptibles de subir une mammographie (non significatif à $p < .01$: $p = .012$ et $p = .02$ respectivement).

CONCLUSIONS La majorité de ces résultats sont conformes à ceux d'autres études portant sur les femmes de 50 ans et moins. Les conclusions laissent entendre que les variables chez les patientes de moins de 50 ans associées au fait d'avoir subi une mammographie pourraient être semblables à celles retrouvées chez les femmes de plus de 50 ans. Il reste un facteur important à déterminer, à savoir si cette tendance dans le recours à la mammographie est attribuable à la demande d'un dépistage par les patientes plus jeunes ou à la prescription par les médecins de cette épreuve. Il faut aussi des recherches plus approfondies pour comprendre la dynamique entre le médecin et la patiente dans cette situation.

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While it is widely accepted that cancer prevention is an important part of medical care, especially in primary care, many routinely performed screening maneuvers are not recommended because no good evidence supports them. Furthermore, the various organizations that publish and disseminate guidelines for clinical preventive maneuvers do not always agree on their recommendations, which is confusing for physicians.¹⁻⁷ Some of these controversies, particularly those pertaining to screening mammography, have become quite public.⁸

As of 1994, the Canadian Task Force on the Periodic Health Examination (CTFPHE) has given mammography screening for women aged 40 to 49 a "D" recommendation, which indicates there is fair evidence *against* screening them.² This is based on clinical trials that found no evidence that screening younger women significantly reduced mortality from breast cancer,^{9,11} as it does for women aged 50 to 69.² The earlier CTFPHE guideline (1986) on mammography screening was an uncertain "C."¹²

In the United States, confusion and controversy exist around guidelines for mammography for women younger than 50. The US Preventive Services Task Force (USPSTF)⁴ and the National Institutes of Health⁸ give it a "C" recommendation, yet the American Cancer Society⁵ and the American Medical Association³ both recommend it at least every 2 years starting at age 40.

Many healthy Canadian women younger than 50 have regular screening mammography; in fact, the number has greatly increased since the Health Promotion Survey of 1990.¹³ It is not clear why this is happening. One possible reason is that many of these women are getting a baseline mammogram at age 35, likely based on a widely published US recommendation in 1989 for women with a family history of breast cancer.³ A second reason might be that women today are bombarded by conflicting advice, particularly from US sources, much of which recommends screening women younger than 50.

Numerous studies describe how physician characteristics¹⁴⁻²⁶ and practice variables^{16,17,20,23,27,28} affect screening behaviour, but we do not understand how

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patient demand affects patterns of mammography use, especially given the wide dissemination of conflicting guidelines. Most studies have attempted to determine patient factors from physicians' perspectives.

Despite the popularity and acceptance of evidence-based practice, substantial health care resources are being spent on preventive maneuvers that are based on unclear evidence or conflicting guidelines.²⁹⁻³² Screening mammography for younger women is typical. By better understanding the patient characteristics associated with demand for this test, we could devise more effective ways of disseminating guidelines, ways that could involve patients in the decision-making process.

The question this paper addresses is: What are the characteristics of the younger women who are receiving mammograms not recommended by the CTFPHE? While health care resources are decreasing in this country,³² rates of cancer screening are increasing, especially for common cancers for which there is unclear evidence or conflicting guidelines for screening (personal communication from E. Holowaty of the Ontario Cancer Registry).^{29,30,33-36}

We hypothesized that, if patient requests influence who receives mammograms, the characteristics of those younger than 50 receiving mammograms will be similar to those older than 50 receiving mammograms. Characteristics associated with mammogram use in previous studies of women 50 and older include older age^{13,37} (similar in the United States³⁸), higher level of education (positively related),^{13,38} employment status and higher income (positively related),^{13,38,39} marital status,³⁹ province of residence,³⁷ health status (positively related),⁴⁰ having a regular source of medical care,^{38,39} smoking status,⁴¹ and having a confidant.³⁹ The relationship between alcohol consumption and having mammograms has not been previously studied, but we included it because of the strong evidence linking alcohol use and breast cancer.^{42,43} We included immigrant status because Goel⁴⁴ found that it was negatively related to Pap smear screening.

METHODS

Ethics approval

Data for this study were obtained from Statistics Canada who were responsible for ethics approval and confidentiality of the data originally collected during the 1994-1995 National Population Health Survey (NPHS).⁴⁵ These data were presented anonymously. According to Statistics Canada, the data are for public

use, and ethics or other formal approval is not required for any secondary analysis of it.⁴⁵

Subjects

This study used data from the NPHS, a national cross-sectional study conducted by Statistics Canada in 1994 and 1995. The NPHS's target population encompassed household residents throughout Canada except people living on Native* reserves, Canadian Forces bases, and in some remote areas. Households were identified through a multistage stratified sampling design. One person was randomly selected from each household, resulting in a sample of 17 626 respondents. Response rate was 88.7%.⁴⁶

The analyses, which were weighted using a variable constructed by the NPHS, conducted for this paper were confined to data on women aged 35 to 49. Because the whole data set was no longer being used, the weighting variable was rescaled so that the average value of the weighting variable for our subsample was 1.

About half the original 2413 women in the sample (1228, 50.9%) had never had a mammogram, and 1185 (49.1%) had had at least one. We excluded from the sample 360 women (14.9%) who had had their most recent mammograms because of a breast problem or other nonroutine problem. Of the remaining 2053, 825 (40.2%) women had had screening mammograms as part of a periodic health examination. The NPHS did not provide data on whether these women had a family history of breast cancer. Thus we were unable to exclude from our sample those women who were appropriately receiving mammograms due to this risk factor.

Even though breast cancer screening is intended to be ongoing and not a one-time occurrence, we included anyone who had ever had a mammogram as part of a regular medical checkup. This is because the NPHS data set does not indicate the number of times a respondent had received a mammogram and also because we believe that having even one nonrecommended mammogram is an unnecessary use of health care resources.

Measures

We included 12 independent variables in the analysis. Most have been shown to be associated with patterns of mammography use in those older than 50^{13,38,39}.

*Native is used throughout this article to refer to the indigenous and aboriginal inhabitants of Canada and their descendants.

nine demographic and health-related characteristics and three lifestyle characteristics (Table 1). The demographic variables included age (grouped by half decade), education level (university graduate versus other), employment status, marital status (married versus other), immigrant status, and region of residence. Although analysis by province was preferable, we were limited by small numbers in some of the cells.

In the logistic regression analysis, actual household income, measured as a continuous variable, was divided by \$10 000 to make the odds ratio easier to interpret. Health-related variables were self-reported health status (dichotomized into poor-fair, good-excellent) and having a regular doctor. Lifestyle variables included type of smoker (current smokers versus former and never smokers), heavy alcohol consumption (more than 12 drinks per week versus 12 or fewer), and having a confidant.

Statistical analyses

The strategy was to devise a model containing demographic, health, and lifestyle characteristics in order to assess which variables were associated with whether or not women younger than 50 had screening mammograms as part of their regular checkups. Most (10/12) of the independent variables included had been previously documented to be related to mammogram use; two were included for reasons noted earlier. Logistic regression analysis—a form of multivariate analysis used with a dichotomous outcome variable—was conducted to *independently* assess the odds ratio (OR) of each predictor variable while controlling for all the other variables in the equation. This common use of logistic regression is described in detail elsewhere.^{47,48}

In addition to the point estimate of the OR, Table 1 presents 99% confidence intervals and the *R* statistic, which estimates the partial correlation between each independent variable and the dependent variable, controlling for the other independent variables. The value of *R* can range from -1 to +1; the greater the absolute value of *R*, the greater the partial contribution to the model.

One hundred three respondents of the 2053 had missing values for the dependent variable or at least one of the independent variables. Therefore, they were excluded from the logistic regression analysis, resulting in a final sample of 1950 women. The .01 level of significance was chosen because of the large sample size.

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Table 1. Multivariate logistic regression analysis predicting younger women's (35 to 49 years) use of nonrecommended screening mammography: $N = 1950$.

VARIABLES	ODDS RATIO	99% CONFIDENCE INTERVAL	R	P
Age (y)	—	—	.29	<.001
• 35-39 (reference group)	—	—	—	—
• 40-44	3.45	2.50-4.76	.19	.001
• 45-49	6.73	4.80-9.45	.28	.001
University graduate	0.94	0.66-1.35	0	—
Currently working	1.26	0.91-1.73	.02	—
Household income	1.08	1.02-1.15	.06	.01
Married	1.10	0.77-1.57	0	—
Immigrant	1.34	0.96-1.86	.03	.05
Region	—	—	.13	<.001
• Ontario (reference)	—	—	—	—
• Quebec	2.51	1.74-3.61	.12	.001
• Atlantic provinces	1.02	0.61-1.70	0	—
• Western provinces	1.19	0.86-1.65	0	—
Poor or fair health	0.92	0.57-1.50	0	—
Has a regular doctor	1.63	1.02-2.62	.04	.01
Current smoker	1.07	0.80-1.45	0	—
Weekly consumption of > 12 alcoholic drinks	0.40	0.15-1.02	-.04	.05
Has a confidant	1.40	0.88-2.23	.02	—

RESULTS

Logistic regression analysis revealed four variables to be associated with a statistically significant *greater* likelihood of having had a screening mammogram ($P < .01$): older age, higher household income, living in Quebec, and having a regular doctor. Two more variables were found to be associated with having a screening mammogram, but the effects were not significant at the predetermined level ($P < .01$): immigrants were more likely and heavy drinkers were less likely to have had mammograms. Six variables were not found to be related to mammogram use: level of education, employment status, marital status, self-reported health status, smoking status, and having a confidant.

DISCUSSION

This study is one of the only Canadian investigations that provides detailed data on characteristics of women younger than 50 who have had screening

mammograms. The logistic analysis indicates that respondents approaching age 50, those with higher incomes, those living in Quebec, and those with regular medical doctors are more likely to have had mammograms. A statistical trend indicated that heavy drinkers were less likely to have mammograms ($P = .012$), and immigrants were more likely to have them ($P = .02$), although this was not significant at the predetermined level ($P < .01$).

Some of these findings are not new. For example, age has been shown to be positively related to women of a range of ages having mammograms both in Canada^{13,37} and in the United States.³⁸ Studies of income have shown the same relationship, but mostly for older women, both in Canada¹³ and in the United States.³⁸⁻⁴⁰ Older women would be more likely to have had at least one mammogram because they have had more years for that event to occur.

Employment status has not previously been examined in Canada, but it should correlate with income. Data from the United States have shown that having mammograms is positively correlated with having a

regular physician for women 40 or younger,^{38,39} older than 50,⁴¹ and any age.⁴⁹ This had not been shown in Canadian data. There is no clear explanation for the higher rate of mammography among immigrant women. Why both older and younger women residing in Quebec were more likely to have screening mammograms³⁷ has never been adequately explained in the literature. It might reflect a cultural difference in demand by Francophones for this service, or a programmatic difference in service delivery in Quebec. The relationship between mammography and alcohol consumption has not been previously explored.

Our findings suggest that the patient variables associated with having mammograms might act similarly for women both older and younger than 50. An important next step in this research would be to determine whether this sort of use has more to do with younger women demanding mammograms or with physicians ordering the tests. Although the NPHS included many patient characteristics, it did not ascertain whether the women specifically requested mammography. Earlier studies have suggested, however, that patient wishes are one of the most important predictors of physician behaviour regarding screening.^{50,51} Patient wishes, therefore, probably play a substantial role in use of nonrecommended screening.

While it is clear that having a regular physician increases the likelihood of having nonrecommended mammography, further study is needed to understand the dynamics of the doctor-patient relationship in this situation. For example, do certain types of patients insist on mammograms, thereby forcing a doctor's hand? What is the role of other influences, such as the media? Stories from US agencies frequently give messages that conflict with CTFPHE and USPSTF recommendations.

Educational interventions for both patients and physicians will likely be required to change the high rates of mammography use by younger healthy women. Further research should focus on why younger women demand mammography. In addition, this research will need to test educational interventions targeted at the younger women most likely to receive mammography and at the physicians ordering the tests.

Limitations

First, this study involved a secondary analysis of data gathered for a different study question. Second, the most recent guidelines were published in 1994 at the time of the NPHS, so physicians and patients might

Key points

- In the 1994-1995 National Population Health Survey, 40% of women aged 35 to 50 received screening mammograms as part of their periodic health examinations.
- This practice does not reflect either the 1986 or 1994 Canadian Task Force on the Periodic Health Examination guidelines on the subject.
- Women younger than 50 were more likely to have screening mammograms if they were closer to 50, had higher incomes, lived in Quebec, and had a regular family doctor.
- Further research is needed to clarify whether younger women's increased use of screening mammography is driven by patient demand or physician recommendation.

have thought differently at that time than they do now. Also, the issues around screening might have been different at that time. Third, there are the usual limitations of data from self-report and interviews.

Conclusion

Several of the characteristics of Canadian women younger than 50 who receive screening mammography are similar to those of women 50 and older who receive mammography: being older, having higher incomes, living in Quebec, and having a regular medical doctor. These findings lend credence to our hypothesis that patient requests are an important factor in determining who receives screening mammograms in Canada. Further research is needed to better understand the dynamics of the doctor-patient relationship in this situation. ♣

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References

1. Canadian Task Force on the Periodic Health Examination. *The Canadian guide to clinical preventive health care*. Ottawa, Ont: Health Canada; 1979.
2. Canadian Task Force on the Periodic Health Examination. *The Canadian guide to clinical preventive health care*. Ottawa, Ont: Health Canada; 1994.
3. American Medical Association. Eleven medical groups endorse mammogram guidelines. *Am Med News* 1989;3:35. ➤

RESEARCH

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4. US Preventive Services Task Force. *Guide to clinical preventive services. Report of the US Preventive Services Task Force.* Baltimore, Md: Williams and Wilkins; 1996.
5. American Cancer Society. *Guidelines for the cancer-related checkup: an update.* Atlanta, Ga: American Cancer Society; 1993.
6. Green CJ, Hadorn D, Bassett K, Kazanjian A. *Prostate specific antigen in the early detection of prostate cancer.* Vancouver, BC: British Columbia Office of Health Technology Assessment; 1993.
7. American Urological Association. *Executive Committee report.* Baltimore, Md: American Urological Association; 1992.
8. National Institutes of Health. *Draft NIH Consensus Statement. Breast cancer screening for women ages 40-49* [on-line monograph]. 1997 Jan 21-23; 15(1):1-35. http://odp.od.nih.gov/consensus/statements/cdc/103/103_stmt.html.
9. Elwood JM, Cox B, Richardson AK. The effectiveness of breast cancer screening by mammography in younger women: correction [letter]. *Online J Curr Clin Trials* 1994 May 31; doc No. 121.
10. Organizing Committee and Collaborators, Falun Meeting. Report of the Organizing Committee and Collaborators, Falun Meeting, Falun Sweden 21 and 22 March, 1996. Breast cancer screening with mammography in women aged 40-49 years. *Int J Cancer* 1996;68:693-9.
11. Miller AB. Breast cancer screening: who should be included? *J Gen Intern Med* 1990;5(5 Suppl):S19-22.
12. Canadian Task Force on the Periodic Health Examination. 2: 1985 update. *Can Med Assoc J* 1986;134:724-9.
13. Snider J, Beauvais J, Levy I, Villeneuve P, Pennock J. Trends in mammography and Pap smear utilization in Canada. *Chronic Dis Can* 1996;17(3-4):108-17.
14. Zyzanski SJ, Stange KC, Kelly R, Flocke S, Shank JC, Chao J, et al. Family physicians' disagreements with the US Preventive Services Task Force recommendations. *J Fam Pract* 1994;39:140-7.
15. Brownson RC, Davis JR, Simms SG, Kern TG, Harmon RG. Cancer control knowledge and priorities among primary care physicians. *J Cancer Educ* 1993;8:35-41.
16. Battista RN, Williams JI, MacFarlane LA. Determinants of primary medical practice in adult cancer prevention. *Med Care* 1986;24:216-26.
17. Battista RN, Williams JI, MacFarlane LA. Determinants of preventive practices in fee-for-service primary care. *Am J Prev Med* 1990;6:6-11.
18. Stange KC, Kelly R, Chao J, Zyzanski SJ, Shank JC, Jaen CR, et al. Physician agreement with US Preventive Services Task Force recommendations. *J Fam Pract* 1992;34:409-16.
19. Burack RC. Barriers to clinical preventive medicine. *Prim Care* 1989;16:245-50.
20. Haug K, Fugelli P, Aaro LE. Recruitment and participation of general practitioners in a multipractice study of smoking cessation. *Scand J Prim Health Care* 1992;10:206-10.
21. Osborn EH, Bird JA, McPhee SJ, Rodnick JE, Fordham D. Cancer screening by primary care physicians. Can we explain the differences? *J Fam Pract* 1991;32:465-71.
22. Crump WJ, Marquiss CE, Pierce PJ, Phelps T. The decision to suggest screening lower gastrointestinal tract endoscopy. The effect of training. *Fam Med* 1991;23:267-70.
23. Costanza ME, Stoddard AM, Zapks JG, Gaw VP, Barth R. Physician compliance with mammography guidelines: barriers and enhancers. *J Am Board Fam Pract* 1992;5:143-52.
24. Weingarten S, Stone E, Hayward R, Tunis S, Pelter M, Huang H, et al. The adoption of preventive care practice guidelines by primary care physicians. *J Gen Intern Med* 1990;10:138-44.
25. Hayward RSA, Guyatt GH, Moore KA, McGibbon KA, Carter AO. Canadian physicians' attitudes about preferences regarding clinical practice guidelines. *Can Med Assoc J* 1997; 156:1715-23.
26. Young MJ, Fried LS, Eisenberg J, Hershey J, Williams S. Do cardiologists have higher thresholds for recommending coronary arteriography than family physicians? *Health Serv Res* 1987;22:623-35.
27. Bernstein LM. Improving information search and retrieval for practitioners [editorial]. *Med Decis Making* 1995;15(2):188-9.
28. Resnicow KA, Schorow M, Bloom HG, Massad R. Obstacles to family practitioners' use of screening tests: determinants of practice? *Prev Med* 1989;18:101-12.
29. Conseil d'évaluation des technologies de la santé du Québec. *Screening for cancer of the prostate: an evaluation of benefits, unwanted health effects, and costs.* Quebec, Que: Conseil d'évaluation des technologies de la santé du Québec; 1995.
30. Clayman CB. Mass screening for colorectal cancer: are we ready? [editorial]. *JAMA* 1989;261:609.
31. Smith HE, Herbert CP. Preventive practice among primary care physicians in British Columbia: relation to recommendations of the Canadian Task Force on the Periodic Health Examination. *Can Med Assoc J* 1993;149:1795-800.
32. DeCoster CA, Brownell MD. Private health care in Canada: savior or siren? *Public Health Rep* 1997;112:298-305.
33. Health Services Utilization and Research Commission. *The PSA test in the early detection of prostate cancer. Final report.* Saskatoon, Sask: Health Services Utilization and Research Commission; 1995.
34. Mercer S, Goel V, Ashbury F, Iverson D, Levy I, Iscoe N. Canadian men's knowledge, attitudes and beliefs on prostate screening. *Can J Public Health.* In press.
35. Ontario Medical Association, Endocrinology Committee. *Laboratory proficiency testing program.* Toronto, Ont: Ontario Medical Association; 1995.
36. Thompson IM, Zeidman EJ. Current urological practice: routine urological examination and early detection of carcinoma of the prostate. *J Urol* 1992;148:326-30.
37. Gaudette LA, Altmayer CA, Nobrega KM, Lee J. Trends in mammography utilization, 1981 to 1994. *Health Rep* 1996;8:17-27.

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38. Martin LM, Calle EE, Wingo PA, Heath CW. Comparison of mammography and Pap test use from the 1987 and 1992 national health interview surveys: are we closing the gaps? *Am J Prev Med* 1996;12:82-90.
39. Zapka JG, Stoddard AM, Costanza ME, Greene HL. Breast cancer screening by mammography: utilization and associated factors. *Am J Public Health* 1989;79:1499-502.
40. Mayer-Oakes SA, Atchison KA, Matthias RE, De Jong FJ, Lubben J, Schweitzer SO. Mammography use in older women with regular physicians: what are the predictors? *Am J Prev Med* 1996;12:44-50.
41. Rimer BK, Trock B, Engstrom PF, Lerman C, King E. Why do some women get regular mammograms? *Am J Prev Med* 1991;7:69-74.
42. Bowlin SJ, Leske MC, Varma A, Nasca P, Weinstein A, Caplan L. Breast cancer risk and alcohol consumption: results from a large case-control study. *Int J Epidemiol* 1997;26:915-23.
43. Swanson CA, Coates RJ, Malone KE, Gammon MD, Schoenberg JB, Brogan DJ, et al. Alcohol consumption and breast cancer risk among women under age 45 years. *Epidemiology* 1997;8:231-7.
44. Goel V. Factors associated with cervical cancer screening: results from the Ontario Health Survey. *Can J Public Health* 1994;85:125-7.
45. Statistics Canada. *1994 National Population Health Survey. Public use data file*. Ottawa, Ont: Statistics Canada; 1995.
46. Statistics Canada. *1996 N.P.H.S. microdata documentation*. Ottawa, Ont: Statistics Canada; 1996. p. 22.
47. McCullough P, Nelder JA. *Generalized linear models*. New York, NY: Chapman Hall; 1989.
48. Nelder JA, Wedderburn RWM. Generalized linear model. *J R Stat Soc* 1972; 135:761-8.
49. O'Malley AS, Mandelblatt J, Gold K, Cagney KA, Kerner J. Continuity of care and the use of breast and cervical cancer screening services in a multiethnic community. *Arch Intern Med* 1997;157:1462-70.
50. Triesenberg DJ, Smith MA, Holmes TM. Cancer screening and detection in family practice: a MIRNET study. *J Fam Pract* 1985;40:7-33.
51. Langley GR, Tritchler DL, Llewellyn-Thomas HA, Till JE. Use of written cases to study factors associated with regional variations in referral rates. *J Clin Epidemiol* 1991;44:391-402.

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