Determining use of preventive health care in Ontario

Comparison of rates of 3 maneuvers in administrative and survey data

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ABSTRACT

OBJECTIVE To examine rates of influenza vaccination, mammography, and Papanicolaou smear by comparing data obtained from the Ontario Health Insurance Plan administrative database with rates as self-reported in the Canadian Community Health Survey.

DESIGN Retrospective cohort study using data from Statistics Canada's 2000-2001 Canadian Community Health Survey and from the Ontario Health Insurance Plan administrative database for the same period.

SETTING Ontario.

PARTICIPANTS Those aged 12 and older who had received influenza vaccination, women aged 35 or older who had had mammograms within the past 2 years, and women aged 18 or older who had had Pap smears within the past 3 years who were surveyed during the Canadian Community Health Survey in 2001.

MAIN OUTCOME MEASURES Rates of influenza vaccination, mammography, and Pap smear in Ontario's 14 Local Health Integration Networks by network, age group, and socioeconomic status.

RESULTS Rates varied by health network. Analysis by age showed that influenza vaccination rates increased with age and peaked among those 75 and older. Rates of mammography screening increased with age but dropped substantially among those 75 and older. Rates of Pap smear peaked among those 20 to 39 and decreased with increasing age. Rates of mammography and Pap smear increased with rising socioeconomic status, but influenza vaccination rates did not differ substantially by socioeconomic status. Rates for all 3 preventive maneuvers were lower in the Ontario Health Insurance Plan data than in the self-reported Canadian Community Health Survey data.

CONCLUSION There are obstacles to finding out the true rates of preventive health care use in Ontario. We need to ascertain these rates in order to establish a criterion standard for delivery of these services. Development of programs to target specific geographic locations, socioeconomic classes, and high-risk groups are needed to increase the overall use of preventive health services in Ontario.

EDITOR'S KEY POINTS

- Increasing the use of preventive health services would improve overall health outcomes and be cost-effective for the health care system. Although preventive health services are readily available, preventable illnesses are still occurring.
- This study looked at rates of use of preventive care as ascertained from the Ontario Health Insurance Plan database and the Canadian Community Health Survey data in order to see how the rates differed by Local Health Integration Network, age, and socioeconomic status, and also how they differed between the 2 data sources.
- Establishing a criterion standard for the use of preventive health services would allow accurate measurement of delivery of such services for reimbursement purposes, for assessing reductions in the incidence of preventable illnesses, and for evaluating the effects of preventive health programs.

Détermination du taux d'utilisation des soins de santé préventifs en Ontario

Comparaison des taux de 3 interventions à partir des données administratives et d'une enquête

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RÉSUMÉ

OBJECTIF Établir les taux de vaccination anti-grippale, de mammographie et de test de Papanicolaou en comparant les données provenant de la banque de données d'Assurance-santé de l'Ontario aux taux obtenus par auto-déclaration à l'Enquête sur la santé des collectivités canadiennes.

TYPE D'ÉTUDE Étude de cohorte rétrospective à partir des données de l'Enquête sur la santé des collectivités canadiennes 2000-2001 de Statistique Canada et celles de la base de données administratives de l'Assurance-santé de l'Ontario pour la même période.

CONTEXTE Ontario.

PARTICIPANTS Les personnes de 12 ans et plus ayant reçu le vaccin anti-grippal, les femmes de 35 ans et plus ayant eu des mammographies au cours des 2 dernières années, et celles de 18 ans et plus ayant subi des tests de Papanicolaou au cours des 3 dernières années et qui avaient participé à l'Enquête sur la santé des collectivités canadiennes de 2001.

PRINCIPAUX PARAMÈTRES ÉTUDIÉS Taux de vaccination anti-grippale, de mammographie et de test de Papanicolaou dans les 14 Réseaux locaux d'intégration des services de santé de l'Ontario, selon le réseau, et l'âge et la situation socioéconomique des patients.

RÉSULTATS Les taux variaient selon les réseaux sanitaires. L'analyse a montré que les taux de vaccination anti-grippale augmentaient avec l'âge, atteignant un maximum à 75 ans et plus. Les taux de dépistage par mammographie augmentaient avec l'âge mais déclinaient substantiellement à partir de 75 ans. Les taux de Pap test étaient maximaux entre 20 et 39 ans, et diminuaient par la suite. Les taux de mammographie et de Pap test augmentaient avec la situation socioéconomique, mais non celui de vaccination anti-grippale. Pour les 3 interventions, les taux provenant des données de l'Assurance-santé de l'Ontario étaient plus bas que ceux des auto-déclarations à l'Enquête sur la santé des collectivités canadiennes.

CONCLUSION Trouver les véritables taux d'utilisation des soins de santé préventifs en Ontario n'est pas tâche facile. Il importe d'évaluer ces taux afin d'établir des normes pour la prestation de ces services. On devra développer des programmes ciblant spécifiquement certaines régions et classes socioéconomiques, et certains groupes à risque élevé si on veut accroître l'utilisation globale des services de santé préventifs en Ontario.

POINTS DE REPÈRE DU RÉDACTEUR

- Une augmentation du taux d'utilisation des services de soins préventifs permettrait d'améliorer l'ensemble des issues de santé et serait plus rentable pour le système de santé. Même si les services de santé préventifs sont déjà disponibles, des maladies évitables continuent de survenir.

- Cette étude examinait les taux d'utilisation des soins préventifs découlant des données de l'Assurance-santé de l'Ontario et de l'Enquête sur la santé des collectivités canadiennes, afin d'établir les différences de taux selon le Réseau local d'intégration des services de santé, l'âge et le statut socioéconomique, et aussi pour voir comment les 2 sources de données diffèrent.

- L'établissement de critères normalisés pour l'utilisation des services de soins préventifs permettrait de mesurer plus précisément la prestation de ces services à des fins de remboursement, en plus d'évaluer la réduction de l'incidence des maladies évitables et l'effet des programmes de santé préventive.

Preventive health services are an essential element of a modern primary health care system. Numerous studies have demonstrated that many preventive interventions, including cancer screening and influenza vaccination, lower mortality and morbidity rates. The 5-year survival rate for women whose breast cancer is found and treated early is more than 95%,[1] and Papanicolaou tests in high-quality organized screening programs can reduce the incidence and mortality of cervical cancer by at least 70%.[2] Influenza vaccination can prevent influenza in 70% to 90% of healthy children and adults and is 85% to 95% effective in preventing deaths among immunocompromised and elderly populations.[3] Vaccinating home care staff against influenza in times of moderate influenza activity can also prevent deaths, health service use, and hospital admissions among residents.[4]

Based on the recommendations of the Canadian Task Force on Preventive Health Care, the number of preventive maneuvers in primary care practice has increased dramatically during the past decades. The Task Force makes recommendations based on the strength of evidence published in the scientific literature. The Task Force recommends annual mammography for women aged 50 to 69 years; annual screening using Pap smear after initiation of sexual activity or at age 18, and once every 3 years after 2 normal smears to age 69; and annual influenza vaccination for healthy adults and children.[5]

Even with preventive services readily available, however, preventable illnesses are still occurring, which indicates that prevention targets are not being met. Cancer Care Ontario reported that, in 2005, approximately 25 600 people in Ontario died of cancer,[6] and according to the Pan American Health Organization's Country Health Profile of Canada in 2001, the influenza virus causes an estimated 70 000 hospitalizations and 6700 deaths between April and November of every year, especially among elderly people and those with underlying illnesses.[7] It is clear from both primary care and population health perspectives that accurate measures of how well preventive goals are being reached need to be in place so we can monitor the health care system's performance.

Currently, there is no criterion standard for determining rates of use of preventive health care. As primary care reform advances and as remuneration is being tied to performance, it is essential to know what the criterion standard is. Previous studies on use of preventive services have looked at various data sources. While some studies used self-reported survey data, others used administrative databases. A recent health services study conducted by the Institute for Clinical Evaluative Sciences, *Primary Care in Ontario,*[8] which used both types of databases reported that rates of influenza vaccination, mammography, and Pap smears were not linked. To our knowledge, no peer-reviewed publication has directly compared these 2 different data sources through use of linked data. Such linkage would allow administrative data to be compared with self-reported data on the basis of individual patients. We also need to examine rates of use of preventive health care by geographic location, age group, and socioeconomic status in order to assess and implement programs and to move toward greater equity in health.

This study examines rates of influenza vaccination, mammography, and Pap smear as preventive measures in the context of periodic health examinations in the 14 Local Health Integration Networks (LHINs) in Ontario by age group and socioeconomic status; compares rates of use as obtained from the Ontario Health Insurance Plan (OHIP) administrative database with rates obtained from the self-reported Canadian Community Health Survey (CCHS); and examines the consistency of the differences between administrative and self-reported data.

METHODS

Data sources
The analysis in this study is based on linked data from the 2000-2001 CCHS, Cycle 1.1, and the OHIP administrative database using unique encrypted identifiers. Statistics Canada conducts the CCHS to provide regular and timely estimates of health determinants, health status, and health system use in 133 health regions across Canada. The overall response rate for Cycle 1.1 was 84.7%; the sample size was 131 535. A total of 37 681 people responded in Ontario: 32 751 were 20 years old or older.

All 11.9 million Ontario residents have universal health insurance for essential medical services. Approximately 94% of general practitioners and family physicians submit claims data (either fee-for-service billings or information on use) to OHIP. Every claim contains the details of each transaction, including a diagnosis code, a fee code for the service, and a date of service. Health card numbers were encrypted for privacy and confidentiality. Screening tests that would generate OHIP billings were selected for analysis. These included influenza vaccination (fee codes G590, G591, G538, G539), mammography (fee codes X184, X185), and Pap smears (fee codes G365, Q001, G394, L812). To avoid counting the same individual many times, subjects were counted only once for the same screening test during the study period.

Socioeconomic status
Socioeconomic status quintiles were calculated for each study subject using his or her postal code, which was found in the Registered Persons Database. Statistics Canada has estimated socioeconomic gradients (based on income) using neighborhood of residence. Each adult's postal code was linked to Statistics Canada's socioeconomic status quintile gradient. Those in quintile 1 had the lowest income and those in quintile 5 the highest.

Analyses

Cross-tabulations were used to estimate the proportions of Ontarians who received preventive health services. The CCHS self-reported survey data were linked to the OHIP administrative data for 2 years for mammogram and influenza vaccination and 3 years for Pap smear before the CCHS of 2001 in order to compare rates from the same cohort. Data were weighted to represent the demographic makeup of the Ontario population in 2000 to 2001. Descriptive analysis was conducted based on age, LHIN, and socioeconomic status standardized to the 1991 Canadian population.

This study was approved by the Research Ethics Board of Sunnybrook Health Sciences Centre in Toronto, Ont.

RESULTS

The overall rate of influenza vaccination (during the previous 2 years) was reported in the CCHS as 37.7% and in the OHIP database as 30.3%. For mammography (within the previous 2 years), overall rates were 46.6% in the CCHS data and 31.1% in the OHIP database. For Pap smears (within the previous 3 years), CCHS and OHIP rates were 70.8% and 58.9%, respectively.

A comparison of influenza vaccination, mammography, and Pap smear rates by LHIN in Ontario in 2001 shows that the rate varied among LHINs (**Table 1**[8]).

Differences among LHINs varied by 6% for CCHS rates and 13% for OHIP rates for influenza vaccination, by 13% and 21% for mammography, and by 9% and 14% for Pap smears.

Analysis by age showed that the percentage of Ontarians receiving influenza vaccinations increased with age and peaked among the 75 and older age group, although a slight drop was observed among those aged 20 to 39 (**Table 2**[8]). The percentage of women having mammograms increased with age and was highest among those aged 65 to 74. Mammogram rates dropped substantially among those older than 75. The percentage of women having Pap smears peaked among those aged 20 to 39 and decreased with increasing age.

A comparison of mammogram and Pap smear rates by socioeconomic status revealed that rates increased with increasing socioeconomic status (**Table 3**[8]). Differences between the lowest and highest socioeconomic status for mammography screening were 6.6% in the CCHS data and 6.8% in the OHIP data, and for Pap smears were 8.9% in the CCHS data and 10.9% in the OHIP data. Influenza vaccination rates did not differ substantially by socioeconomic status.

Rates in the OHIP data were consistently lower than those in the self-reported CCHS data (in 77 of 78 comparisons). The lone exception was in influenza vaccination rates among those older than 75.

Table 1. Rates of influenza vaccination, mammography, and Papanicolaou smear obtained from the Ontario Health Insurance Plan database and the Canadian Community Health Survey data by Local Health Integration Network in Ontario in 2001

LOCAL HEALTH INTEGRATION NETWORK	INFLUENZA VACCINATION* (WITHIN THE PAST 2 Y)		MAMMOGRAPHY† (WITHIN THE PAST 2 Y)		PAP SMEAR‡ (WITHIN THE PAST 3 Y)	
	CCHS, %	OHIP, %	CCHS, %	OHIP, %	CCHS, %	OHIP, %
Central	36.2	32.5	47.5	38.3	68.8	62.8
Central East	37.1	34.3	48.9	31.4	70.3	60.3
Central West	36.1	31.2	41.9	29.4	66.5	57.6
Champlain	40.2	34.0	47.5	30.3	71.8	60.7
Erie St Clair	41.5	31.0	54.4	38.5	68.5	53.1
Hamilton Niagara Haldimand Brant	36.3	27.3	43.3	28.5	71.8	58.0
Mississauga Halton	35.9	30.3	48.8	39.2	70.6	59.8
North East	39.9	24.3	43.2	18.5	70.0	51.4
North Simcoe Muskoka	36.8	27.5	47.4	28.5	72.9	57.3
North West	41.8	21.5	49.5	28.6	72.9	65.0
South East	40.3	29.6	44.0	22.7	73.4	58.9
South West	38.7	32.4	41.1	24.0	72.1	53.5
Toronto Central	35.9	30.1	49.0	31.8	72.8	61.3
Waterloo Wellington	37.3	25.9	43.0	31.6	75.1	63.9
All Ontario	**37.7**	**30.3**	**46.6**	**31.1**	**70.8**	**58.9**

*Influenza vaccination for codes G590, G591, G538, and G539.
†Mammography among women 35 y and older.
‡Pap smear among women 18 y and older.
Data from the Ontario Health Insurance Plan and the Canadian Community Health Survey 2001.[8]

Table 2. Rates of influenza vaccination, mammography, and Papanicolaou smear obtained from the Ontario Health Insurance Plan database and the Canadian Community Health Survey data by age group in Ontario in 2001

AGE GROUP, Y	INFLUENZA VACCINATION* (WITHIN THE PAST 2 Y)		MAMMOGRAPHY† (WITHIN THE PAST 2 Y)		PAP SMEAR† (WITHIN THE PAST 3 Y)	
	CCHS, %	OHIP, %	CCHS, %	OHIP, %	CCHS, %	OHIP, %
12–19	30.6	24.6	N/A	N/A	40.8	35.6
20–39	26.3	18.5	12.1	6.8	78.7	68.6
40–64	38.9	29.4	54.5	37.8	77.8	62.7
65–74	70.2	65.8	64.9	42.8	53.2	40.6
75 and older	72.3	73.4	35.4	21.4	28.4	18.2

*Influenza vaccination for codes G590, G591, G538, and G539.
†Mammography among women 35 y and older.
†Pap smear among women 18 y and older.
Data from the Ontario Health Insurance Plan and the Canadian Community Health Survey 2001.[8]

Table 3. Rates of influenza vaccination, mammography, and Papanicolaou smear obtained from the Ontario Health Insurance Plan database and the Canadian Community Health Survey data by socioeconomic quintile in Ontario in 2001: *Those in quintile 1 had the lowest income and those in quintile 5 had the highest.*

SOCIO-ECONOMIC QUINTILE	INFLUENZA VACCINATION* (WITHIN THE PAST 2 Y)		MAMMOGRAPHY† (WITHIN THE PAST 2 Y)		PAP SMEAR† (WITHIN THE PAST 3 Y)	
	CCHS, %	OHIP, %	CCHS, %	OHIP, %	CCHS, %	OHIP, %
1	38.52	29.96	44.32	27.65	67.21	53.09
2	36.65	29.24	43.67	29.63	68.49	57.25
3	37.64	30.43	45.69	31.37	70.81	59.97
4	37.03	30.85	47.19	33.17	70.99	60.03
5	38.01	31.48	50.9	34.4	76.09	63.96
All Ontario	**37.7**	**30.3**	**46.6**	**31.1**	**70.8**	**58.9**

*Influenza vaccination for codes G590, G591, G538, and G539.
†Mammography among women 35 y and older.
†Pap smear among women 18 y and older.
Data from the Ontario Health Insurance Plan and the Canadian Community Health Survey 2001.[8]

DISCUSSION

These results show that rates of influenza vaccination, mammography, and Pap smears in Ontario were lower than required to produce the greatest health benefits. Also, the rates differed by LHINs, age, and socioeconomic status. Self-reported rates of use were higher than rates in the OHIP data.

The Canadian Task Force on Preventive Health Care's recommendations for use of preventive screening services were not being carried out. Education and awareness campaigns on the benefits of preventive health care have been shown to be the most effective way to increase use of preventive services, while reminder systems and targeting groups with low rates of use of preventive services have also been successful.[9-13]

Differences by LHIN

Differences in the rates of use of preventive health care services by LHIN might have been affected by whether these services were available, especially in northern Ontario, where there are fewer physicians in practice, a high volume of patients per practice, and sparsely distributed medical centres.[14,15] An important objective of any health care system is to provide equal access to health care or the opportunity for equal health outcomes. Programs targeted at specific geographic locations are needed to reduce regional disparities.

Differences by age

Influenza vaccination rates were highest among the elderly, which would be expected because influenza causes a great deal of morbidity and mortality among elderly people. Rates of mammography within 2 years were highest among those aged 65 to 74 and dropped substantially among those 75 and older, as 75 years is the suggested upper age limit for mammography screening.[16] There is evidence that mammography screening of women 50 to 69 years old can reduce mortality from breast cancer by as much as 30%, although the benefits of mammography for those younger than 50 remain controversial.[17,18] Rates of Pap smear use by age group were similar to rates in Canada as a whole. Greatest use of Pap smears (before adjusting for hysterectomy) occurs among those aged 25 to 34. Rates decline in each subsequent age group.[19]

Differences by socioeconomic status

Our findings indicate that those with higher incomes were more likely than those with lower incomes to have preventive screening for breast and cervical cancer. These results are consistent with those of previous studies that have shown that the higher a woman's education or income level is, the more likely she is to receive mammograms and Pap tests.[14,20-23]

Despite access to universal health care in Canada, rates of use of preventive services still vary by socioeconomic status. This is the result of differences in knowledge, resources, and attitudes across socioeconomic levels. If the health care system is to be fully accessible, programs targeting specific groups need to be put in place to educate patients with lower socioeconomic status about the benefits of preventive health care.

With respect to influenza vaccination, our results showed that rates did not differ substantially by socio-economic status, most likely a result of the universal vaccination plan targeting underserved populations that came into effect in 2001.[24]

Administrative versus survey data

Our results show that the rates obtained from the OHIP data were substantially lower than the rates obtained from the CCHS data for the same periods. This is consistent with results of previous studies with regard to the differences between self-reported and administrative data on use of preventive services.[25-31] Since OHIP includes only fee-for-service claims, data on physicians and patients enrolled in alternative payment plans, such as those in place at Community Health Centres and Health Service Organizations, are excluded. This likely leads to an underestimation of the use of preventive services in Ontario.

Rates of influenza vaccination in the OHIP data might also be underestimated because of the approximately 35% of Ontario patients who do not receive vaccinations in doctor's offices. Vaccinations are administered at workplaces, schools, and community-based clinics that are not monitored by OHIP.[29] Creation of an immunization registry or assignment of a fee code for influenza vaccination would help to determine the rate of vaccination more accurately.

Ontario mammography screening rates determined from the OHIP administrative database also underestimate true rates as the data do not include screening offered by the Ontario Breast Screening Program. A study has shown that when Ontario Breast Screening Program and OHIP rates are combined, the rates become similar to CCHS rates.[25] To obtain true rates of mammography screening, there needs to be harmonization between the Ontario Breast Screening Program and OHIP.

Low rates of Pap smear in the administrative database might be a result of billing or coding processes. For example, Pap tests performed during periodic health examinations might not be billed separately.[28] A provincial cervical screening registry has been suggested to improve the accuracy of the data.[27]

Self-reported data might not give an accurate picture of use of preventive services. For example, one study showed that, while self-reported data were more accurate regarding whether a woman had had a mammogram, they were less accurate about when the woman had had it.[26] Surveys are also susceptible to misunderstanding of terms or language in the questions. Privacy might also be an issue as patients might not wish to disclose certain information to interviewers. On the other hand, rates in the CCHS data might be overestimated because of respondents' eagerness to report services as received in order to show good behaviour to the surveyor, when such services were not actually received.

Limitations

Both the self-reported data and the administrative data have their limitations. First, the CCHS relied on self-report and the voluntary participation of randomly selected participants; the results were not verified independently. Second, the CCHS did not try to determine the purpose of any screening tests. Third, the OHIP administrative data were not originally collected for the purposes of conducting health research. For example, the billing codes cited in physician claims have not been validated and, therefore, might not necessarily represent an accurate picture of preventive health care utilization.

Conclusion

Despite the limitations, our study contributes important information on the use of preventive health services in Ontario. There is room for improvement to increase the overall use of preventive health services as well as to develop programs to target specific geographic locations, socioeconomic classes, and high-risk groups. For example, research is needed to explore the barriers to receiving preventive health care from the perspectives of both patients and physicians. With the recent introduction of Canada's human papillomavirus vaccination program, future research could also be conducted to determine the effectiveness of vaccination in reducing the prevalence of disease. There are obstacles to finding out what the true rates of preventive health care use are. We need to know what the criterion standard is for the delivery of such services to be able to move toward accurate measurement for reimbursement, to measure reduction in preventable illnesses, and to evaluate the effects of preventive health programs. 🍁

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