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Review of Reported Respiratory Infection Outbreaks in Institutions in Ontario 2001-2003

Introduction

Respiratory infection outbreaks caused by various pathogens are a major concern for healthcare institutions in Ontario. As such, the recognition and control of these outbreaks is an important priority for various healthcare institutions. In 2001, amendments were made to the *Ontario Health Protection and Promotion Act* requiring reporting of *Respiratory Infection Outbreaks in Institutions*. Under this Act, all respiratory outbreaks in institutions, irrespective of the causative agent, are reportable to the Medical Officer of Health, and a copy of the report is forwarded to the Public Health Division of the Ministry of Health and Long-Term Care. The rationale for reporting is that respiratory infections contribute significantly to morbidity and mortality in Ontario. The goal of this reporting requirement is to assess the epidemiology of respiratory infection outbreaks in order to develop effective control measures.

Objectives

The objective of this report is to review the reported outbreaks of respiratory infections in institutions in Ontario, using data collected through reports of institutional outbreaks by health units for the 2001-02 and 2002-03 surveillance seasons.

Specifically, this report:

- Describes differences from one surveillance season to the next
- Determines if particular institution types or organisms have been associated with a greater number of outbreaks or higher attack rates

- Compares the attack rates and number of outbreaks over the two year period

Methods

A summary of the process involving data source, analyses, and reporting is found in Figure 1.

Data Source

Surveillance data for institutional respiratory infection outbreaks was obtained from health unit reports of institutional outbreaks. The two surveillance seasons under review (2001-02 and 2002-03) began in the third week of October and ended April 30 the following calendar year. The data collected were presented in a spreadsheet format under the following fields: health unit, institution, institution type, onset month, date of onset for first case, date of onset for last case, duration of outbreak, organism, total number of resident cases, influenza vaccination history (only relevant for influenza outbreaks), number of deaths, and antiviral usage. (A more detailed review of surveillance indicators used can be found in the *Summary Report of the Influenza 2001/02 Ontario "Influenza and Respiratory Outbreak Surveillance Season Report"*. [1])

Descriptive Analyses

Descriptive statistics were generated in order to determine patterns in the occurrence of outbreaks using Excel and SPSS. The number of outbreaks and the mean duration of disease were compared between the two surveillance seasons.

The number of outbreaks was also compared by:

- Month
- Institution type
- Causal organism
- Health Unit

Risk analyses

Risks over the two seasons were compared and patterns in attack rates among institutional residents were examined using Microsoft Excel and SPSS. Relative risks and case fatality rates (CFR) were generated and compared between the two seasons. In addition, the CFRs among residents were compared between influenza and non-influenza outbreaks. An outbreak institution was defined as an acute care hospital (ACH), chronic care hospital (CCH), home for the aged (HFA), nursing home (NH), or retirement home (RH) that had a respiratory infection outbreak during the reporting period.

The attack rates were also compared by:

- Seasonal variation (i.e. by month)
- Institution type (i.e. ACH, CCH, HFA, NH, RH)

Results

Descriptive Analyses:

Reported Respiratory Infections by Organism and Year

In the 2001-02 surveillance season, 9 different organisms were responsible for 317 outbreaks. The majority (56%) of these outbreaks were caused by influenza type A viruses, 10% were caused by respiratory syncytial virus (RSV), 5% were caused by influenza type B virus (Flu B), and 3% by parainfluenza viruses (PIV). Less than 1% of outbreaks were caused by Group A streptococcus, *Streptococcus pneumoniae*, *Haemophilus influenzae* bacteria, or *Mycoplasma pneumoniae*. In approximately 24% of the outbreaks, no causative organism could be identified.

In the 2002-03 surveillance season, 5 different organisms were responsible for 185 outbreaks. Fifteen percent of the outbreaks were traced to RSV, 14% to influenza A, 11% to PIV, and 1% to rhinovirus. In 59% of the outbreaks, the source was not identified.

Influenza A, PIV, and RSV were responsible for the majority of outbreaks in both surveillance seasons. Causative organisms of the institutional outbreaks in the two surveillance seasons are reported in Table 1.

Figure 1: Summary of Data Source and Analyses

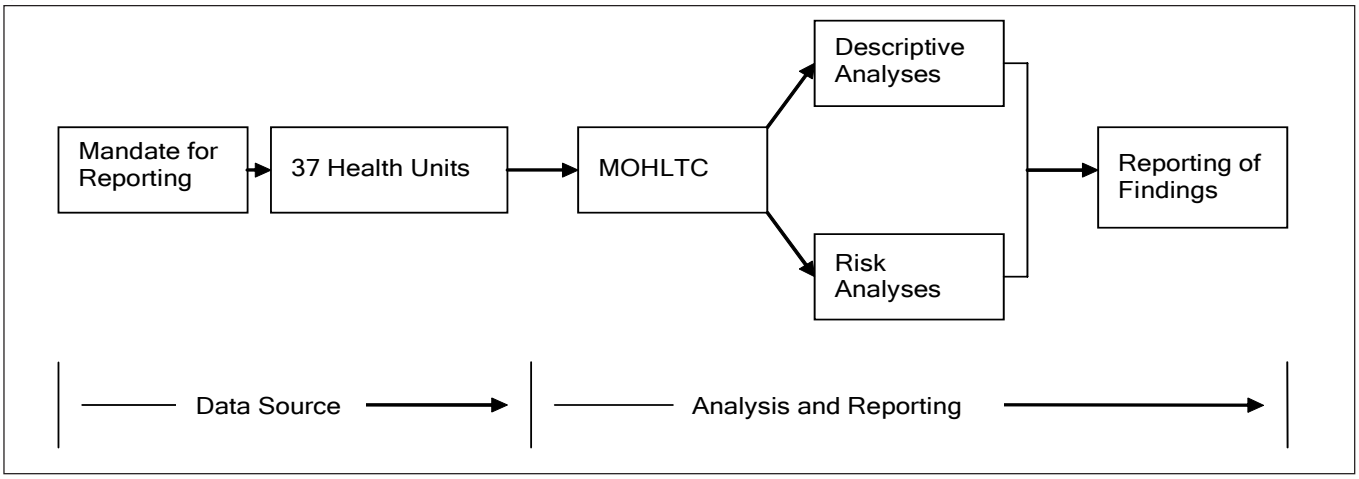


Table 1: Causative Organisms for Institutional Outbreaks

2001 - 02	2002 - 03
Influenza type A	Influenza type A
Influenza type B	Respiratory syncytial virus
Respiratory syncytial virus	Parainfluenza viruses
Parainfluenza viruses	Rhinovirus
Group A streptococcus	Unknown
Streptococcus pneumoniae	
Haemophilus influenzae	
Mycoplasma pneumoniae	
Unknown	

Reported Institutional Outbreaks by Month and Year

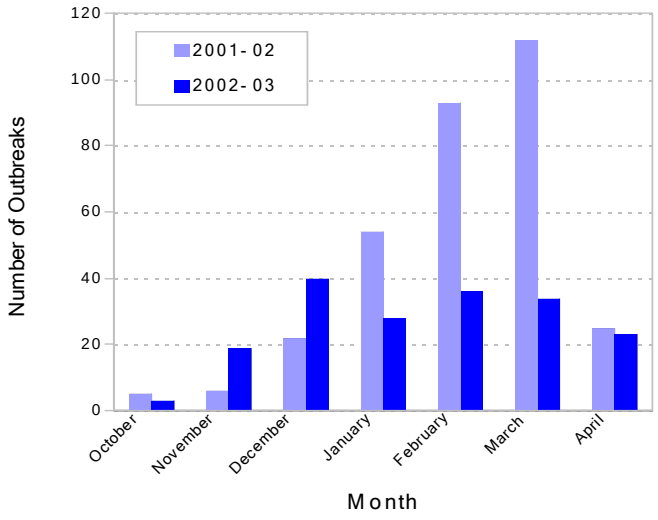
Seasonal variations (by month) of reported outbreaks in Ontario for the 2001-02 and 2002-03 surveillance seasons are displayed in Figure 2. With the exception of November and December (when the number of outbreaks was low), the number of outbreaks in each month was greater in 2001-02 than in 2002-03.

In 2001-02, the number of outbreaks rose progressively over the reporting period (October-April) and peaked in March. The relationship is not as clear for the 2002-03 surveillance season when a gradual increase from October to December was observed, after which there was a slow decline until April.

Reported Outbreaks by Type of Institution and Year

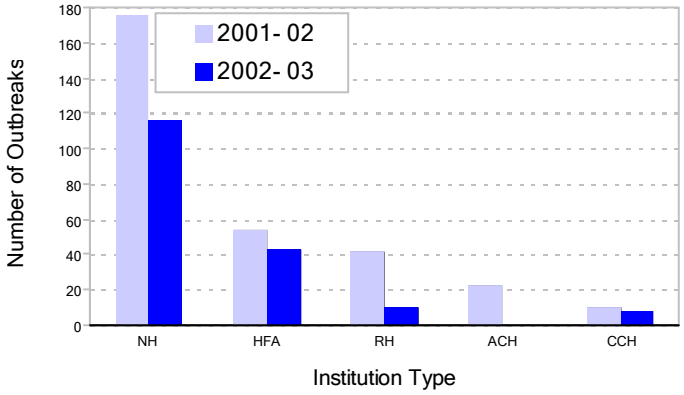
For both surveillance seasons, the number of outbreaks was greatest in NHs, followed by HFAs and RHs (Figure 3).

Figure 2: Reported Number of Institutional Outbreaks by Month



There were fewer institutional respiratory outbreaks in the 2002-03 season than in the 2001-02 season for each institution type.

Figure 3: Reported Number of Institutional Outbreaks by Institution Type

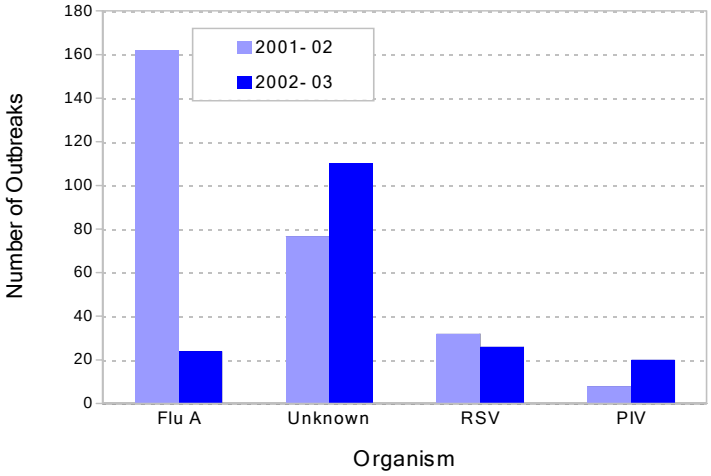


Causative Organism of Outbreak by Year

Outbreaks by causative organism (only for those organisms found in both surveillance seasons) are displayed in Figure 4. In the 2001-02 season, influenza A was responsible for 51% of the outbreaks, RSV for 10%, and PIV was responsible for 3% of the outbreaks. For 24% of outbreaks, the source was unknown.

In the 2002-03 season, influenza A was responsible for 13% of the outbreaks, RSV for 14%, and PIV was responsible for 11% of the outbreaks. For 59% of outbreaks, the source was unknown.

Figure 4: Reported Number of Institutional Outbreaks by Causative Organism and Year



Reported Number of Institutional Outbreaks by Health Unit

There was a large variation in the number of outbreaks reported between health units (Table 2). However, these numbers should not be compared without reference to population size and number of institutions affected.

From 2001-02 to 2002-03, Toronto Public Health had the greatest decrease in the number of reported respiratory outbreaks, while Middlesex-London had the greatest increase in reported outbreaks. Overall, a decrease in the number of respiratory outbreaks (by 132) was observed between the 2001-02 season to the 2002-03 season.

Table 2. Difference in Reported Number of Institutional Outbreaks by Health Unit

Health Unit	Reported Number of Outbreaks 2001-02 (A)	Reported Number of Outbreaks 2002-03 (B)	Change from Previous Year (B - A)
Algoma	10	3	(7)
Brant	12	1	(11)
Bruce-Grey	3	6	3
Chatham-Kent	7	9	2
Durham	11	5	(6)
Eastern Ontario	12	7	(5)
Elgin	3	5	2
Haldimand Norfolk	5	5	0
Halton	2	0	(2)
Hamilton	8	3	(5)
Hastings	8	5	(3)
Huron	3	1	(2)
Kingston	5	0	(5)
Lambton	3	1	(2)
Leeds, Greenville	12	0	(12)
Middlesex London	11	21	10
Muskoka	2	0	(2)
Niagara	13	9	(4)
North Bay	12	3	(9)
Ottawa	23	15	(8)
Oxford	5	11	6
Peel	11	5	(6)
Perth	8	4	(4)
Porcupine	0	2	2
Peterborough	6	0	(6)
Renfrew	4	1	(3)
Simcoe	8	2	(6)
Sudbury	3	5	2
Thunder Bay	8	1	(7)
Timiskaming	1	4	3
Toronto	47	25	(22)
Waterloo	21	0	(21)
Wellington-Dufferin	11	11	0
Windsor	3	2	(1)
York Region	16	13	(3)
Total	**317**	**185**	**(132)**

Risk Analyses

Crude Relative Risk

The crude relative risk compares the risk of a resident/patient becoming ill in an institution (with an ongoing outbreak) in 2002-03 compared to the previous season (2001-02). In an outbreak institution, the risk of becoming ill for 2002-03 and 2001-02 was 118.6 and 153.2 per 1,000 residents/patients exposed, respectively (Table 3). The relative risk (RR) of getting ill in the 2002-03 season (compared to the previous season) was 0.77 (95% confidence interval = 0.74, 0.80). Thus, the risk of a resident/patient becoming ill in an outbreak institution during the 2002-03 season was significantly lower than during the 2001-02 season (p-value < 0.05).

Table 3: Risk of Respiratory Illness among Institutional Residents/Patients

Year	Ill	Not Ill	Total	Risk Per 1,000
2002-03	2,912	21,638	24,550	118.6
2001-02	5,336	29,491	34,827	153.2
Total	8,248	51,129	59,377	138.9

RR (crude) = 118.6/153.2 = 0.77
95% CI = (0.74, 0.80)

Relative Case Fatality Rate by Year

The case fatality rate (CFR) is the risk of dying once ill. The overall CFR among residents over both surveillance seasons was 2.84% (as shown in Table 4). The CFR in the 2002-03 season was slightly lower (2.51%) than in the 2001-02 season (3.02%). The relative CFR was 0.83. However, this relationship was not statistically significant (p-value > 0.05; 95% CI= 0.63, 1.09).

Table 4: Case Fatality Rate among Institutional Residents/Patients

Year	Dead	Alive	Total	CFR (%)
2002-03	73	2,839	2,912	2.51
2001-02	161	5,175	5,336	3.02
Total	234	8,014	8,248	2.84

Relative CFR=2.51/3.02=0.83
95% CI = (0.63, 1.09)

Influenza versus Non-Influenza Relative Case Fatality Rate

Although the overall CFR (over both surveillance seasons) was 2.84% among residents/patients, at 3.58% the CFR for influenza outbreaks was higher than for non-influenza outbreaks (2.56%). The relative CFR comparing the influenza outbreaks to the non-influenza outbreaks in both years was 1.40 (95% CI=1.003, 1.95) as shown in Table 4a. Therefore, the risk of a resident/patient dying once ill was significantly greater in influenza outbreaks than in non-influenza outbreaks for both seasons.

As previous analyses have shown, the attack rates were significantly different in the two seasons. Relative CFRs were calculated (comparing influenza and non-influenza cases). In 2002-03, the relative CFR was 1.25 (95% CI=0.75, 2.08) as shown in Table 4b. In 2001-02, the relative CFR was 1.97 (95% CI=1.16, 3.35) as shown in Table 4c. Although the risk of death was higher for influenza cases in both seasons this result was only significant with respect to the 2001-02 season.

Table 4a: Case Fatality Rate among Residents/Patients for Outbreaks 2001-2003*

Source	Dead	Alive	Total	CFR (%)
Influenza	122	3,282	3,404	3.58
Non-Influenza	44	1,676	1,720	2.56

*Outbreaks with an unknown source of disease were excluded from analyses
Relative CFR=1.40 (95% CI=1.003, 1.95)

Table 4b: Case Fatality Rate among Residents/Patients for Outbreaks 2002-03*

Source	Dead	Alive	Total	CFR (%)
Influenza	17	397	414	4.11
Non-Influenza	29	849	878	3.30

*Outbreaks with an unknown source of disease were excluded from analyses
Relative CFR=1.25 (95% CI=0.75, 2.08)

Table 4c: Case Fatality Rate among Residents/Patients for Outbreaks 2001-02*

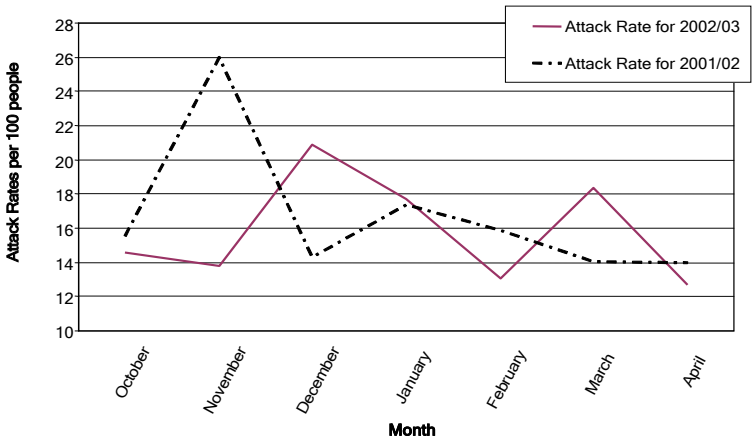
Source	Dead	Alive	Total	CFR (%)
Influenza	105	2,885	2,990	3.51
Non-Influenza	15	827	842	1.78

*Outbreaks with an unknown source of disease were excluded from analyses
Relative CFR=1.97 (95% CI=1.16, 3.35)

Seasonal Variation of Attack Rates in Outbreak Institutions

The institutional attack rate among residents/patients is the ratio of cases relative to the number of residents/ patients at risk of developing the disease in outbreak institutions. The institutional attack rate in the 2001-02 season peaked in November and remained constant (Figure 5). In the 2002-03 season, the institutional attack rate peaked in December and had another peak in March (Figure 5). The overall institutional attack rates for 2001-02 and 2002-03 seasons were 15.3 and 16.5 cases per 100 exposed residents/patients, respectively.

Figure 5: Institutional Attack Rates among Residents Over Time



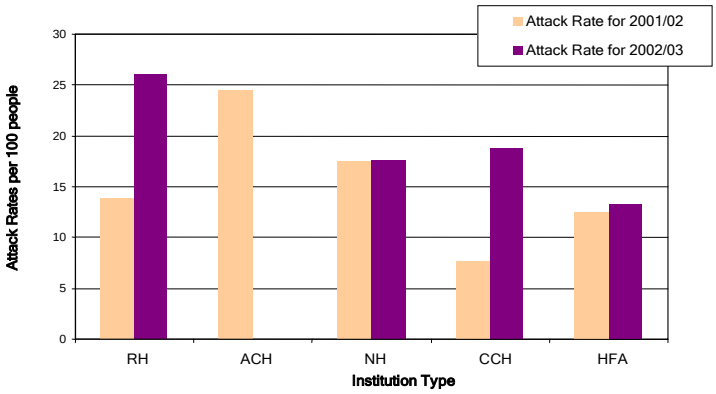
Variation of Attack Rates by Institution Type

Attack rates were similar in both seasons in HFAs and NHs (Figure 6). In RHs and CCHs, the rates in 2002-03 were approximately double that of 2001-02.

In the 2001-02 season, ACHs had the highest attack rate followed by NHs. CCHs had the lowest rate.

In the 2002-03 season, the institutional attack rate was highest for RHs, followed by NHs and CCHs. HFAs had the lowest attack rate. There were no outbreaks reported in acute care facilities.

Figure 6: Institutional Attack Rates among Residents by Institution Type



Discussion

Based on the 2001-02 and 2002-03 seasons, the number of respiratory infection outbreaks reported in institutions was lower for 2002-03 than 2001-02 (185 vs. 317). As expected, the greatest number of outbreaks occurred in the winter months for both surveillance seasons; however, reporting periods only spanned from October to April. During this period (2001-02 and 2002/03 surveillance seasons) influenza type A viruses were identifed as a major contributor of outbreaks in institutions.

In both surveillance seasons, NHs represented the majority of institutional settings where outbreaks occurred. This is not surprising, as NHs and HFAs are required to report outbreaks, while RHs are not; the latter do so on a voluntary basis. As such, outbreaks may be underreported in RHs. Another possible explanation is that residents living in NHs may be in poorer health than those living in RHs.

Based on the data reported it would appear that among residents there was a significant (23%) reduction in the risk

of becoming ill in 2002-03 compared to 2001-02. Likewise, there was a reduction (although non-significant) in the relative case fatality rate of 17 percent. However, this was a non-significant result and may be a function of sample size, although this is unlikely. When comparing influenza and non-influenza outbreaks in both years, the relative CFR was higher for influenza than non-influenza outbreaks, although this result was only significant in 2001-02.

The number of outbreaks varied considerably between the two seasons. Cyclical variations due to the natural history of organisms may affect the number of outbreaks. As a result, the number of outbreaks was lower in 2002-03 than 2001-02 season; alternatively the result may be attributed to a "light" flu season experienced globally.

Concerns and Limitations

The discrepancy in the number of "unknown" causative organisms between the two seasons is a major concern regarding the data. In the 2001-02 season, 24% of reported outbreaks were caused by unknown organisms. This proportion more than doubled to 59% in the 2002-03 season. The inability to identify the causative agent may present a major challenge for those trying to treat residents/patients and control outbreaks.

While the overall percentage of missing data was small, this missing information may present challenges with respect to data analysis. For example, 2% of the data had missing information about the number of residents ill due to the outbreak or on the population at risk in the institution. When generating cumulative incidences and relative risks, outbreaks occurring in institutions with missing numerators (those residents/patients who were ill) and/or denominators (population at risk in institutions) were excluded. Despite the low level of likelihood given the small percentage of missing data, the exclusion of these institutions from the analyses could have introduced systematic biases in the estimates. Moreover, imputation would not be desirable due to the variability in the size and practice of different institutions.

With respect to reporting on the use of antiviral drugs, it was not clear whether everyone in the institution was given the same drug, or whether the drugs were used for prophylaxis, treatment, or both. For this reason antiviral drug information was not included in the analyses for this review.

Given that data for institutional outbreaks was only available for two seasons, it was not possible to determine trends based on two data points.

Summary and Conclusions

The review of the data for the two reporting seasons of institutional outbreaks indicates that:

- The risk of an institutional respiratory outbreak in 2002-03 was significantly lower than that of 2001-02.
- Based solely on reported data, outbreaks were reported more often in NHs than in ACHs, HFAs, and CCHs. Peak outbreak activity was seen in the months of March and December for the 2001-02 and 2002-03 seasons, respectively.
- Influenza A viruses were responsible for more outbreaks (proportionally and in absolute numbers) in the 2001-02 season than in 2002-03.
- Case fatality among residents for all reported respiratory illness was lower in 2002-03 than 2001-02. However, the relationship was not significant.
- The case fatality rate among residents was higher for influenza cases than for non-influenza cases (only significant for 2001-02).

Conclusions

Although reporting of respiratory infection outbreaks in institutions has only been mandatory since 2001, data from this reporting system is valuable in monitoring and comparing the frequency and consequences of outbreaks in various institutions. As more data is collected, patterns and trends of respiratory infection outbreaks in different types of institutions (or other sub-populations) may become more apparent. This type of information will be invaluable for public health staff and policy makers to plan and implement specific programs that can be targeted to high-risk populations.

List of Acronyms

ACH	Acute Care Hospital
CCH	Chronic Care Hospital
CI	Confidence Interval
Flu A	Influenza type A virus
Flu B	Influenza type B virus
HFA	Home for the Aged
NH	Nursing home
PIV	Parainfluenza viruses
RDIS	Reportable Disease Information System
RH	Retirement Home
RSV	Respiratory Syncytial Virus

Source

Minh T. Do, MSc; Sujitha Ratnasingham, MSc; Epi-Centre, Public Health Division

Reference

1. Winter A.L., Nsubuga J. Summary Report of the 2001/02 Ontario "Influenza and Respiratory Outbreak Surveillance Season" PHERO 2002; 13: 194-209.

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Process Evaluation of a Tailored Multi-faceted Intervention to Improve Respiratory Infection Control in Primary Care Settings

Introduction

In January 2004, City of Ottawa Public Health and the University of Ottawa Family Medicine departments entered into a partnership to develop and deliver a multi-faceted, short-term intervention to assess the extent to which public health nurse facilitators can help family practices incorporate respiratory infection control policies into primary care. The study occurred between January and May 2004. The study received approval from the Ottawa Hospital Research Ethics Board.

The purpose of this report is to describe the study components and the intervention. A report on the results of the intervention is pending completion of the final phase of the study in mid-May. This last phase will provide the data to assess the outcomes of the intervention and report on changes to practice respiratory infection control performance and physicians' knowledge of infection transmission and control, as well as physician satisfaction with the intervention and facilitation processes.

Background

The incidence of Severe Acute Respiratory Syndrome (SARS), the threat of pandemic influenza, and the multiple outbreaks of avian influenza worldwide highlight the need for an effective response to control the spread of respiratory infections. Patients with a cough and fever often seek medical attention from their family physician, so it is important that family physicians have the support and knowledge to implement best practices in respiratory infection control.

There are numerous guidelines on respiratory infection control. For instance, the Ministry of Health and Long-Term Care recently released the provincial guidelines on preventing respiratory illnesses in community settings.[1] However, evidence-based guidelines are not self-sustaining and programs that address physician knowledge alone are insufficient in their scope, breadth and follow-up to ensure that change has been integrated and consolidated into new and lasting patterns of behaviour.[2] In a study undertaken in Health System Organizations in Ontario, Lemelin, Hogg and Baskerville, have shown that a tailored multi-faceted outreach facilitation program, delivered by nurse facilitators, is one knowledge transfer strategy that can change physician behaviour and significantly improve preventive care performance.[3]

In the Ottawa Model of Facilitation, nurse facilitators work with family physician practices to help them change their behaviour by adapting the intervention and tailoring activities to meet the needs of each practice. Much of the work of facilitation is based on a strong and trusting relationship between the facilitator and the interdisciplinary team of the practice. By its nature, facilitation is multi-faceted. Changing the behaviour of family physicians is complex and this multi-faceted collaboration between the physician, practice staff and facilitator supports practical organizational change within the practice structure.

Study Population

The unit of study is the physician practice. During February 2004, 638 City of Ottawa family physicians from 242 practices were invited, by facsimile, to participate in the study. Physicians who did not have facsimile services were excluded from the study. Where necessary, the invitation was sent out a second time, with a follow-up telephone call from a physician recruiter. Fifty-three practices, with 143 physicians, consented to participate in the study. The practices ranged in size from 1 to 13 physicians.

Study components

The study methodology includes the following major components:

- The identification of best practices in respiratory infection control and the development of best respiratory infection control practices for a primary care setting;
- Development of a "Tool Kit";
- A pre- and post-intervention audit of practice performance on the key dimensions of good respiratory infection control;
- A pre- and post-intervention assessment of physician knowledge about infection transmission and control;
- Implementation of outreach facilitation intervention in primary care practices; and
- Process and outcome evaluations of the intervention.

Best Practices in Respiratory Infection Control

An expert advisory committee developed respiratory infection control guidelines for a primary care setting. The committee, comprised of an infection control specialist, the Associate Medical Officer of Health, two family physicians and a librarian, selected and reviewed the most current, reliable and best quality evidence found through a search of the Cochrane Library database, medical literature databases, and Canadian and international government-

sponsored public health websites. Based on their review, the committee concluded that the waiting room was the best place to stop the spread of respiratory infections. The following are the most important respiratory control practice policies for a primary care setting:

- Signage, outlining respiratory infection control guidelines for patients, in and about the waiting room;
- Patients with a cough or fever given, or instructed to wear fluid resistant face masks, by the receptionist;
- Patients with a cough or fever instructed to sanitize their hands with alcohol gel; and
- Patients with a cough or fever instructed to sit one metre from others.

Development of a "Tool Kit"

Based on the guidelines developed by the expert committee, a Tool Kit was developed to help family practices implement respiratory infection control strategies.

The Tool Kit contained:

- Signs outlining respiratory infection control guidelines for patients, demonstrating proper use of hand sanitization gel and proper hand-washing techniques;
- A reference list of major guideline sources and major disease control web sites;
- Four infection control articles; and
- A box containing fluid resistant face masks, wall-mounted alcohol gel dispensers with refills, alcohol gel pumps, hospital grade disinfectant wipes, and order forms for additional supplies. (All gel used was Purrell Hand Sanitizer 62% ethyl alcohol.)

Audit of Practices

The study uses a pre/post observational and self-report design to collect data to assess the outcomes and impacts of the intervention.

Using observation and self-report, independent auditors collected baseline data on the respiratory infection control performance for each practice. The auditors observed practice performance for the four preventive measures considered most important for a primary care setting: i.e. signage, and patients with cough or fever given masks or instructed to wear them, patients instructed to sanitize their hands with alcohol gel, and instructed to sit one metre from others.

Auditors also collected self-reported, or observational data, on the following additional preventive measures:

- Availability of masks in the waiting area;
- Availability of alcohol gel dispensers in the office, and frequency of use; and,
- The use of disinfectant wipes to clean contaminated areas, and frequency of use.

This audit is being repeated in mid-May, six weeks after the intervention. A comparison of audit results before and after the intervention will enable the investigators to assess the impact of the intervention on respiratory infection control in the practices.

Knowledge Assessment

Physician knowledge about infection transmission and control is also being assessed before and after the intervention. To obtain baseline data on physician knowledge about infection transmission and control, as well as basic demographic information and information on the scope of their practice, the auditors asked participating physicians to complete a pre-intervention knowledge questionnaire. The questionnaire was subsequently collected by the facilitators during their first visit to the practice. The knowledge component of the questionnaire is being repeated post intervention. A comparison of pre- and post-intervention results will enable the investigators to assess if the intervention had an impact on physician knowledge about infection transmission and control.

Recruitment and Training of Facilitators

The intervention employed five Public Health Nurses as facilitators. The nurses were seconded by City of Ottawa, Public Health. In selecting the nurse facilitators, preference was given to nurses with experience and additional training in infectious diseases and education.

Before being assigned to the intervention practices, the Public Health Nurses completed two weeks of intensive training. The objective of the training was to: equip the nurses with the knowledge and skills to work with family physicians and their staff; promote best practices in respiratory infection control; and, to incorporate best practices into the primary-care setting. The training covered models of change theory, principles of organizational behaviour, group behaviour, motivational strategies, communication skills, and evidence-based best practices in respiratory infection control. The training also included sessions from an infection control expert and a family practitioner. The nurse facilitators had an opportunity to apply their newly-acquired skills and knowledge through role playing, and by providing constructive audit feedback and the Tool Kit to three pilot settings.

The Intervention

The intervention itself occurred over a five-week period during February and March 2004. The 53 practices were assigned to the Public Health Nurse facilitators according to practice size and location. The facilitators set up appointments for visits and worked independently with family physicians and office staff in their assigned practices to incorporate the evidence-based best practices into the family practice setting. Throughout the intervention, the facilitators corresponded with the project team daily and attended scheduled weekly meetings to share information and strategies. The trainer was available to mentor the facilitators, respond to their questions, and serve as the interface between the facilitators and the infection control specialist.

The intervention involved a multi-faceted approach to put evidence into action by focusing on the educational, attitudinal and organizational barriers to change, and then tailoring interventions to meet the needs of the practice. The facilitators offered two intervention strategies designed to change practice behaviour and improve respiratory infection control performance: audit and on-going feedback, and planning and consensus building.

During the first visit from their facilitator, the practice received feedback on their infection control performance based on the respiratory infection control practices observed by, or reported to the auditors, during the pre-intervention audit. This feedback increased awareness of the guidelines, stimulated discussion, and set the stage for disseminating and implementing the respiratory infection control policies in the practice. Also, during the first visit, the facilitator explained the project, provided the practice with the Tool Kit, explained the evidence-based best practices, set goals and desirable levels of respiratory infection control performance, and facilitated meetings to gain consensus on implementing infection control strategies. This first meeting was usually attended by the practice physician(s) and office staff. Subsequent visits tended to be with the nurses and receptionists.

The facilitators collaborated with the physicians and office staff, and provided support and practical strategies, tailored to meet the needs and unique characteristics of the practices, and improve the containment of droplet respiratory infections. Consequently, activities associated with subsequent visits to implement the strategies varied with the practice. The activities could include reinforcing the respiratory infection control guidelines; assisting the practice in setting goals and desirable levels of performance; facilitating decision-making on strategies to implement the infection control measures, such as determining where to put the signage and alcohol gel dispensers; adapting tools and strategies to implement the plan; facilitating meetings to assess progress and modify plans; responding to additional requests for infection control information; and, providing feedback on performance changes.

Since a key component of facilitation is to tailor the intervention to meet the needs of the practice, we adjusted the intervention at the request of the practices. The following are a few examples of adjustments made to the intervention:

- Signage in the Tool Kit was provided in English, but was subsequently translated into French and Spanish. Facilitators also received requests for translation to Chinese, Arabic and Somali. However, the short time frame for the intervention did not allow enough time to translate the materials into these languages.
- Facilitators adjusted the location and installation of the alcohol gel dispensers to meet the needs of the practices. One practice was unwilling to install wall-mounted dispensers, but agreed to use table-top dispensers.
- For some practices, the “one metre rule” was removed from the signage because waiting room logistics did not permit the practices to comply with this infection control policy.

Evaluation

The study design includes an outcome and a process evaluation. The outcome evaluation will report on the outcomes and impacts of the intervention. The results of the pre- and post-intervention audit and physician knowledge questionnaires will be used to assess changes to respiratory infection control in the practices, and physician knowledge about infection transmission and control. The investigator will also administer a physician satisfaction questionnaire to obtain participating physicians’ input on the aspects of the intervention that they found most useful.

As the primary outcome measure an improvement of 15% or more in the proportion of practices, that implement any of the four key preventive measures, would be a significant change from a public health perspective. Clinically, improvement in any one area is likely to reduce transmission. However, effective respiratory control requires that practices have policies in place to support all these activities. Therefore, the proportion of practices that implemented any or all four preventive measures will be reported, as will, the proportion of practices that

were observed, or self-reported, to implement the additional preventive policies: masks in the waiting area, the use of alcohol gel dispensers and the use of disinfectant wipes.

The process evaluation will allow reporting on the intervention activities, to assess the extent to which the intervention was implemented as intended, and to gain insight into how facilitation works to improve respiratory infection control in a family practice setting. For the process evaluation, data was collected on the time, resources and activities involved in delivering intervention components, the scope of the intervention, and feedback from facilitators on their facilitation and intervention experience.

To collect data for the process evaluation, facilitators were asked to record their intervention activities and progress on two structured forms: the Narrative Report and Activity Log. Facilitators completed a Narrative Report after each visit. They recorded the activities undertaken and the outcome of each visit, the type and number of participants at the meetings, and a plan for the next visit. Facilitators were also asked to identify the factors that they felt facilitated or impeded efforts to improve respiratory infection control in the practices. The data collected from the Narrative Reports by intervention component will be analyzed to obtain an overview of intervention activities within practices, and to identify common themes across practices about which elements worked well and which did not.

Facilitators were also asked to maintain an ongoing Activity Log to record the time spent on on-site and off-site activities. On-site activities included audit and ongoing feedback, planning, and consensus building. Off-site activities included administrative activities such as meetings, photocopying, writing reports and travel time. The data from the Activity Logs will be used to calculate the time spent on the on-site intervention components, travel, and administration.

A Facilitator course evaluation and Post-Intervention Questionnaires will give the investigators data on facilitators' satisfaction with their training and facilitation experience. Close-ended questions measure overall satisfaction with the various components of the training and intervention. Open-ended questions solicit additional feedback on both the training and facilitation experience.

Acknowledgements

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Use of a Web-based Survey as a Data Collection Strategy in Public Health

Introduction

Increasingly, health units are conducting population-based campaigns and there is an expectation that such investments will be evaluated to determine if desired outcomes are being realized. This expectation is coupled with a reality of limited resources, both financial and human. Using technology such as web-based surveys to facilitate data collection offers new possibilities in the conduct of such evaluations.

This article describes experiences and lessons learned from using a web-based survey to evaluate a media campaign designed to educate and raise awareness about the risks of binge drinking. The campaign targeted 19-24 year olds in post-secondary institutions and was conducted in southwest and central west Ontario in the fall of 2000. In addition to the web-based survey, the evaluation included three other components: tracking the distribution of campaign materials, focus groups with 19-24 year olds, and a survey of representatives from the 16 participating health units. A description of the media campaign and evaluation results were published in PHERO[1] and the full report [2] can be found at www.healthunit.com (see "Reports").

Background

The use of web-based surveys is gaining popularity, especially in business, yet is relatively new in public health. Web-based surveys offer multiple benefits, as well as unique challenges.

Research regarding the use of web-based surveys is an emerging field and many questions remain unanswered. Indeed, electronic surveys are considered to be at the stage where mail and telephone surveys were twenty-five years ago. Now the latter are considered standard practice for conducting surveys. Hence, it is likely that in the next few years there will be significant advancements and refinements in using electronic surveys.

Dillman[3] concluded that access to the Internet is generally growing, and others[4] have noted that although access has traditionally been associated with males, higher income and education, the gender gap seems to be narrowing. This bodes well for using this technology for evaluating population-based initiatives.

Schonlau, Fricker and Elliott[5] suggest that web-based surveys may be preferable to mail or telephone surveys when the following conditions exist:

- the survey can be conducted with a convenience sample;
- a current directory of accurate e-mail addresses for the target population exists;
- the target population represents a small segment of the total population;
- the sample size is relatively large;
- the survey questions address potentially sensitive issues and include many key open-ended questions; and
- multimedia components or interactive elements are warranted.

Some of the principles for developing surveys are common, despite the medium. However, there are some unique features that must be addressed when using electronic data collection. Dillman[3] has articulated a series of principles to be considered when developing web-based surveys including the following:

- introduce the questionnaire with an inviting welcome screen with sufficient instructions for next steps;
- keep the design simple and clear, using a format that is consistent with paper surveys;
- avoid the use of complex graphics and computer programming to enhance visual appeal; and
- include a percentage completion bar at the top of each section to allow participants to see their progress in completing the survey.

Similarly, Schonlau and colleagues[6] have identified a number of recommendations including:

- list only a few questions per screen to avoid unnecessary scrolling;
- ask only essential questions and delete questions that are unnecessary, i.e. questions that the computer can answer such as the date the survey was completed;
- use graphics sparingly to lessen the time required to download the survey and to lower the likelihood of computer crashes;
- reduce response errors by restricting response choices;
- ensure the protection of respondents' privacy and perception of privacy;
- include some measure to reflect the degree of survey completion;
- offer respondents an incentive to complete the survey;
- provide opportunities for respondents to report problems;
- thoroughly pre-test to ensure that the survey is compatible with different platforms, various hardware configurations and different browsers including different versions and connecting speeds; and

- stagger the e-mail invitations to ensure that the server is accessible and not overloaded if large numbers are contacted by e-mail.

Technology offers survey designers the option of using many sophisticated features such as colour, animation, automated skip patterns, validation of input, time tracking for individual questions as well as determining response times to complete the entire survey. Such features can be attractive to evaluators and can be incorporated relatively easily. Even more appealing is that these items can be accomplished at minimal cost. However, this is an example where "more is not always better." Increasing the sophistication requires greater computer memory and can make it impossible for some computers to access, while for others the final product may appear different than originally designed. Dillman[7] cites a case study where respondents were randomly assigned to either a "plain" version of a web-based questionnaire, while others were given a "fancy" version. Respondents using the "plain" version completed a statistically significant greater number of pages, more write-in boxes and were more likely to finish the survey than those using the "fancy" version. Furthermore, it required significantly less time to complete the "plain" version. Dillman concluded that programming requiring greater computer memory should be restricted.

One of the common themes in the literature is that web-based surveys are faster, cheaper and better.[8, 9,10] Yet Schonlau and colleagues[11] caution that such claims are often exaggerated and indicate that some qualifiers are needed. There are cost savings if respondents can be contacted by e-mail, thus avoiding expensive mailing costs. Indeed, the cost for coding and data entry is minimal, when using web-based surveys since the data are captured electronically. This cost saving needs to be balanced with the cost of developing the web-based survey and dealing with technical problems, which can be expensive, especially if the research team has minimal expertise with the technology.

Other advantages of electronic surveys include a perception of increased confidentiality and anonymity. Respondents tend to give more honest, less socially desirable answers and are more likely to give more detailed responses to open-ended questions in comparison to paper questionnaires.[3, 12]

Some of the challenges such as obtaining a probability (i.e. random) sample when an e-mail sampling frame does not exist, are just as difficult as when a mail or telephone survey is being undertaken. A potential disadvantage with web-based surveys is the expected response rate. Evidence collected to date indicates that there seems to be a broad range of response rates. A summary of studies comparing e-mail surveys with other survey methods, found that response rates for e-mail surveys varied between 6% and 73% and were considerably lower than mail surveys.[13] Schonlau, Fricker and Elliott[14] concluded that "surveys using a mail response mode and surveys using both mail and Web response mode tend to have higher response rates than those using just an e-mail or web response mode... Response rates ranged from 7 to 44 percent for web surveys."

Description of Web-based Evaluation Component

Our web-based survey was developed to estimate the proportion of 19-24 year olds exposed to an anti-binge drinking media campaign launched by the Substance Abuse Prevention Network of Central West and Southwest Ontario (Network). The survey also measured knowledge and attitudes towards binge drinking and was used to recruit participants for focus groups. The technology offered respondents an opportunity to view the campaign postcard and poster on-line. The survey included a question about media messages related to a non-existent drug (CPSP) to assess social desirability bias. Demographic data and feedback on campaign materials were also solicited. The Research Ethics Boards of McMaster University and The University of Western Ontario approved the project. Network members and a research team from the Middlesex-London and Hamilton Public Health Research Education and Development (PHRED) Programs conducted the evaluation.

Decision Points

Early in the project, a number of data collection strategies such as telephone or face-to-face interviews were explored and dismissed due to cost and the human resources required to administer them. Following further dialogue and a review of the literature, a decision was made to use a web-based survey. Given the short time line for this phase of the project, on-line data collection was anticipated to be more economical and an efficient method of collecting a large amount of data, across a wide geographical area. Other benefits included not having to dedicate resources for data entry, reduced data entry errors and an expectation that respondents would give less socially desirable responses and more detailed responses to the open ended questions. Furthermore, it was felt that a web-based survey was especially suitable for this target population because young adults are generally familiar with and have access to computer and Internet technology.

The survey was developed following the principles cited above for designing web questionnaires as outlined by Dillman[3]. Such principles were important to increase the response rate by ensuring compatibility across computers, thereby decreasing the likelihood of computer crashes and premature termination. The Health Intelligence Unit,

Southwest Region Health Information Partnership (SRHIP), provided the technical support to design and launch the survey on the Internet. Other more costly alternatives, such as hiring an Internet survey company and purchasing Internet survey software, were investigated and deemed not feasible.

The survey was pilot-tested with 5 young adults who reviewed the print version and 14 who reviewed the on-line version of the survey. Following the pilot testing, sample images of the campaign materials were added, the e-mail invitation was revised to catch the participants' attention, an explanation of the requirement for postal code information was added, and some technical problems were resolved. The final questionnaire included 9 topic and 4 demographic questions.

Site Recruitment

The PHRED Research Team attempted to recruit 15 post-secondary institutions located in the southwest and central west Ontario public health planning regions to participate in the evaluation. Only four institutions, three universities and one college, agreed to participate. The main reason cited for institutions not participating was that they did not allow mass mailing of external e-mails. One institution did not participate because students did not have e-mail access. Four institutions did not return calls to the PHRED Research Team.

A common concern expressed by the education administrators was sharing student information. As a result, institutions were asked to send out a one-time e-mail invitation, as opposed to sharing student e-mail addresses with the research team. It is estimated that across the four sites 31,599 e-mail invitations were sent to 19-24 year olds with active e-mail accounts. Two weeks after the fall media campaign, the e-mail invitation was sent to all participating university undergraduate students and full-time college students.

Participant Recruitment

The e-mail invitation sent by the educational institution outlined the purpose of the study, contained the web site address (URL) and a password to access the web-based survey. Since the institutions were sending out the e-mail, it was necessary to take proactive steps to discourage multiple responses from a single respondent. Hence a password was provided to give the illusion that the e-mail had been personalized. Furthermore, the server would not receive a survey response from the same computer within 15 minutes of a previous response. Multiple responses from a single respondent are not unique to web surveys as respondents can complete more than one paper survey if they choose or complete additional surveys on behalf of others. Fischbacher, Chappel, Edwards and Summerton[15] suggest that there is anecdotal evidence that Internet surveys are particularly prone to falsification.

Potential respondents were informed that participation was voluntary, they could refuse to answer any questions and they were assured that their individual answers would not be shared with their educational institution. This initial e-mail invitation also indicated that the survey required five minutes to complete and that respondents could win one of ten $50.00 gift certificates to their campus bookstore. An e-mail address and telephone number were provided for participants to contact a member of the research team if they had questions or difficulties accessing the web survey. A voice mailbox was established to handle telephone queries. Participants were also given the option of printing the survey and returning it to the evaluation team by fax or mail. Potential participants were given two weeks to respond to the survey.

Our Experiences

From a survey perspective, having the institution send out the e-mail and not being able to send out individual e-mail invitations as suggested by Dillman[3] was less than ideal. As a result, the exact denominator was not known and an estimate was calculated to determine the response rate. The denominator estimate was based on the number of e-mails sent out by the institution, and the number of students 19-24 years of age at each institution, which was calculated from information provided by the institution. Our overall response rate was estimated at 12%. Although this rate may appear somewhat low it is consistent with the literature.[14] Nonetheless, a total of 4,094 responses were received. After excluding those respondents who were not in the 19-24 age group, 3,767 respondents remained. A majority of the respondents were female (63%) and 72% of respondents were 19, 20 or 21 years of age.

There were some technical problems where some respondents could not complete the survey on-line. Although attempts were made to address the problem, a diagnosis could not always be made. It was estimated that a maximum of 222 respondents were potentially lost. However, it is possible that the actual number was much lower. Nonetheless, this experience highlights the importance of ensuring survey compatibility with older and less powerful computers and different web browsers. Furthermore, the survey needs to offer sufficient coaching for less experienced users so that they do not become frustrated with the technology, while at the same time not annoying expert users by providing tedious instructions.

Most responses to the survey came back in the first week after the e-mail invitation was sent out with the majority returned within the first three days. In assessing the risks of collecting data electronically, the research team was cognizant of the need to offer respondents confidentiality

and anonymity. However, almost 90% of participants entered their names into the draw for the $50.00 gift certificate and over 1,000 participants gave permission to be contacted for a follow-up focus group. No survey responses were received by mail or fax.

One of the interesting aspects of the survey was the control question. Respondents were asked if they had seen or heard media messages about the dangers of a fictitious drug called CPSP. Only 2.3% of the respondents answered "Yes" to the control question, in comparison to other studies where 49% of women under-reported their energy intake by 21%,[16] and 30.7% of a sample of young men reported falsely about illicit drug use.[17] Therefore, it was felt that the respondents were truthful in their responses to the remainder of our awareness questions.

Discussion

This project offered an innovative way to conduct an evaluation of a population-based campaign with a population that can be challenging to access. Collaborating with SRHIP on the implementation of the survey enhanced our capacity and provided needed technical expertise. Using the Internet survey offered many advantages. It allowed us to increase our sample with minimal cost, to collect and analyze the data in a relatively short period of time and to minimize data entry errors. Furthermore, substantially fewer resources were required in comparison to other alternative data collection methods, such as mail or telephone surveys. The web-based survey was a viable option and provided the research team with access to a population that is generally computer literate. Computer literacy is an important factor in determining whether web-based surveys are the method of choice for particular populations.

The literature offered useful guidance for developing the web-based survey. This was especially important to the project team, who had minimal expertise and experience in using technology in this capacity. Introducing protocols to minimize the likelihood of multiple responses from the same individual strengthened the survey design. Critical developmental steps included allowing sufficient time to pilot the survey with users that fit the demographic profile of the survey population and making the revisions following the pilot. The incentive of offering a chance to win a limited number of gift certificates did achieve a favourable response. The web-based survey also expedited the process of recruiting focus group participants across a large geographical area. This recruitment strategy represented a substantial cost saving and required considerably less time than more traditional strategies.

Response to the social desirability question was intriguing. Our findings support the observation noted in the literature that respondents are likely to be more honest and to provide more extensive answers to web-based surveys than other types of surveys.[3, 12] Using web-based surveys to gather data about potentially sensitive topics is worthy of further investigation.

Gaining access to the students by e-mail was challenging. It was helpful to first initiate contact with Campus Administration when recruiting participating sites. At the time the survey was conducted (Fall 2000), many institutions were developing policies about sending out mass e-mails. The Information Technology Departments were inclined to say no, but because permission had been granted by the administration, the project was allowed to proceed. With the increased concerns about SPAM and mass e-mails, it would be interesting to see if a similar type of survey would be possible today. It is our feeling that site recruitment in this manner may become harder as organizations become increasingly concerned about security and superfluous e-mail. Web-surveys may prove most useful with organizations that are willing to share a current e-mail mailing list with researchers.

It was less than ideal that the researchers did not have access to accurate e-mail lists. This precluded sending reminder notices and following a protocol developed by Dillman[3] that has been shown to increase response rates. The response rate is a concern as it limits the generalizability of the findings. It is recognized that this web-survey used a convenience sample with only four of the 15 post-secondary institutions in the southwest and central west regions and indeed some eligible students may not have received the one-time e-mail invitation. Furthermore, despite the large sample size, there is no way of knowing how representative this group is of the target population. Nonetheless, it would have been challenging to economically conduct a mail or phone survey of this nature and get almost 4,000 respondents.

Summary

These experiences were encouraging to the research team and Network members. Using the web-based survey allowed relatively quick access to a large sample across a wide geographic area. The majority of the responses were returned within one week and the findings provided data to assist program managers and front line staff in making informed program decisions. Furthermore, the findings regarding reduced socially desirable responses are noteworthy and highlight the possible benefits of using web-based surveys to collect data, especially when the questions address personal and potentially socially unacceptable behaviours. Many lessons were learned. Designing the survey required additional care to ensure that it was "computer friendly" and ongoing technical support and expertise achieved through partnership with SRHIP were critical factors to the project's success. Similarly, piloting the survey was an especially important step.

Despite the limitations of the convenience sample and the response rate, collecting data by means of a web-based survey offers many advantages to public health units. This is an area that requires ongoing research and further development.

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Central West Breast Screening Education Campaign

Background and Rationale

The Ontario Breast Screening Program (OBSP) and Public Health share a common goal in addressing the burden of breast cancer in Ontario. Both agencies seek to increase to 70% the proportion of women aged 50-69 who receive breast screening through the OBSP by the year 2010.[1,2]

Central West Cancer Prevention and Early Detection Network (CW CPEDN) planned and implemented a regional education campaign to increase awareness about the importance of organized breast screening programs. This collaboration ensured a consistent message across the region and allowed for the optimal use of human and financial resources.

The campaign, entitled Central West Breast Screening Education Campaign, had the following objectives:

- To increase awareness among women aged 50 and older of the benefits of breast screening at the OBSP;
- To enable women aged 50 and over to seek screening by increasing their knowledge of available OBSP services;
- To increase positive support among significant others (e.g., family and friends) to attend the OBSP;
- To increase awareness and support among key opinion leaders (e.g., workplace contacts) for breast screening through the OBSP; and
- To raise awareness of the benefits of screening and support for accessible OBSP sites in the community.

Methodology

The Health Communication Unit at the University of Toronto (THCU) has a 12-step health communication process that served as a guide through all stages of campaign planning, implementation and evaluation. Women aged 50 and over, who had never been screened, were identified as the primary population of interest. Partners of women and key workplace contacts were secondary targets. The workplace was chosen as the primary communication channel, building on pre-existing relationships between Health Units and workplaces. The secondary channel of communication was media, which reached the community at large.

Budget

In June 2002, a funding proposal was written and submitted to the Central West Cancer Care Ontario Region (CCOR) Early Detection and Prevention Network and $15,000 was granted in September 2002. The campaign planning committee membership also contributed a range of funds for enhancement of the regional campaign at local levels, totalling approximately $10,000. In kind, contributions added significantly to the commitment and success of this campaign, which involved close to 1,300 staff hours. The actual cost of the campaign is estimated at approximately $56,000.

Message Development and Implementation

Message development was a key component of the campaign and was considered early in the planning process. A number of groups and/or organizations assisted in this very important developmental phase. In April 2002, a workshop conducted by THCU focused on: (i) primary audience analysis, e.g., demographics, behavioural characteristics, and psychographics; (ii) determining channels and vehicles; and (iii) message development.

After this initial consultation work was completed, key messages and multiple strategies were developed to meet campaign objectives. The campaign's key messages were:

- "Take time for Breast Screening."
- "Finding breast cancer early could save your life."
- "At the OBSP we do more than squeeze you in."

A poster was designed, evaluated through focus testing, and distributed to workplace contacts, in conjunction with a comprehensive resource kit. The kit included: promotional nail file, suggested workplace activities, sample breast health pamphlets, sample payroll insert, sample workplace newsletter, breast health quiz (including answers), breast cancer backgrounder and additional resource order form.

The resource kit was either sent automatically to area workplaces with an opportunity to order additional resources or a letter was faxed with an opportunity to order the kit and resources. Each resource kit contained an evaluation form and incentives were offered to workplace contacts for returning these evaluations.

Radio and newspaper advertisements with the key messages were also created. Radio ads were aired on three major stations having a regional reach. Individual health units with additional funds could pay to air the ads on their local stations and print advertisements in local newspapers. The same posters and pamphlets used in workplace packages were distributed throughout the branches of 3 large banks, community agencies and

businesses. Family physicians also received written notification about the campaign.

Evaluation Methods

A consultant from the Public Health Research, Education and Development program (PHRED) guided the evaluation process.

Formative evaluation: Three focus groups, with membership reflecting the diversity of the region, were held to assess the campaign poster. Recommendations were made, and the final poster reflected these changes in message, graphics and design.

The process evaluation included: (i) a tracking form to log the distribution and types of resources; (ii) a survey questionnaire for the workplace key contacts; (iii) an evaluation survey for attendees at workplace presentations; and (iv) focus groups conducted with selected workplaces where campaign resources were used.

Summative evaluation measured both first contacts and initial screenings by recruitment method at OBSP during and after the campaign. First contact refers to clients when they first call to book their appointments and initial screening refers to clients when they actually come in for their appointments.

Results

Tracking Forms

Of the 525 workplaces that received packages, 204 (39%) requested additional materials. Total distribution of resources included 10,755 OBSP pamphlets, 4,918 mammogram pamphlets, 1,242 campaign posters and 5,916 nail files.

Workplace Contact Evaluation

There were 152 completed and usable evaluation surveys returned (29% response rate). Response rates for returned surveys ranged across the Health Units from 12% to 55%. Eighty-six percent of the responding workplace contacts (n=131) reported they used the package and they rated the package either excellent (39%) or good (62%). The information was identified as new for 74% of the respondents.

Presentations Evaluation

There were 27 presentations given by Public Health staff across all seven Health Units. A total of 137 evaluations were collected. Seventy-two percent of respondents (n=99) saw the poster, and of those, 29% (n=29) said it made them think about calling the OBSP. Given that only 47 were within the eligible age range, 29% (n=29) is not a surprising response. Of the 42 women who responded to being asked whether they would call in the next year to make an appointment with OBSP, 45% (n=19) said they would. Eight said they would call in the next 1-2 years.

Post-Campaign Focus Groups in the Workplace

Three focus groups were conducted in three different participating workplaces across the Central West region. The majority of the women were between 50-54 years (55%, n=30). The poster had the highest recall among focus group participants. None of the women interviewed reported hearing the two radio ads, or seeing the newspaper advertisement.

First Contacts by Recruitment Method at OBSP Centres (October 1, 2002 – February 28, 2003)

A total of 144 First Contacts were likely attributable to the campaign. The newspaper was the most frequently chosen recruitment option (98 responses, or 70% of responses), with Workplace Campaign next (30 responses, or 20% of responses). TV, Radio and Unspecified Media were chosen less frequently.

Initial Screenings by Recruitment Method at OBSP Centres (October 1, 2002 - February 28, 2003)

There were a total of 130 Initial Screens that were likely attributable to the campaign.

Table 1 presents First Contacts and Initial Screenings at OBSP Centers in Central West from October 1, 2002 through February 28, 2003.

Key Learnings and Recommendations

- A comprehensive framework such as The Health Communication Unit's 12-step process is an extremely valuable tool for planning and implementing communication campaigns.
- Collaboration with Health Units, OBSP and PHRED enhanced all aspects of the campaign (i.e. message consistency, sharing of resources, networking). Involving other appropriate consulting bodies should also be considered.
- Planning should start early allowing for the impact of competing campaigns and time for delays. Project timelines should be reveiwed regularly.
- Use of multiple strategies and channels is more effective in meeting needs of all partners.
- The value of message development and focus testing materials under development should not be underestimated. Formative evaluation will provide a rationale in making campaign decisions as the process evolves.
- Sustainable promotional resources are both cost effective and popular with women. Nail files and posters incorporated local service information for easy access. Time and finances should be budgeted accordingly.

Table 1. First Contacts and Initial Screenings at OBSP Centres in Central West (October 1, 2002 to February 28, 2003)

Centre	Newspaper		Radio		TV		Unspecified media		Workplace campaign		Totals	
	FC	IS	FC	IS	FC	IS	FC	IS	FC	IS	FC	IS
Hamilton	10	10			0	1			5	5	15	16
St. Josephs Hamilton	5	8			6	7	0	1	1	1	12	17
Cambridge Memorial	11	10									11	10
Cambridge RDS	3	3	1	1			2	3	2	1	8	8
KW - Grand River Hospital	4	4							1	1	5	5
KW RDS	12	10									12	10
Guelph	2	2							2	2	4	4
Burlington	9	6									9	6
Georgetown	3	2									3	2
Norfolk	15	13			1	3	2	2	5	2	23	20
Niagara Falls	5	4	1	1	2	1			5	3	13	9
St. Catharines	7	4			1	1			5	4	13	9
Welland	12	11							4	3	16	14
All Centres	98	87	2	2	10	13	4	6	30	22	144	130

* FC = First Contact
** IS = Initial Screen

- Establishing or enhancing relationships with workplaces provides a basis for future activities.

Acknowledgements

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Sources and Contacts

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References

1. Ontario Ministry of Health, Public Health Branch. Mandatory Health Programs and Services Guidelines, December 1997.

2. Cancer Care Ontario (2002). Ontario Breast Screening Program Annual Report 2001/2002. p.2.

Statistics

Previously, the Summary of Reportable Diseases in PHERO used a five-Health Region grouping of the 37 Public Health Units. The regions were: Northern, Eastern, Central East, Central West, and Southwest.

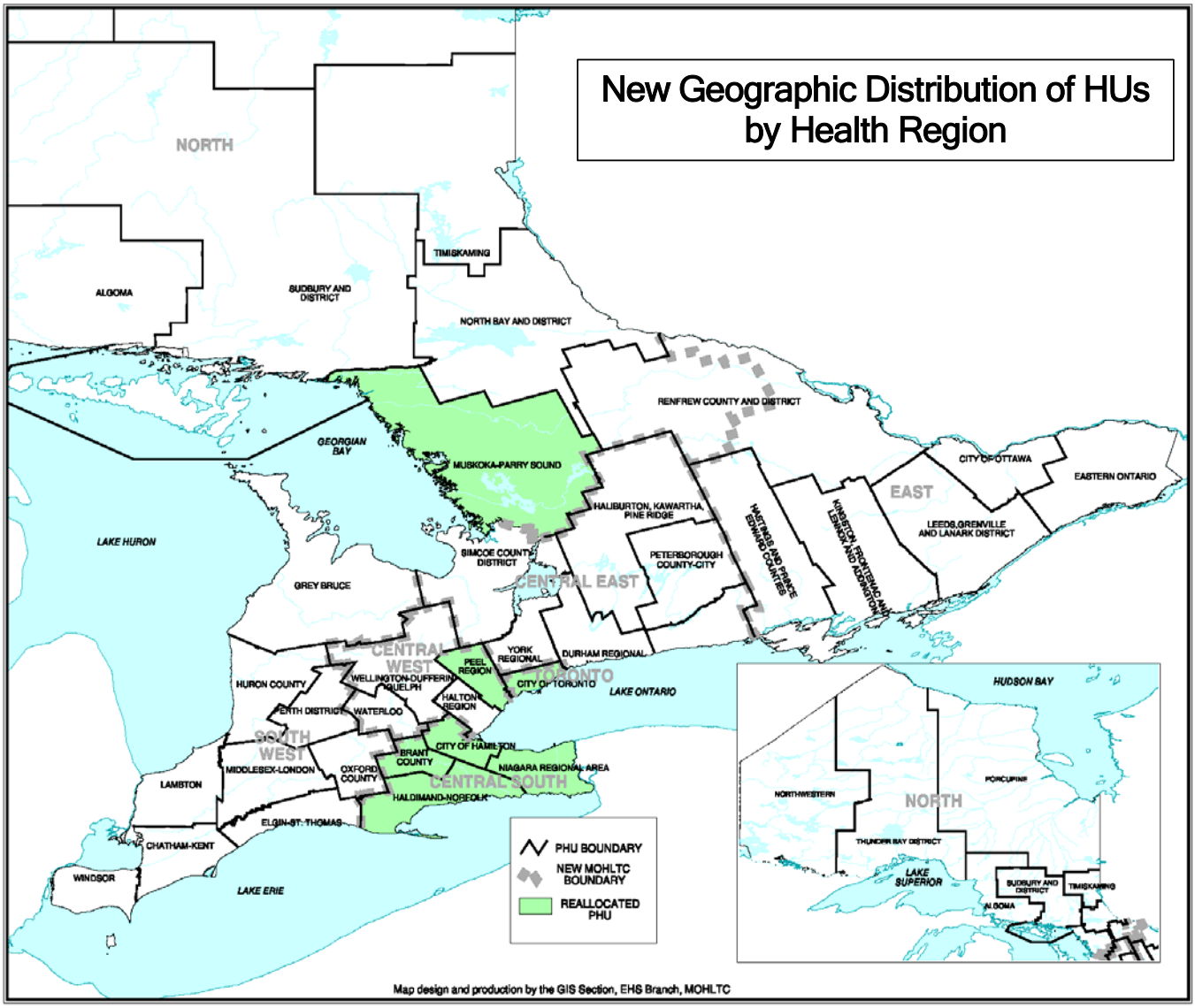
Presently, the Ministry of Health and Long-Term Care uses a seven-Region structure: Northern, Eastern, Central East, Toronto, Central West, Central South, and Southwest.

From this point forward, the Summary of Reportable Diseases will group the Public Health Units according to this seven-region structure.

To achieve greater accuracy when calculating rates based on population data, population projections for 2003 are now taking the place of 2001 estimates.

As shown in the map below, the Health Units that are now grouped in different Health Regions are:

Health Unit	Old Region	New Region
Muskoka-Parry Sound	Central East	Northern
Toronto	Central East	Toronto
Peel	Central East	Central West
Hamilton	Central West	Central South
Niagara	Central West	Central South
Haldimand-Norfolk	Central West	Central South
Brant	Central West	Central South



Summary of Reportable Diseases in Ontario - 1st Quarter, 2004

Health Units by Region	Population Projections 2003	AIDS	Campylo.	Chicken-pox	Chlamydia	Enceph./ Meningitis	GAS	Gonorrhea	Hepatitis A	Hepatitis B	Hepatitis C	Hib
Northern Region	**864,731**	**3**	**24**	**515**	**442**	**6**	**14**	**33**	**2**	**9**	**113**	
Algoma	119,929		4	40	62	1			1	2	29	
Muskoka-Parry Sound	86,383		3	22	21						14	
North Bay	94,875	1	2	268	40		1	1			7	
Northwestern	81,874			91	46		1	4		1	6	
Porcupine	89,876		3	3	42	1	1	2		1	6	
Sudbury	196,787		2	91	107	4	3	7	1	1	22	
Thunder Bay	159,592	2	9		107		8	18		3	27	
Timiskaming	35,415		1		17			1		1	2	
Eastern Region	**1,637,692**	**2**	**73**	**383**	**551**	**5**	**19**	**41**	**9**	**5**	**204**	
Eastern Ontario	197,370		17	15	39		1	3	1	1	11	
Hastings & Prince Ed.	160,658		4	79	58		5	1		1	8	
Kingston, Fron. & Len.	188,219		8		89		2	2	1		67	
Leeds, Gren. & Lan.	167,762	1	2		36		1			1	21	
Ottawa	823,608	1	42	263	310	5	10	34	7	2	86	
Renfrew	100,075			26	19			1			11	
Central East Region	**2,114,060**		**123**	**985**	**669**	**22**	**20**	**59**	**5**	**6**	**190**	
Durham	547,759		29	146	212	3	6	24	2		12	
Haliburton-Kawartha	170,627		9		52		1		1	1	30	
Peterborough	132,615		4	102	89		2	2			30	
Simcoe	411,024		16	479	115	7	4	12		1	61	
York	852,035		65	258	201	12	7	21	2	4	57	
Toronto Region*	**2,611,661**	**20**	**186**	**1,276**	**1,608**	**12**	**14**	**482**	**10**	**8**	**348**	**1**
North		*3*	*31*	*328*	*339*	*2*	*5*	*65*	*1*	*2*	*72*	
South		*14*	*63*	*290*	*570*	*5*	*4*	*259*	*1*	*4*	*137*	
East		*2*	*46*	*525*	*434*	*4*	*2*	*99*	*7*		*82*	
West		*1*	*46*	*133*	*265*	*1*	*3*	*59*	*1*	*2*	*57*	*1*
Central West Region	**2,260,237**	**3**	**159**	**1,256**	**855**	**25**	**12**	**116**	**16**	**3**	**173**	
Halton	413,454		21	108	80	3	2	7		1	28	
Peel	1,122,959	2	79	839	474	15	6	89	8	2	89	
Waterloo	470,022	1	41	109	207	5	2	16	7		37	
Wellington-Duff.	253,802		18	200	94	2	2	4	1		19	
Central South Region	**1,188,202**	**2**	**61**	**757**	**474**	**2**	**8**	**92**	**9**	**3**	**168**	
Brant	131,721	2	6	93	47		1	7		1	8	
Haldimand-Norfolk	109,756		8	77	28	1		5			14	
Hamilton	516,776		24	85	249		2	49	4	1	74	
Niagara	429,949		23	502	150	1	5	31	5	1	72	
Southwest Region	**1,561,717**	**3**	**90**	**471**	**596**	**15**	**13**	**67**	**8**	**7**	**126**	**1**
Grey Bruce	160,624	1	9	1	44		1	2	1		12	
Elgin-St. Thomas	86,096		5	40	18		1	1		3	5	1
Huron	61,896		6	52	12			1			2	
Chatham-Kent	110,124	1	4	10	25		1	1		1	3	
Lambton	132,664		6		26			2		2	7	
Middlesex-London	428,628		17		263	5	2	39	4	1	47	
Oxford	103,880		5		31	3		1	1		5	
Perth	77,265		9	75	15	1					4	
Windsor-Essex	400,540	1	29	293	162	6	8	20	2		41	
1st Quarter 2004	**12,238,300**	**33**	**716**	**5,643**	**5,195**	**87**	**100**	**890**	**59**	**41**	**1,322**	**2**
***** Total YTD 2004**	**-**	**33**	**716**	**5,643**	**5,195**	**87**	**100**	**890**	**59**	**41**	**1,322**	**2**
***** Total YTD 2003**	**-**	**38**	**691**	**4,350**	**4,632**	**83**	**141**	**736**	**30**	**25**	**1,447**	**1**

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** Infectious Syphilis cases include 'Primary, Secondary and Early Latent' staging effective January 1, 2003

*** Adjusted for deletions and late reports

Summary of Reportable Diseases in Ontario - 1st Quarter, 2004 (Cont'd)

Health Units by Region	Influenza	IPD	Measles	Meningo-coccal	Mumps	Pertussis	Rubella	Salmon.	Shigellosis	Syphilis Infectious**	TB	VTEC
Northern Region	**125**	**15**		**1**		**5**		**17**	**3**	**1**	**4**	**1**
Algoma	40	2						3				1
Muskoka-Parry Sound	1	1				1		3	2			
North Bay	23	1				3		2				
Northwestern	1	1						1			2	
Porcupine	6							1				
Sudbury	18	6				1		3		1	2	
Thunder Bay	16	4		1				3	1			
Timiskaming	20							1				
Eastern Region	**132**	**40**		**3**		**6**		**50**	**10**	**6**	**7**	**1**
Eastern Ontario	25	5				1		4		2		
Hastings & Prince Ed.	23							1				
Kingston, Fron. & Len.	19	9		1				5				
Leeds, Gren. & Lan.	1	8				1		3	1			
Ottawa	51	17		2		4		34	9	4	6	1
Renfrew	13	1						3			1	
Central East Region	**129**	**47**		**2**	**2**	**29**		**76**	**15**	**4**	**16**	**1**
Durham	7	12			1	9		18	3		4	
Haliburton-Kawartha	11	4		1		1		3	2			1
Peterborough	2	3				11		4	2			
Simcoe	29	14		1	1	1		2	2			
York	80	14				7		49	6	4	12	
Toronto Region*	**140**	**84**		**3**	**1**	**11**		**105**	**26**	**87**	**87**	**6**
North	*62*	*20*		*1*		*3*		*29*	*6*	*8*	*16*	*2*
South	*37*	*35*		*1*	*1*	*2*		*25*	*10*	*75*	*26*	
East	*20*	*16*		*1*		*4*		*32*	*4*	*1*	*30*	*1*
West	*21*	*13*				*2*		*19*	*6*	*3*	*15*	*3*
Central West Region	**120**	**52**		**1**	**2**	**10**		**87**	**18**	**4**	**34**	**4**
Halton	31	6				1		15	2	1	2	
Peel	55	22		1	2	6		50	9	2	28	2
Waterloo	22	19						16	1	1	2	1
Wellington-Duff.	12	5				3		6	6		2	1
Central South Region	**97**	**44**		**6**		**4**		**45**	**14**		**4**	**1**
Brant	36	5		1				8				
Haldimand-Norfolk	6	3						4	1			
Hamilton	39	19		3		1		9	5		3	
Niagara	16	17		2		3		24	8		1	1
Southwest Region	**105**	**48**		**3**		**23**		**38**	**8**	**4**	**2**	**5**
Grey Bruce	11	2		1		1		3				1
Elgin-St. Thomas	4	2		1		4		1				
Huron	6	1						2	2			1
Chatham-Kent	3	7							1	1		
Lambton	12											
Middlesex-London	54	18		1		4		10	3		2	2
Oxford	8	3				12		2		2		
Perth	5	3				1		3	1	1		1
Windsor-Essex	2	12				1		17	1			
1st Quarter 2004	**848**	**330**		**19**	**5**	**88**		**418**	**94**	**106**	**154**	**19**
***** Total YTD 2004**	**848**	**330**		**19**	**5**	**88**		**418**	**94**	**106**	**154**	**19**
***** Total YTD 2003**	**342**	**270**	**5**	**15**	**8**	**57**	**3**	**436**	**88**	**76**	**196**	**112**

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Summary of Reportable Diseases in Ontario - May, 2004

Health Units by Region	Population Projections 2003	AIDS	Campylo.	Chicken-pox	Chlamydia	Enceph./ Meningitis	GAS	Gonorrhea	Hepatitis A	Hepatitis B	Hepatitis C	Hib
Northern Region	**864,731**		**6**	**320**	**129**	**1**	**1**	**5**			**20**	
Algoma	119,929		2	15	18	1					5	
Muskoka-Parry Sound	86,383		1	69	6							
North Bay	94,875			134	13			2			3	
Northwestern	81,874			9	18							
Porcupine	89,876				10							
Sudbury	196,787		2	79	18		1				5	
Thunder Bay	159,592		1	14	33			3			7	
Timiskaming	35,415				13							
Eastern Region	**1,637,692**		**26**	**296**	**192**	**2**	**5**	**19**	**2**		**56**	
Eastern Ontario	197,370		2	2	17			2			2	
Hastings & Prince Ed.	160,658		2	59	18			1	2		1	
Kingston, Fron. & Len.	188,219		3		30						21	
Leeds, Gren. & Lan.	167,762		1		9		2				5	
Ottawa	823,608		18	235	113	2	3	16			27	
Renfrew	100,075				5							
Central East Region	**2,114,060**	**1**	**49**	**491**	**162**	**9**	**2**	**22**	**1**		**64**	**1**
Durham	547,759	1	5	182	52	1	1	9	1		14	
Haliburton-Kawartha	170,627		2		9			1			14	
Peterborough	132,615		3	48	19	2		2			9	
Simcoe	411,024		4	111	41	1	1	3			13	1
York	852,035		35	150	41	5	0	7			14	
Toronto Region*	**2,611,661**	**2**	**57**	**420**	**509**	**3**	**5**	**129**	**5**	**1**	**112**	
North			*15*	*93*	*120*	*2*	*2*	*23*	*2*		*22*	
South		*2*	*25*	*72*	*168*		*2*	*49*	*1*	*1*	*47*	
East			*10*	*218*	*146*	*1*		*33*			*28*	
West			*7*	*37*	*75*		*1*	*24*	*2*		*15*	
Central West Region	**2,260,237**	**1**	**43**	**367**	**234**	**5**	**4**	**29**	**3**	**3**	**63**	
Halton	413,454		4		10		1	3	1		12	
Peel	1,122,959		27	337	133	3	2	24	2	1	33	
Waterloo	470,022	1	5		68	1	1	2			14	
Wellington-Duff.	253,802		7	30	23	1				2	4	
Central South Region	**1,188,202**	**1**	**18**	**342**	**174**	**2**		**32**	**2**		**46**	
Brant	131,721	1		47	10			9			6	
Haldimand-Norfolk	109,756		1	18	14	1		2			2	
Hamilton	516,776		5	92	83	1		14	1		19	
Niagara	429,949		12	185	67			7	1		19	
Southwest Region	**1,561,717**		**37**	**127**	**162**	**6**	**5**	**27**	**1**		**43**	
Grey Bruce	160,624		10	3	11						4	
Elgin-St. Thomas	86,096		3	15	8	1					7	
Huron	61,896		2	32	6		1	1			1	
Chatham-Kent	110,124		1	3	18			2			5	
Lambton	132,664				8			1			3	
Middlesex-London	428,628		4		54		1	15			13	
Oxford	103,880		1		5	1	3					
Perth	77,265		6	9	10							
Windsor-Essex	400,540		10	65	42	4		8	1		10	
May 2004	**12,238,300**	**5**	**236**	**2,363**	**1,562**	**28**	**22**	**263**	**14**	**4**	**404**	**1**
***** Total YTD 2004**	**-**	**40**	**1,200**	**10,231**	**8,525**	**149**	**149**	**1,453**	**96**	**57**	**2,151**	**3**
***** Total YTD 2003**	**-**	**58**	**1,126**	**8,722**	**7,607**	**143**	**231**	**1,195**	**60**	**48**	**2,315**	**3**

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Summary of Reportable Diseases in Ontario - May, 2004 (Cont'd)

Health Units by Region	Influenza	IPD	Measles	Meningo-coccal	Mumps	Pertussis	Rubella	Salmon.	Shigellosis	Syphilis Infectious**	TB	VTEC
Northern Region		**5**				**4**		**9**		**3**	**1**	
Algoma		1						1				
Muskoka-Parry Sound		1				4				3		
North Bay								1				
Northwestern											1	
Porcupine												
Sudbury		3						3				
Thunder Bay								3				
Timiskaming								1				
Eastern Region	**1**	**12**			**2**	**4**		**22**	**2**	**2**	**2**	**1**
Eastern Ontario		4			2			4	1		1	
Hastings & Prince Ed.	1	2						1				
Kingston, Fron. & Len.		1						1				
Leeds, Gren. & Lan.								1				
Ottawa		5				4		14	1	2	1	1
Renfrew								1				
Central East Region	**2**	**16**		**1**		**22**		**46**	**3**	**4**	**4**	**4**
Durham		4				8		7				
Haliburton-Kawartha		2				0		5				
Peterborough		1		1		3		1				
Simcoe	1	4				4		8		2	1	3
York	1	5				7		25	3	2	3	1
Toronto Region*		**30**				**8**		**41**	**2**	**38**	**27**	**1**
North		*7*				*3*		*13*		*5*	*5*	
South		*11*				*2*		*10*	*1*	*28*	*7*	
East		*10*				*3*		*10*	*1*	*2*	*13*	*1*
West		*2*						*8*		*3*	*2*	
Central West Region		**5**				**6**		**39**	**1**	**1**	**13**	**7**
Halton								9			1	4
Peel		2	1			3		14	1		11	1
Waterloo		3				3		10				1
Wellington-Duff.								6		1	1	1
Central South Region		**12**				**4**		**8**	**1**	**3**	**1**	**1**
Brant						1		1		1		
Haldimand-Norfolk		1						1				
Hamilton		8						3	1	2	1	
Niagara		3				3		3				1
Southwest Region	**2**	**4**						**13**	**1**	**1**	**1**	**4**
Grey Bruce	1							4				1
Elgin-St. Thomas												
Huron	1	1										
Chatham-Kent												
Lambton												
Middlesex-London		1									1	
Oxford								3				
Perth								1	1			2
Windsor-Essex		2						5		1		1
May 2004	**5**	**84**	**1**	**1**	**2**	**48**	**0**	**178**	**10**	**50**	**49**	**18**
***** Total YTD 2004**	**866**	**536**	**5**	**23**	**15**	**172**	**2**	**772**	**132**	**189**	**253**	**47**
***** Total YTD 2003**	**450**	**458**	**5**	**25**	**10**	**118**	**5**	**704**	**128**	**160**	**310**	**162**

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