Ontario Region and Public Health Unit Mammography Screening Rates: Administrative Versus Survey Methods

Naomi Kasman
Graham Woodward
Sten Ardal

September 2003

EXECUTIVE SUMMARY 1

ACKNOWLEDGEMENTS 2

INTRODUCTION 3

OBJECTIVES 4

DATA SOURCES 5

METHODS 6
- Provision of data 6
- Operational definitions 7
- Analyses 8

RESULTS 9

DISCUSSION 13
- Conclusion 18

REFERENCES 19

APPENDICES 21

EXECUTIVE SUMMARY

Breast cancer is the most frequently diagnosed cancer for Canadian women. A decline in breast cancer-related mortality is believed to be due in large part to the benefits of screening programs such as the Ontario Breast Screening Program (OBSP). The goal of the OBSP is to screen 70% of women aged 50-74. To evaluate whether this goal is being reached, the Ontario public health units monitor local breast screening activity, which can be determined from either the OBSP or Ontario Health Insurance Plan (OHIP) administrative databases or by analysing the self-reported data from the Canadian Community Health Survey (CCHS).

While analyses of self-reported mammography yielded different rates of utilization than either the OBSP or the OHIP databases separately, when the two administrative databases were combined the rates became similar to those obtained from the CCHS. However, confidence intervals of self-reported rates of mammography utilization determined from survey data showed a high amount variance. Both the administrative and survey results showed that the goal of screening 70% of women has not been met. Given the positive impact that screening has on breast cancer mortality, accurate tracking of breast screening behaviour is essential.

ACKNOWLEDGEMENTS

The authors would like to thank Paul Lee, Chris Altmeyer, Dianne Bokor, and Clemon George for their involvement in the preparation of this report. We would also like to thank Cancer Care Ontario, Statistics Canada, and the Ontario Ministry of Health and Long-Term Care for providing the data required for this report.

INTRODUCTION

In 2002, the most frequently diagnosed cancer for Canadian women was breast cancer, with approximately 20,700 incident cases.[1] According to Cancer Care Ontario, it is estimated that 21,200 Canadian women will be newly diagnosed with breast cancer in 2003 and there will be 5,300 breast cancer-related deaths. Estimates for Ontario predict 8,000 new cases of breast cancer in 2003 (making up over 30% of total incident cases of cancers) resulting in 2000 deaths.

Although the rates of new breast cancers in Canada have remained relatively stable over the past decade, the mortality rates have declined steadily, from an estimated 32% in 1986 to 26% in 2002.[1] This decline is believed to be due in large part to the benefits of breast cancer screening programs. In studies of organized mammography, decreases in mortality of as much as 35%-40% have been documented in women aged 50-74.[2,3] In March 2002, the World Health Organization's International Agency for Research on Cancer Working Group confirmed that there is sufficient scientific evidence of reduction in breast cancer mortality to demonstrate the efficacy of mammography screening for women between 50 and 69 years of age.

Based on the evaluation of this evidence, the Canadian Cancer Society has recommended combining: 1) mammography every 2 years for women between the ages of 50 and 69; 2) clinical breast examination by a trained health professional at least every 2 years for all women, and; 3) regular breast self-examination.[4] In response to this guideline, the Ontario Ministry of Health and Long-Term Care (MOHLTC) established the Ontario Breast Screening Program (OBSP) in 1990. The OBSP is a comprehensive program for women aged 50 years and older that was developed to improve the population coverage of screening mammography and to provide a means for quality

assurance and program evaluation.[5] The OBSP recommends that women between the ages of 50 and 74 be screened every two years. Women may be referred to the program by their family doctor or they can make appointments themselves. As of March 2003, there were 97 OBSP sites across the province.[*] Women in Ontario can also receive mammograms from other diagnostic clinics after referral from a physician. Like most medical services in Ontario, mammography (both screening and diagnostic) is covered under the provincially managed Ontario Health Insurance Plan (OHIP).

The MOHLTC has committed $24.3 million to expanding the OBSP throughout Ontario and to increasing capacity at existing sites. The goal of the OBSP clinics is to screen 70% of women when the program is fully implemented.[1] In order to evaluate whether this objective is being reached, the Ontario public health units must monitor local breast screening activity. There are three sources of data through which breast screening rates can be determined: 1) the OBSP administrative database; 2) the OHIP administrative database, or; 3) self-reported data from the Canadian Community Health Survey (CCHS).

OBJECTIVES

The primary objective of this study was to compare breast-screening rates obtained from the self-reported CCHS survey data to rates obtained from the OBSP and OHIP administrative databases for the 7 MOHLTC health regions and the 37 public health units of Ontario.

[*] A complete list of sites can be found at http://www.cancercare.on.ca/prevention_105.htm

A secondary objective was to determine biennial self-reported breast screening rates in Ontario's public health units, comparing Statistics Canada's definition of a screening mammogram to one that is routinely used for public health purposes.

DATA SOURCES

When analysing rates of mammography utilization, self-reported data from surveys such as the CCHS are frequently used; however previous studies have demonstrated that rates of self-reported mammography obtained from surveys differ from rates obtained from corresponding 'gold standard' (i.e. administrative) data.[3,6-12] As well, a recent literature review found that self-reported information regarding certain health behaviours, such as mammography, were less than ideal, with a sensitivity ranging from 81%-99% but a specificity range of only 50%-85%.[13] This suggests that while surveys are accurate in reports by women who have had a screening mammogram within the past 2 years, they are less accurate in reporting women who had a screening mammogram more than 2 years ago.

For these reasons, administrative data are becoming increasingly important for monitoring and planning the health care system. One such administrative database, the OHIP database, contains details of each transaction including a diagnosis code, the physician's specialty, and the fee for the service. However, administrative data can be very difficult to access and may not be easy to analyse for non-administrative purposes. As well, the accuracy and validity of these data for secondary research has often been questioned. The benefits and limitations of both survey and administrative data are further explored in a later section of this report.

METHODS

Provision of data

OBSP administrative data

Cancer Care Ontario provided the OBSP data for the study. These are routinely collected data for women having mammograms at any of the OBSP clinics in the province of Ontario. The data were provided in summary form for the age groups 50-64, 65-74, 75-84, and 85 and older. For this report, we limited our analyses to individuals in the first two age groups, which is consistent with the recommendation of the OBSP that all Ontario women aged 50-74 undergo regular breast screening including a mammogram.[1] The data provided included the number of women who had received at least one mammogram in either 1999 or 2000. For the purposes of our analyses, the two age groups were combined and the data were reorganized into the 37 public health units and the 7 MOHLTC health regions of Ontario.

OHIP administrative data

OHIP data were obtained from the OHIP Model of the Provincial Health Planning Database, Health Planning Branch, MOHLTC. The Central East Health Information Partnership (CEHIP) was granted access to these data for the purposes of this project and under the close supervision and guidance of Health Planning Branch staff.

Survey data – CEHIP

CEHIP received a copy of the 2000/2001 Canadian Community Health Survey, Cycle 1.1 Sharing File, which was used to analyse self-reported information on screening mammograms for Ontarians. The CCHS is conducted by Statistics Canada to provide

regular and timely cross-sectional estimates of health determinants, health status and health system utilization for 133 health regions across Canada, plus the territories. The Sharing File of the CCHS contains data only for individuals who agreed to allow Statistics Canada to distribute data containing their information while the Public Use Microdata File (PUMF) contains information for all CCHS survey participants. All of the analyses that were performed on the Sharing File were also performed on the PUMF version of the CCHS, which has a weighted sample size that is 0.4% larger than the Sharing File for the population of interest in this report. No significant differences were found when comparing these files. Accordingly, only the results from the Sharing File are presented and discussed in this report.

Survey data – Statistics Canada

Mammography screening rates that have been calculated by Statistics Canada from the Master File of the CCHS were obtained through the CANSIM link of Statistics Canada's website.[14] CANSIM statistics on mammography utilization are only provided for the 50-69 year age group, at the level of the public health unit, and are based on a more restrictive definition of a 'screening' mammogram.

Operational definitions

CEHIP definition of a 'screening' mammogram

In order to estimate the percentage of women who had received at least one screening mammogram over the past 2 years, the questions from the CCHS of "When was the last time you had a mammogram?" and "Why did you have a mammogram?" were combined. In consultation with Partners, CEHIP further defined a 'screening'

mammogram as a mammogram that had been done within the past two years because of either: a) age; b) family history of breast cancer, or; c) as part of a routine check-up. All other mammograms were classified as 'diagnostic'.

Statistics Canada's definition of a 'screening' mammogram

Statistics Canada's definition of a 'screening' mammogram was derived from the same two questions in the CCHS as the CEHIP definition but was limited to a mammogram that had been done within the past two years as part of a routine check up.

Analyses

Administrative data

Queries were run on the OHIP database to count the number of women receiving one or more bilateral mammograms (Fee Schedule Code X185) during the fiscal years of 1999/2000 and 2000/01. Multiple counts of the same individual were controlled for by only counting an individual once regardless of the number of mammograms which took place over the two-year time period. Multiple counts could have occurred for a number of reasons, such as a woman receiving 2 mammograms at overlapping age groups or while living in different counties. Simple rates of mammography utilization were computed by dividing the summary counts of breast screenings by the estimated population. Estimates of the average populations over the 2-year period were provided by Cancer Care Ontario and were used as the denominator for all calculations on administrative data.

Survey data - CEHIP

The number of screening mammograms reported in the CCHS was found using the statistical software package SPSS version 11.5. For the first objective of this study, rates were calculated from the CCHS by dividing the number of women aged 50-74 who had reported a screening mammogram (as defined by CEHIP) in the previous two years by the population of women, aged 50-74, who were eligible for mammograms. For the second study objective, the same analyses were carried out on the population of women aged 50-69. Bootstrap estimates and 95% confidence intervals for mammogram utilization rates were calculated using a statistical program that was provided with the data from Statistics Canada. Bootstrapping is a non-parametric method of generating a large number of repetitive computations to estimate the shape of a statistic's sampling distribution.

Survey data – Statistics Canada

Rates of screening mammography and 95% confidence intervals from the Master File of the CCHS were generated from the CANSIM website of Statistics Canada. CANSIM statistics are only available for women aged 50-69 years and, therefore, cannot be compared to results of the OBSP or OHIP, for which data were only provided in groups of 50-64 and 65-74.

RESULTS

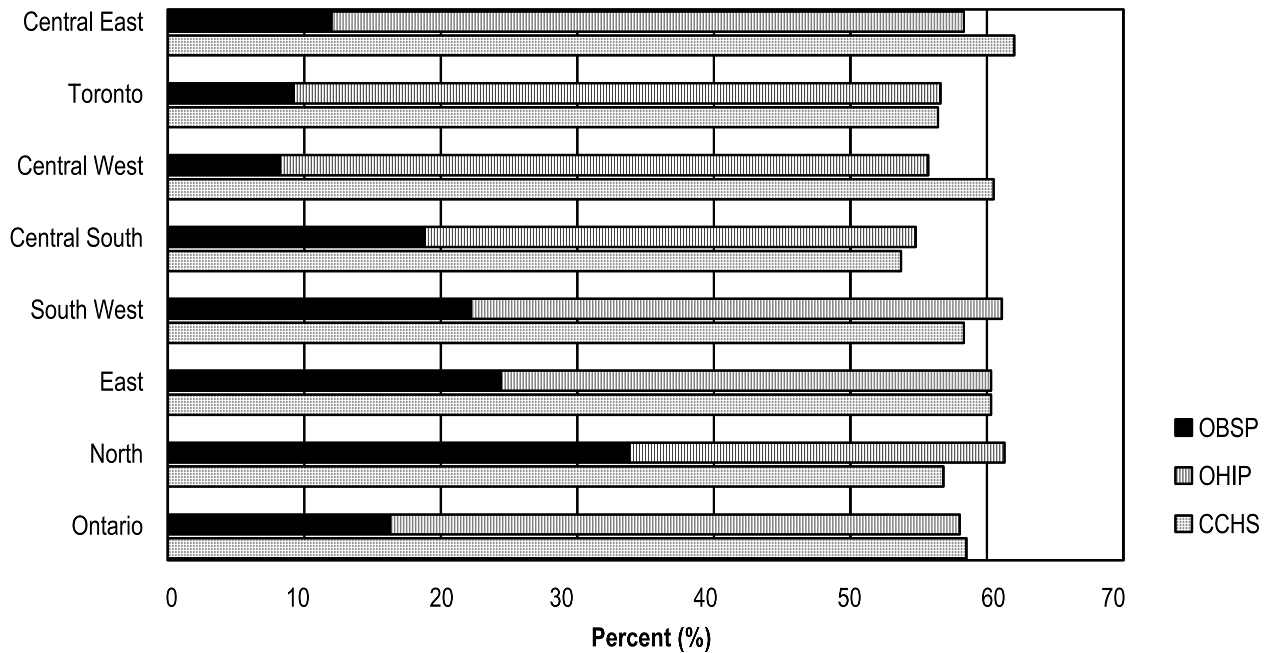
Health region level

Table 1 shows the comparison of mammography screening rates for the 7 MOHLTC health regions and for the provincial total. The OBSP rates were found to be

quite low across the province, with an overall rate of only 16.3% for Ontarians. The OHIP rates, while generally higher than the OBSP values (with the exception of the 'North' Region) were also fairly small compared to the CCHS values. Since it appeared that neither the OBSP nor the OHIP data counted all the screening mammograms for women in Ontario, the results from the two databases were summed. This combined OBSP/OHIP rate follows the logic that, within a two year period, women will only be screened at either an OBSP or an OHIP clinic (which are currently the only two options for Ontario women seeking screening mammograms) and subsequently these women will only be counted in one of the two data sources. The combined value should, therefore, cover screening mammograms for all women in the province. In the past, reports such as the Ontario Women's Health Status Report have only provided data from the OBSP along with the proviso that these data provide only a partial picture of the extent of breast screening in Ontario.[15]

For the provincial health regions, the differences between the combined OBSP/OHIP rates and the CCHS rates were relatively small. For Ontario, the OBSP/OHIP rate was only 0.5% smaller than the CCHS rate. The largest difference seen was 4.8% in the Central West Region while no difference in rates appeared in the East Region (Figure 1).

Figure 1: Mammography screening rates from the Ontario Breast Screening Program (OBSP), the Ontario Health Insurance Plan (OHIP) and the Canadian Community Health Survey (CCHS), for women aged 50 to 74 years, by MOHLTC health region across Ontario



Public health unit level

Table 2 shows the screening mammography participation rates for women between the ages of 50 and 74 for each of the 37 public health units in Ontario. According to the CCHS, percentages of mammogram screening for women in this age group ranged from a low of 48.9% in the Brant County Health Unit to a high of 72.9% in the Durham Region Health Department. Similar to the findings at the health region level, the values obtained from the OBSP data were quite low across the province, with screening rates below 40% in all but 4 of the public health units. The OHIP findings were also low, ranging from 17.1% in the Algoma Health Unit to 54.4% in the Halton Region Health Department. The combined OBSP/OHIP values were generally more similar to the CCHS values, with a maximum difference of 15.1% in the Haldimand-Norfolk Regional Health Department.

Statistics Canada survey data

The Statistics Canada results for the proportion of women aged 50-69 who reported a screening mammogram appear in Table 3. For comparison, Table 3 also contains the results of the CCHS analyses for the same age group, but using the previously outlined CEHIP definition of a 'screening' mammogram. With the exception of 2 health units (Windsor-Essex County Health Unit and Oxford County Health Unit), the CCHS utilization rates for mammograms were higher than the CANSIM values. These differences varied across area, and ranged from 0.3 in York Region Health Services Department to 15.6 in the Algoma Health Unit.

Tests of significance

The 95% confidence intervals around the CCHS rates for women aged 50-74 using the 7 health regions were fairly narrow in size, and had variances ranging from ±3.5 to ±6.6 (Table 4). The confidence interval for the overall Ontario utilization rate of 58.5% was: lower limit=56.6, upper limit=60.4, with a variance of only ±1.9. On the other hand, the confidence intervals for the 50-74 year age group by the smaller public health units were found to be quite large, with variances ranging from ±6.6 to ±11.3 (Table 5). In only 5 public health units (Durham Region Health Department, Haliburton, Kawartha, Pine Ridge District Health Unit, Haldimand-Norfolk Regional Health Department, Huron County Health Unit, and Chatham-Kent Public Health Division) did the combined OBSP/OHIP rate not fall within the confidence interval of the CCHS rate (i.e. were significantly different at $p<0.05$).

For women aged 50-69 who had reported having a screening mammogram in the past two years, the confidence intervals were also wide, ranging from ±7.1 to ±14.8

across the province (Table 6). This was fairly close to the range of variances for Statistics Canada's CANSIM rates (±6.6 to ±13.5). The confidence limits obtained from the CCHS and from CANSIM overlapped (i.e. could not be said to be statistically different) in all but 1 of the public health units (Chatham-Kent Public Health Division).

DISCUSSION

Mammography screening for breast cancer has been shown to be effective in reducing breast cancer mortality in women aged 50-69 and is currently recommended as part of standard care for this age group in Ontario, Canada.[5] Many methodologies and data collection strategies have been used to study mammography utilization including chart review, clinical databases, and survey data.[5] The findings of this study showed that while self-reported survey data yielded highly different rates of utilization than either the OBSP or the OHIP databases separately, when these two administrative databases were combined, the rates became similar to those from the CCHS. However, the rates obtained from survey analysis showed extremely high levels ofdt variance. Furthermore, the relatively low rates found when using the Statistics Canada definition of a 'screening' mammogram suggest that this definition may be too narrow for use by public health departments when considering program planning and evaluation.

Administrative data

In studies conducted in the United States, administrative data have often disagreed with survey data, raising doubt that administrative data is not the 'gold standard' against which to evaluate self-reported data.[10] However, the increasing availability of administrative databases coupled with modern computer technology has enabled health

researchers to use these data to address a variety of research issues.[9] While the two administrative data sources analysed for this study were not found to be ideal when considered separately, once combined they showed results that were similar for most of the health regions and public health units in Ontario to the self-reported, though highly variable, CCHS data.

One benefit of the OHIP administrative data is that while survey data can take 2-3 years before becoming publicly accessible, OHIP files are often available for analysis much sooner. As well, OHIP files are used for determining financial reimbursements for physicians; therefore it is unlikely that information has been under-reported. There may, however, be misclassification of a procedure if it has the same financial return as another procedure. For example, OHIP data does not differentiate between ‘screening’ and ‘diagnostic’ mammography and hence there may be less incentive for accurate recordings. Also, since OHIP and OBSP data are collected on a continuous basis they have much better potential for time trend analysis than the more periodic health surveys.

For the OHIP data, the assumption was made that all women who had received a bilateral mammogram were receiving it for screening purposes. Thus, some misclassification error could have occurred. However, an individual who on screening showed abnormal tissue would have had a subsequent diagnostic mammogram. Since we removed double counted cases from our database, it is unlikely that we have included these diagnostic examinations in our results. Further in-depth analyses of the OHIP database would be required to estimate the percentage of bilateral mammograms that were not for screening purposes.

Assignment of each woman’s county of residence may also have affected the results at the level of the health region and/or the public health unit. The OHIP residential

information is based upon the Registered Persons Database, which may not be up-to-date. Accuracy in assigning residence information within the OBSP is unknown. Further investigation of this issue could be carried out using additional data such as the Discharge Abstract Database (available through the Canadian Institute for Health Information) and the 'CCHS Linking File', which allows users to study the administrative records of CCHS participants.

Survey data

Survey data are beneficial for research because individual information can be collected that would not otherwise be available (e.g. household income and education levels).[5] However, the issue of the accuracy of self-reported data in health surveys has recently been brought into question as a result of a critical review of the literature which found that there is often a marked discrepancy between what people report and what is found in their medical records.[11,16] While studies have shown that women can accurately confirm whether or not they have ever had a mammogram, there is far less accuracy when asked to report when the mammogram occurred. Studies have reported that for the majority of respondents (71%), the date of the mammogram was 'telescoped', a phenomenon whereby an event is thought to have happened more recently that it actually did.[6,17,18]

The large confidence intervals for the rates obtained from the survey data suggests that these estimates are highly variable and it would, therefore, require multiple years worth of data before any trend analyses could be carried out. While inter-regional comparisons can be made little else can be deduced from the survey data.

As with any survey, non-sampling errors due to misunderstanding by the interviewer or interviewee may have occurred with the CCHS. For example, there may have been misunderstanding of the term ‘mammogram’ or breast X-ray, especially with individuals whose first language was not that in which the interview was conducted. Furthermore, memory of an event such as a mammogram may be forgotten, particularly if the test was done between 1.5 years and 2.5 years ago. Breast screening is also considered by some women to be a very personal topic. These women may not wish to discuss the event with a stranger. On the other hand, since regular mammograms may be seen as a ‘good’ health seeking behaviour, women may be more likely to over report its occurrence. There are many studies that have shown this phenomenon of over reporting of a ‘good’ behaviour to an authority figure such as a doctor or an interviewer.[18]

Mammography definitions

A ‘screening’ mammogram has traditionally been understood by public health to be one that was done due to age, family history, or as part of a routine check-up. For the second objective of this report, analyses showed that Statistics Canada’s more narrow definition - which only includes those mammograms done as part of a routine check-up – resulted in rates that were significantly lower than CEHIP’s findings and may result in the erroneous view of perceived failure of health care programs. However, the confidence intervals for both the CCHS and the CANSIM rates were extremely wide suggesting caution when using the estimates.

Breast screening guidelines and barriers to access

All the data sources that were analysed for this report suggested that the goal of the OBSP to screen 70% of eligible women has not been met. Provincially, the rate of screening was approximately 58.5% - more than 10% below the recommended guidelines.

There are many possible barriers to patients' participation in breast screening. These include fear of pain or radiation, fear of the screening results, lack of awareness of the benefits of screening, lack of transportation to screening centres, language difficulties, and cultural issues.[2] With Canada's diverse cultural composition, differences in breast cancer knowledge, awareness, and practice have been previously documented for women from various ethnic groups.[19] Although limited access to health care may be a direct result of language barriers, economic conditions, and lack of integration into the majority culture, there are also indirect issues such as beliefs in Western medicine, fears of biased treatment, modesty beliefs, or culturally defined gender roles that may further constrain health-seeking behaviour.[19]

Another factor that may have contributed to low utilization of breast screening services in certain parts of Ontario is variation in the availability of mammography. This may be particularly relevant in the more northern regions of Ontario where medical centres are more sparsely distributed.

With the beneficial effect that screening mammography has had in reducing breast cancer mortality, it is vitally important that factors such as socio-economic status, ethnic and cultural differences, and area of residence not preclude women from engaging in breast health practices.

Conclusion

When combined, OBSP and OHIP rates of mammogram utilization were fairly similar to rates obtained from the CCHS for the 7 provincial health regions and the 37 public health units across the province of Ontario. However, the rates calculated from the survey data were shown to have extremely high levels of variance particularly for the smaller public health units. While administrative data are often not used due to a perception of it being flawed, the results of this study show that in certain cases, such as determining rates for screening mammography, administrative data appear to be a reliable and accurate a source of information. Furthermore, Statistics Canada's definition of a 'screening' mammogram appears to under-estimate utilization rates and should be used with caution. The overall results suggest that the goal of screening 70% of women aged 50-74 has not yet been met and, given the positive impact that screening has on breast cancer mortality, accurate tracking of breast screening behaviour is essential.

REFERENCES

1. http://www.cancercare.on.ca/obsp

2. Bass B, Pross D, Bell P. Recruitment for breast screening in a rural practice. *Canadian Family Physician* 1994;40:1730-1739.

3. King ES, Rimer BK, Trock B, Balshem A, Engstrom P. How valid are mammography self-reports? *American Journal of Public Health* 1990;80(11):1386-1388.

4. http://www.cancer.ca

5. Goel V, Iron K, Williams JI. Enthusiasm or uncertainty: small area variations in the use of mammography services in Ontario, Canada. *Journal of Epidemiology and Community Health* 1997;51;378-382.

6. Degnan D, Harris R, Ranney J, Quade D, Earp JA, Gonzalez J. Measuring the use of mammography: two methods compared. *American Journal of Public Health* 1992; 82(10):1386-1388.

7. Fowles JB, Fowler EJ, Craft C. Validation of claims diagnoses and self-reporterd conditions compared with medical records for selected chronic diseases. *Journal of Ambulatory Care Management* 1998;21(1): 24-34.

8. Reijneveld SA, Stronks K. The validity of self-reported use of health care across socio-economic strata: a comparison of survey and registration data. *International Journal of Epidemiology* 2001;30:1407-1414.

9. Muhajarine N, Mustard C, Roos LL, Young TK, Gelskey DE. Comparison of survey and physician claims data for detecting hypertension. *Journal of Clinical Epidemiology* 1997;50(6):711-718.

10. Westbrook JI, McIntosh JH, Rushworth RL, Berry G, Duggan JM. Agreement between medical record data and patients' accounts of their medical history and treatment for dyspepsia. *Journal of Clinical Epidemiology* 1998;51(3):237-244.

11. Thompson B, Taylor V, Goldberg H, Mullen M. Mammography status using patient self-reports and computerized radiology database. *American Journal of Preventive Medicine* 1999;17(3):203-206.

12. Thompson BL, O'Connor P, Boyle R, et al. Measuring clinical performance: comparison and validity of telephone survey and administrative data. *Health Services Research* 2001;36(4):813-825.

13. Caplan LS, Mandelson MT, Anderson LA. Validity of self-reported mammography: examining recall and covariates among older women in a health

maintenance organization. *American Journal of Epidemiology* 2003;157(3):267-272.

14. http://www.statcan.ca/

15. Ontario Women's Health Status Report. Ed: Stewart DE, Cheung AM, Ferris LE, Hyman I, Cohen MM, Williams JI. Ontario Women's Health Council, February 2002.

16. Wallihan DB, Stump TE, Callahan CM. Accuracy of self-reported health services use and patterns of care among urban older adults. *Medical Care* 1999. 37(7):662-670.

17. Zapka JG, Bigelow C. Hurley T, et al. Mammography use among sociodemographically diverse women: the accuracy of self-report. *American Journal of Public Health* 1996;86(7):1016-1021.

18. Rauscher GH, O'Malley MS, Earp, JAL. How consistently do women report lifetime mammograms at successive interviews? *American Journal of Preventive Medicine* 2002;22(1):8-14.

19. Uskul AK. Socio-cultural determinants of delay in medical help-seeking for breast cancer symptoms. Central East Health Information Partnership Report, June 2001.

APPENDICES

Table 1: Comparison of mammography screening rates obtained from the Ontario Breast Screening Program (OBSP), the Ontario Health Insurance Plan (OHIP) and the Canadian Community Health Survey (CCHS), for women aged 50 to 74 years, by MOHLTC health region across Ontario

Health Region	*Population*	*OBSP (%)*	*OHIP (%)*	*OBSP + OHIP (%)*	*CCHS (%)*	*Difference**
Central East	208,889	12.0	46.3	58.3	62.0	-3.7
Toronto	304,807	9.2	47.4	56.6	56.4	0.2
Central West	213,157	8.2	47.5	55.7	60.5	-4.8
Central South	142,986	18.8	36.0	54.7	53.7	1.0
South West	179,378	22.2	38.9	61.1	58.3	2.8
East	185,457	24.4	35.9	60.3	60.3	0.0
North	109,460	33.8	27.5	61.4	56.8	4.6
Ontario	**1,344,134**	**16.3**	**41.7**	**58.0**	**58.5**	**-0.5**

* Difference = (OBSP+OHIP) - CCHS

Table 2: Comparison of mammography screening rates obtained from the Ontario Breast Screening Program (OBSP), the Ontario Health Insurance Plan (OHIP), and the Canadian Community Health Survey (CCHS), for women aged 50 to 74 years, by public health unit across Ontario

Public Health Unit	*Population*	*OBSP (%)*	*OHIP (%)*	*OBSP + OHIP (%)*	*CCHS (%)*	*Difference**
Central East & Toronto						
Durham Region Health Department	50,774	5.6	54.2	59.7	72.9	-13.2
Haliburton, Kawartha, Pine Ridge District Health Unit	24,442	11.2	39.6	50.7	63.8	-13.1
Peterborough County-City Health Unit	17,737	14.5	44.4	58.9	62.5	-3.6
Simcoe County District Health Unit	42,173	23.1	34.5	57.6	58.7	-1.1
York Region Health Services Department	73,763	9.8	50.2	60.1	56.1	4.0
Toronto Public Health	304,807	9.2	47.4	56.6	56.4	0.2
Central West						
Halton Region Health Department	44,661	6.7	54.4	61.1	60.5	0.6
Peel Region Public Health Unit	96,878	8.4	45.9	54.3	61.5	-7.2
Waterloo Regional Community Health	46,129	8.7	44.5	53.2	56.5	-3.3
Wellington-Dufferin-Guelph Public Health Unit	25,489	9.2	46.7	55.9	62.9	-7.0
Central South						
Brant County Health Unit	14,412	2.0	53.2	55.2	48.9	6.3
Haldimand-Norfolk Regional Health Department	13,107	8.1	45.6	53.7	68.8	-15.1
City of Hamilton Public Health Department	59,668	31.0	23.6	54.6	54.8	-0.2
Regional Niagara Public Health Unit	55,799	12.5	42.4	55.0	49.9	5.1
South West						
Grey Bruce Public Health Unit	21,367	35.4	25.6	60.9	53.5	7.4
Elgin-St Thomas Health Unit	9,700	16.6	39.1	55.6	60.4	-4.8
Windsor-Essex County Health Unit	43,078	18.2	45.5	63.7	61.3	2.4
Huron County Health Unit	7,775	15.5	38.3	53.9	66.3	-12.4
Chatham-Kent Public Health Division	13,497	19.2	43.0	62.2	72.5	-10.3
Lambton County Public Health Unit	16,968	14.4	54.0	68.4	66.2	2.2
Middlesex-London Health Unit	46,649	30.3	30.4	60.6	52.7	7.9
Oxford County Public Health Unit	11,824	9.6	44.6	54.2	52.4	1.8
Perth District Health Unit	8,520	14.7	42.6	57.3	51.0	6.3
East						
Kingston, Frontenac, Lennox and Addington Health Unit	22,289	46.9	18.6	65.5	59.3	6.2
Hastings and Prince Edward Counties Health Unit	19,829	22.7	37.1	59.7	60.7	-1.0
Leeds, Grenville and Lanark District Health Unit	21,347	17.2	35.5	52.7	49.0	3.7
City of Ottawa Public Health & Long Term Care Branch	86,993	23.2	39.7	62.9	62.8	0.1
Renfrew County and District Health Unit	12,227	32.8	27.0	59.8	60.2	-0.4
Eastern Ontario Health Unit	22,772	10.4	42.7	53.1	60.0	-6.9
North						
Algoma Health Unit	17,243	42.5	17.1	59.7	54.7	5.0
Porcupine Health Unit	10,234	24.1	31.0	55.0	53.2	1.8
Northwestern Health Unit	8,995	35.2	24.1	59.3	54.5	4.8
Muskoka-Parry Sound Health Unit	14,332	17.3	39.0	56.3	54.8	1.5
North Bay and District Health Unit	10,906	41.5	22.2	63.7	59.0	4.7
Sudbury and District Health Unit	24,966	44.3	21.1	65.3	58.1	7.2
Thunder Bay District Health Unit	18,023	30.1	38.2	68.3	60.2	8.1
Timiskaming Health Unit	4,761	12.5	35.2	47.7	55.9	-8.2
Ontario	**1,344,134**	**16.3**	**41.7**	**58.0**	**58.5**	**-0.5**

* Difference = (OBSP+OHIP) - CCHS

Table 3: Comparison of mammography screening rates generated from the Canadian Community Health Survey (CCHS) by Statistics Canada (CANSIM) to estimates generated by the Central East Health Information Partnership (CEHIP), for women aged 50 to 69 years, by public health unit across Ontario

Public Health Unit	*Population*	*CANSIM (%)*	*CCHS (%)*	*Difference**
Central East & Toronto				
Durham Region Health Department	50,774	61.3	75.6	-14.3
Haliburton, Kawartha, Pine Ridge District Health Unit	24,442	54.6	62.2	-7.6
Peterborough County-City Health Unit	17,737	60.2	64.0	-3.8
Simcoe County District Health Unit	42,173	58.5	60.8	-2.3
York Region Health Services Department	73,763	58.7	59.0	-0.3
Toronto Public Health	304,807	50.1	56.0	-5.9
Central West				
Halton Region Health Department	44,661	54.2	61.0	-6.8
Peel Region Public Health Unit	96,878	58.0	63.1	-5.1
Waterloo Regional Community Health	46,129	53.1	58.7	-5.6
Wellington-Dufferin-Guelph Public Health Unit	25,489	61.3	64.8	-3.5
Central South				
Brant County Health Unit	14,412	41.1	50.4	-9.3
Haldimand-Norfolk Regional Health Department	13,107	67.3	72.8	-5.5
City of Hamilton Public Health Department	59,668	55.3	57.9	-2.6
Regional Niagara Public Health Unit	55,799	48.1	51.5	-3.4
South West				
Grey Bruce Public Health Unit	21,367	45.3	52.9	-7.6
Elgin-St Thomas Health Unit	9,700	51.6	59.6	-8.0
Windsor-Essex County Health Unit	43,078	65.6	61.5	4.1
Huron County Health Unit	7,775	58.6	67.2	-8.6
Chatham-Kent Public Health Division	13,497	60.9	75.4	-14.5
Lambton County Public Health Unit	16,968	65.3	66.0	-0.7
Middlesex-London Health Unit	46,649	45.2	52.3	-7.1
Oxford County Public Health Unit	11,824	63.6	53.4	10.2
Perth District Health Unit	8,520	44.3	55.4	-11.1
East				
Kingston, Frontenac, Lennox and Addington Health Unit	22,289	48.5	59.3	-10.8
Hastings and Prince Edward Counties Health Unit	19,829	53.0	62.1	-9.1
Leeds, Grenville and Lanark District Health Unit	21,347	42.6	53.2	-10.6
City of Ottawa Public Health & Long Term Care Branch	86,993	51.0	62.9	-11.9
Renfrew County and District Health Unit	12,227	53.5	57.6	-4.1
Eastern Ontario Health Unit	22,772	57.9	60.9	-3.0
North				
Algoma Health Unit	17,243	38.6	54.2	-15.6
Porcupine Health Unit	10,234	46.5	54.2	-7.7
Northwestern Health Unit	8,995	42.9	54.9	-12.0
Muskoka-Parry Sound Health Unit	14,332	54.5	58.7	-4.2
North Bay and District Health Unit	10,906	52.1	62.6	-10.5
Sudbury and District Health Unit	24,966	47.2	59.8	-12.6
Thunder Bay District Health Unit	18,023	53.4	57.0	-3.6
Timiskaming Health Unit	4,761	51.4	57.7	-6.3
Ontario	**1,344,134**	**53.5**	**59.6**	**-6.1**

* Difference = CANSIM - CCHS

Table 4: Bootstrapped confidence intervals (CI) for rates of screening mammograms from the Canadian Community Health Survey (CCHS) and the combined Ontario Health Insurance Plan (OHIP) and Ontario Breast Screening Program (OBSP), for women aged 50 to 74, by MOHLTC health regions across Ontario

Health Region	*OBSP + OHIP (%)*	*CCHS (%)*	*CI*
Central East	58.3	62.0	(58.1, 65.9)
Toronto	56.6	56.4	(49.7, 63.0)
Central West	55.7	60.5	(56.4, 64.5)
Central South	54.7	53.7	(48.9, 58.6)
South West	61.1	58.3	(54.8, 61.8)
East	60.3	60.3	(56.2, 64.4)
North	61.4	56.8	(53.2, 60.5)
Ontario	**58.0**	**58.5**	**(56.6, 60.4)**

Table 5: Bootstrapped confidence intervals (CI) for rates of screening mammograms from the Canadian Community Health Survey (CCHS) and the combined Ontario Health Insurance Plan (OHIP) and Ontario Breast Screening Program (OBSP), for women aged 50 to 74, by public health unit across Ontario

Public Health Unit	*OBSP + OHIP (%)*	*CCHS (%)*	*CI*
Central East & Toronto			
Durham Region Health Department	59.7	72.9	(66.0, 79.7)
Haliburton, Kawartha, Pine Ridge District Health Unit	50.7	63.8	(56.4, 71.3)
Peterborough County-City Health Unit	58.9	62.5	(54.5, 70.5)
Simcoe County District Health Unit	57.6	58.7	(50.2, 67.3)
York Region Health Services Department	60.1	56.1	(48.2, 64.1)
Toronto Public Health	56.6	56.4	(49.7, 63.0)
Central West			
Halton Region Health Department	61.1	60.5	(53.2, 67.9)
Peel Region Public Health Unit	54.3	61.5	(54.1, 68.9)
Waterloo Regional Community Health	53.2	56.5	(48.1, 65.0)
Wellington-Dufferin-Guelph Public Health Unit	55.9	62.9	(53.5, 72.3)
Central South			
Brant County Health Unit	55.2	48.9	(38.6, 59.1)
Haldimand-Norfolk Regional Health Department	53.7	68.8	(58.4, 79.2)
City of Hamilton Public Health Department	54.6	54.8	(46.7, 63.0)
Regional Niagara Public Health Unit	55.0	49.9	(42.0, 58.0)
South West			
Grey Bruce Public Health Unit	60.9	53.5	(42.7, 64.3)
Elgin-St Thomas Health Unit	55.6	60.4	(50.3, 70.6)
Windsor-Essex County Health Unit	63.7	61.3	(53.2, 69.3)
Huron County Health Unit	53.9	66.3	(56.0, 76.7)
Chatham-Kent Public Health Division	62.2	72.5	(65.2, 79.8)
Lambton County Public Health Unit	68.4	66.2	(58.4, 74.1)
Middlesex-London Health Unit	60.6	52.7	(44.4, 60.9)
Oxford County Public Health Unit	54.2	52.4	(41.8, 63.0)
Perth District Health Unit	57.3	51.0	(37.5, 64.5)
East			
Kingston, Frontenac, Lennox and Addington Health Unit	65.5	59.3	(49.8, 68.8)
Hastings and Prince Edward Counties Health Unit	59.7	60.7	(53.3, 68.1)
Leeds, Grenville and Lanark District Health Unit	52.7	49.0	(40.9, 57.0)
City of Ottawa Public Health & Long Term Care Branch	62.9	62.8	(55.5, 70.0)
Renfrew County and District Health Unit	59.8	60.2	(49.9, 70.5)
Eastern Ontario Health Unit	53.1	60.0	(51.9, 68.1)
North			
Algoma Health Unit	59.7	54.7	(45.6, 63.9)
Porcupine Health Unit	55.0	53.2	(42.9, 63.5)
Northwestern Health Unit	59.3	54.5	(43.6, 65.4)
Muskoka-Parry Sound Health Unit	56.3	54.8	(46.8, 62.9)
North Bay and District Health Unit	63.7	59.0	(50.1, 67.9)
Sudbury and District Health Unit	65.3	58.1	(49.9, 66.3)
Thunder Bay District Health Unit	68.3	60.2	(50.1, 70.3)
Timiskaming Health Unit	47.7	55.9	(44.6, 67.1)
Ontario	**58.0**	**58.5**	**(56.6, 60.4)**

Table 6: Bootstrapped confidence intervals (CI) for rates of screening mammograms from the Canadian Community Health Survey (CCHS) generated by the Central East Health Information Partnership (CEHIP) and by Statistics Canada (CANSIM), for women aged 50 to 69 , by public health unit across Ontario

Public Health Unit	*CANSIM (%)*	*CI*	*CCHS (%)*	*CI*
Central East & Toronto				
Durham Region Health Department	61.3	(51.5, 71.2)	75.6	(68.5, 82.7)
Haliburton, Kawartha, Pine Ridge District Health Unit	54.6	(45.8, 63.4)	62.2	(53.1, 71.4)
Peterborough County-City Health Unit	60.2	(51.4, 69.0)	64.0	(55.3, 72.6)
Simcoe County District Health Unit	58.5	(50.5, 66.5)	60.8	(51.9, 69.7)
York Region Health Services Department	58.7	(50.2, 67.1)	59.0	(50.1, 68.0)
Toronto Public Health	50.1	(43.6, 56.7)	56.0	(48.9, 63.1)
Central West				
Halton Region Health Department	54.2	(46.3, 62.1)	61.0	(53.0, 68.9)
Peel Region Public Health Unit	58.0	(50.6, 65.4)	63.1	(55.1, 71.1)
Waterloo Regional Community Health	53.1	(43.4, 62.7)	58.7	(48.8, 68.7)
Wellington-Dufferin-Guelph Public Health Unit	61.3	(50.6, 72.0)	64.8	(54.1, 75.5)
Central South				
Brant County Health Unit	41.1	(31.4, 50.7)	50.4	(39.9, 61.0)
Haldimand-Norfolk Regional Health Department	67.3	(54.6, 80.0)	72.8	(62.7, 82.8)
City of Hamilton Public Health Department	55.3	(46.4, 64.2)	57.9	(49.9, 65.8)
Regional Niagara Public Health Unit	48.1	(38.7, 57.40)	51.5	(41.8, 61.3)
South West				
Grey Bruce Public Health Unit	45.3	(34.0, 56.6)	52.9	(41.1, 64.6)
Elgin-St Thomas Health Unit	51.6	(40.1, 63.2)	59.6	(48.5, 70.7)
Windsor-Essex County Health Unit	65.6	(55.9, 75.3)	61.5	(52.1, 71.0)
Huron County Health Unit	58.6	(46.5, 70.7)	67.2	(55.6, 78.9)
Chatham-Kent Public Health Division	60.9	(54.2, 67.7)	75.4	(68.3, 82.4)
Lambton County Public Health Unit	65.3	(57.1, 73.5)	66.0	(57.1, 74.9)
Middlesex-London Health Unit	45.2	(36.6, 53.8)	52.3	(43.4, 61.2)
Oxford County Public Health Unit	63.6	(51.9, 75.3)	53.4	(42.3, 64.6)
Perth District Health Unit	44.3	(30.8, 57.7)	55.4	(40.6, 70.2)
East				
Kingston, Frontenac, Lennox and Addington Health Unit	48.5	(39.3, 57.7)	59.3	(49.6, 69.1)
Hastings and Prince Edward Counties Health Unit	53.0	(44.3, 61.8)	62.1	(54.0, 70.1)
Leeds, Grenville and Lanark District Health Unit	42.6	(33.0, 52.3)	53.2	(43.7, 62.8)
City of Ottawa Public Health & Long Term Care Branch	51.0	(43.6, 58.5)	62.9	(55.1, 70.8)
Renfrew County and District Health Unit	53.5	(42.9, 64.1)	57.6	(46.3, 68.9)
Eastern Ontario Health Unit	57.9	(49.0, 66.7)	60.9	(52.4, 69.4)
North				
Algoma Health Unit	38.6	(29.6, 47.6)	54.2	(44.1, 64.1)
Porcupine Health Unit	46.5	(35.2, 57.7)	54.2	(42.6, 65.8)
Northwestern Health Unit	42.9	(32.9, 52.9)	54.9	(42.6, 67.3)
Muskoka-Parry Sound Health Unit	54.5	(46.0, 63.1)	58.7	(50.1, 67.3)
North Bay and District Health Unit	52.1	(42.8, 61.5)	62.6	(53.3, 72.0)
Sudbury and District Health Unit	47.2	(38.5, 55.8)	59.8	(51.4, 68.2)
Thunder Bay District Health Unit	53.4	(42.2, 64.7)	57.0	(45.7, 68.4)
Timiskaming Health Unit	51.4	(37.4, 64.9)	57.7	(45.0, 70.4)
Ontario	**53.5**	**(51.5, 55.5)**	**59.6**	**(57.5, 61.7)**