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PHISAC Holds First Meeting

The Public Health Information and Strategy Advisory Committee held it's first meeting on April 11, 2000.

Committee Purpose

In order to meet the business and information needs of the Public Health Branch and the 37 Boards of Health, it is essential that a vision and strategy be developed which provides a roadmap for the development and deployment of information, information technology and information systems.

Re-vamping the public health systems has been the topic of several Ministry/field committees throughout the late 1990's, but few significant changes have occurred. Y2K effectively put a hold on system re-development work until this spring.

With the re-organization of the systems side of the Ministry, and the arrival of John Mullin to head-up the systems area for health care programs, it is an opportune time to re-visit the information needs of the public health system in Ontario, and to build a business case to acquire resources to do the necessary systems development work.

Whatever system(s) are recommended, local, provincial and federal information needs must be considered. No decisions on types of systems have been made. Everything is on the table.

Due to the need to feed information into the Ministry's 2000-2001 Business Planning and Allocation exercise, the Public Health Branch needs to know preliminary recommendations around systems redevelopment by September 2000.

The Advisory Committee will assist in providing direction and advice to the Ministry's strategic information and information technology systems plans for public health. The Advisory Committee will report to Dr. Colin D'Cunha, Director of the Public Health Branch and Chief Medical Officer of Health.

Dr. George Pasut, Medical Officer of Health, Simcoe County is the chairman of the committee, while Bill Mindell, Director, Infectious Disease Control, York Regional Health Services, will serve as vice-chairman. The PHISAC Newsletter can be found at the following internet website: www.eagle.ca/PHB.



Descriptive Epidemiology of Enteric Disease due to Microbial Causes in Ontario: 1998

Introduction

The number of persons who experience an enteric disease annually due to bacteria and viruses is difficult to quantify. Frequently, the symptoms from these microbial agents are not severe enough to be brought to the attention of a physician. Furthermore, only a small number of these diseases are reportable under the Health Protection and Promotion Act,¹ and the diseases that are not reportable would have to have resulted in a hospital visit or death to be captured in a reporting system.

Under the Mandatory Health Programs and Services Guidelines, 2 sporadic cases of reportable diseases in Ontario are reported by health units through the Reportable Diseases Information System (RDIS) and outbreaks of enteric diseases are reportable through the outbreak module of RDIS. Hospitals report hospital separations through the Canadian Institute of Health Information (CIHI) database. Mortalities are reported through the Registrar General and these data are made available to health units in the Health Planning Systems (HELPS) mortality database.

The objective of this article is to provide descriptive epidemiological findings from the four previously mentioned data sources in order to provide a picture of bacterial and viral enteric illness for a one-year period. The specific definition of enteric illness will vary depending on the data source, however, the primary point of entry into the human body is oral, with the mode of transmission either common source (food, water) or person-to-person transmission. Some comparisons between data sources are presented. Attempts are made to present findings specific to Ontario that are not published routinely elsewhere. For routine statistics regarding various enteric diseases, the reader is referred to the *Communicable Disease Control: Summary of Reportable Diseases* report.³

Methods

The diseases considered from each database were chosen because of their potential to result in enteric illness. The primary mode of entry of these diseases is oral.

Thirteen diseases were chosen for analysis from RDIS.⁴ The diseases were amebiasis, botulism, campylobacter enteritis, cryptosporidiosis, giardiasis, hepatitis A, listeriosis, paratyphoid fever, salmonellosis, shigellosis, typhoid fever, verotoxigenic *Escherichia coli*/hemolytic uremic syndrome (VTEC/HUS), and yersiniosis. The records for these diseases were considered for analysis if the "Episode Date" was in 1998. All records reported in the RDIS outbreak module that had an "Outbreak Date Reported to the Health Unit" in 1998 were considered for analysis.⁵ Hospital separations for the 1998 fiscal year were obtained from the CIHI database.⁶ The most recent calendar year available for mortality data was from the 1996 HELPS mortality database.⁷ The latter two databases were searched for records that had an International Classification of Diseases - Ninth Edition (ICD-9) four-digit code of 1.0-9.9 and 70.0-70.1.⁸

Definitions - Reported Sporadic Diseases (RDIS Data)

The 'unknown' and 'missing' selections in RDIS variable "Source of Infection" were combined as 'unknown'. 'Other' refers to responses other than provided in the available selections. The 'inpatient' and 'outpatient' selections in variable "Hospitalized?" were combined to form the response 'yes'.

Definitions - Reported Enteric Disease Outbreaks (RDIS Outbreak Module)

An enteric outbreak is defined as the occurrence of two or more cases of enteric illness linked in terms of time, exposure to source, and most often location. The case definition for an 'institutional outbreak of gastro-enteritis' is clinical signs and symptoms compatible with and epidemiologically linked to two or more cases with similar signs and symptoms occurring in an institutionalized individual. The case definition for 'food poisoning' is clinically compatible signs and symptoms, known to be linked to food consumption, with: a) isolation of a microbial toxin, and/or pathogenic organism in vomitus, feces, or a suspected food item; or b) an epidemiological link to two or more laboratory confirmed cases of food poisoning. 'Institutional outbreaks of gastro-enteritis' and 'food poisoning' due to *Clostridium botulinum*, *Listeria monocytogenes*, verotoxin-producing *E. coli*, and infections due to *campylobacter*, *salmonella*, *shigella*, and *yersinia* are reported separately in the outbreak module under these organisms.

The mode of transmission includes selections from the RDIS variable "Outbreak Vehicles". These include 'person-to-person', 'vectorborne', 'food as a vehicle', 'water as a vehicle', 'direct contact with an animal', and 'other'. The selections in the RDIS variable "Type of Establishment" were regrouped

and the new groupings included 'health care facilities', 'day care centres', 'restaurants' (including cafes, catering premises, fast-food establishments, hotels, motels and resorts), 'private homes' and 'other' (including unknown responses).

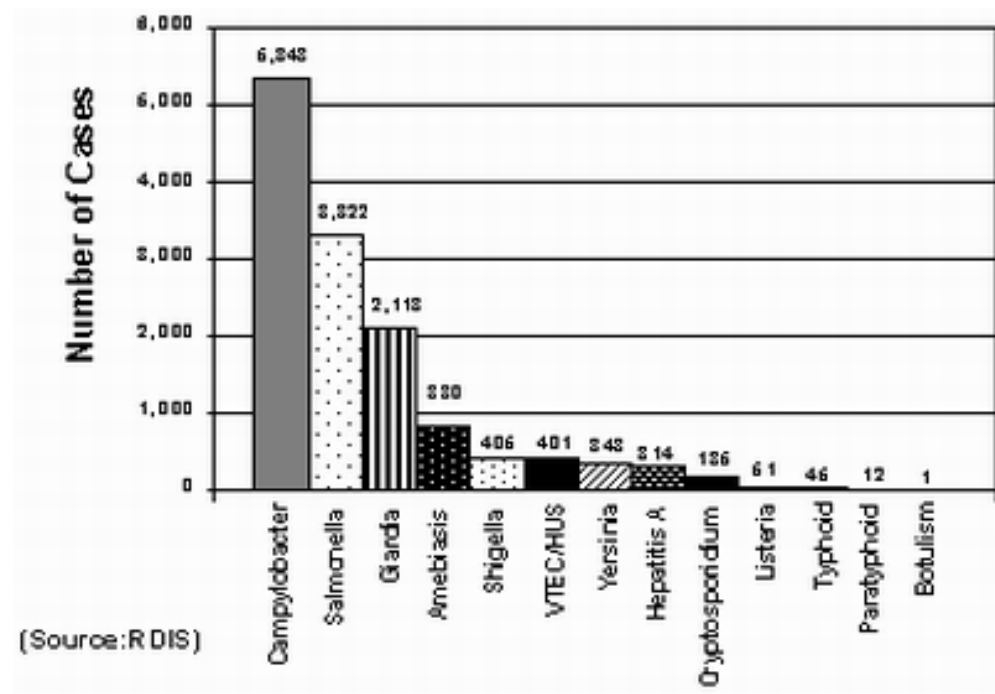
Definitions - Reported Hospital Separations (CIHI Data) and Ontario Mortality Database (HELPS data)

The ICD-9 category and the four digit code for the CIHI data are presented as follows: Cholera (1.0-1.9), Typhoid and Paratyphoid (2.0-2.9), Salmonella; Gastroenteritis (3.0), Salmonella; Various (3.1-3.9), Shigella (4.0-4.9), Bacterial Food Poisoning (5.0-5.9), Protozoa (6.0-7.9), Intestinal Infections; *E.coli* (8.0), Intestinal Infections; Other Organisms (8.1-8.5), Intestinal Infections; Viral (8.6), Intestinal Infections; Other Organisms Not Elsewhere Classified (8.8), and Viral Hepatitis A (70.0-70.1). The ICD-9 codes for mortalities are provided in Figure 9. Greater detail regarding these codes can be found in the International Classification of Diseases Manual.⁸

Results - Reported Sporadic Diseases (RDIS Data)

The number of reported cases for the 13 selected diseases are shown in Figure 1. Of the 5,343 campylobacter cases, 87% were *C. jejuni*, 2% *C. coli*, 0% *C. laridis*, 6% other, and 5% undefined. The 5 most frequent serotypes of the 3,322 salmonella cases were *S. enteritidis* (22%), *S. typhimurium* (18%), *S. heidelberg* (12%), *S. hadar* (6%), and *S. thompson* (2%). Of the *S. enteritidis* cases, 15% (109/738) were associated with an outbreak linked to contaminated cheese that occurred in 1998⁹.

Figure 1. Selected Reportable Diseases, Ontario, 1998



For the three most frequent organisms, the percent of travel associated cases are presented for all reported cases followed by the percent where a response was identified (i.e., the non-responses are eliminated) in the "Risk Other Specify" variable: campylobacter - 4% (223/5,343) and 26% (223/859); salmonella - 4% (134/3,322) and 22% (134/609); and giardia - 12% (245/2,113) and 51% (245/477).

One and one-half percent (6/401) of the VTEC cases were identified as having haemolytic uremic syndrome.

Food was a "Probable Source of Infection" for all 12 diseases shown in Figure 2. The 17% 'water' responses for cryptosporidium consisted of 11% 'water - lake/stream/river/pond', 4% 'water - pool/spa', 1% 'water - municipal', and 1% 'water - well private'. Four of the listeria cases listed in 'other' resulted from transplacental transmission, and thus do not fit the definition of the primary mode of entry being oral. The one case of botulism was intestinal (infant) botulism and the "Probable Source of Infection" was unknown.

Figure 2. Probable Source of Infection, By Disease, 1998

Probable Source (Percent of Total Cases)

Disease	Food	Person-to-Person	Water	Other	Unknown	Pets	Sexual Contact	Unknown	Total Cases
Campylobacter	32	1	2	6	0	0	0	59	5743
Salmonella	38	3	0	4	0	0	0	54	3322
Giardia	4	10	23	4	0	0	0	58	2113
Amoebae	2	15	22	5	0	0	0	56	530
Shigella	24	12	9	4	0	0	0	50	455
VTEC/HUS	42	4	1	3	0	0	0	48	451
Yersinia	26	2	1	4	0	0	0	67	343
Hepatitis A	15	12	5	4	0	0	4	59	314
Cryptosporidium	4	2	17	10	12	2	0	52	185
Listeria	2	2	0	14	0	0	0	22	51
Typhoid	13	0	18	18	0	0	0	51	45
Paratyphoid	17	0	8	25	0	0	0	50	12

(Source: R DIS)

The highest percent of cases identified as being "Outbreak Associated" resulted from VTEC/HUS and salmonella with 14% and 12%, respectively (Figure 3). Listeriosis had the highest case-hospitalization rate with 59 persons hospitalized per 100 persons with listeriosis (Figure 4).

Figure 3. Outbreak Associated Sporadic Cases, 1998

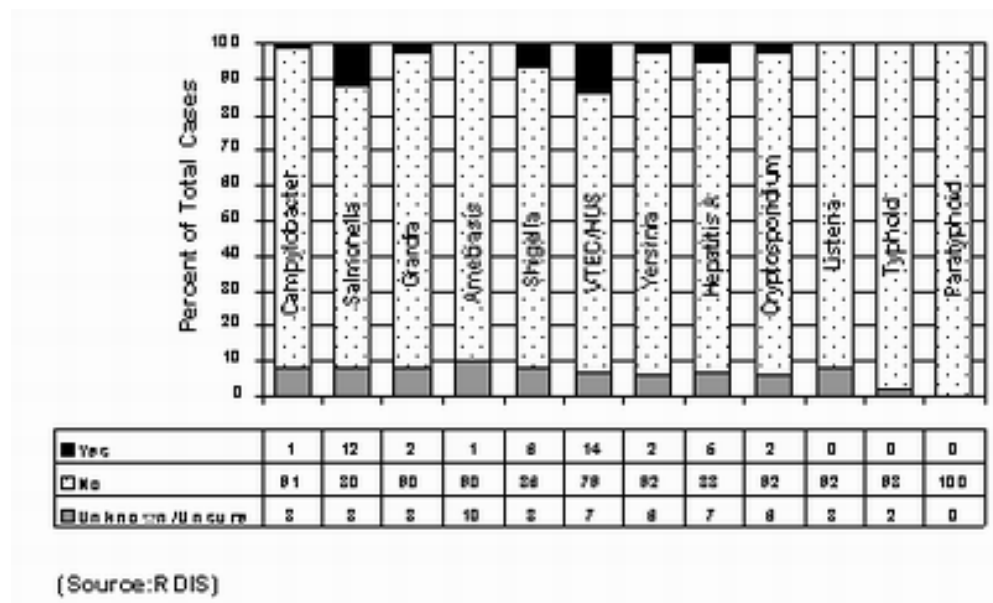


Figure 4. Case Hospitalization Rates*, 1998.

	Hospitalized? (Percent of Total Cases)			Total Cases
	Yes	No	Unknown	
Campylobacter	4	18	79	5343
Salmonella	7	18	75	3322
Giardia	1	22	77	2113
Amebiasis	1	11	88	830
Shigella	4	17	80	405
VTEC/HUS	19	20	61	401
Yersinia	2	20	77	343
Hepatitis A	11	25	64	314
Cryptosporidium	7	25	68	185
Listeria	59	4	37	51
Typhoid	22	18	60	45
Paratyphoid	25	8	67	12

* The figures under "Yes" are the Case Hospitalization Rates per 100 persons.

(Source: RDIS)

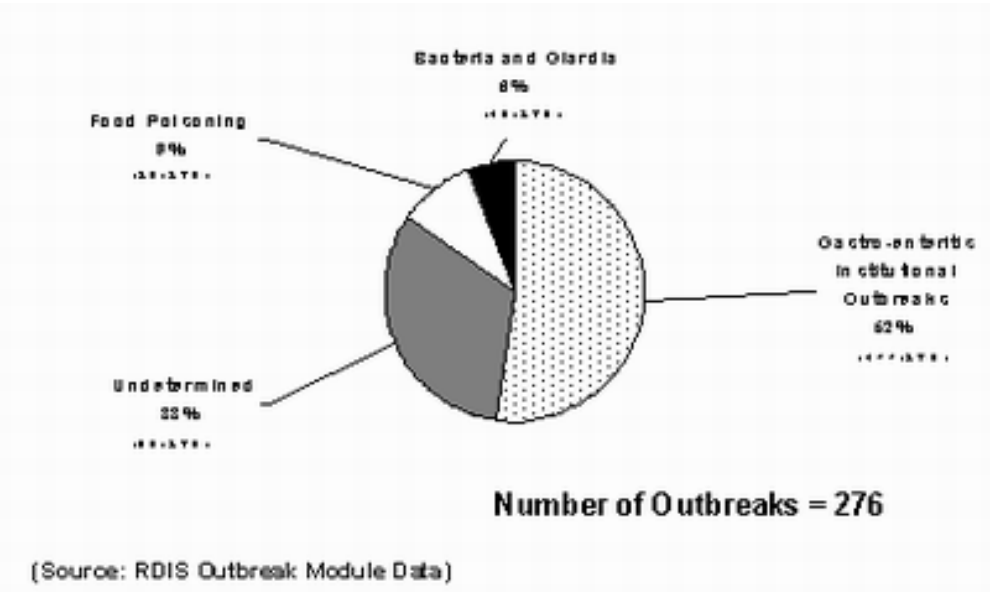
Results - Reported Enteric Disease Outbreaks (RDIS Outbreak Module)

There were 276 reported enteric disease outbreaks in 1998. Twenty-eight (28) of these failed to report the number of persons affected by the outbreak. Of the remaining 248 outbreaks, the mean, median, mode, and range of persons affected was 32, 22, 2, 2 to 138, respectively. There were 8,048 persons affected in these outbreaks.

'Gastro-enteritis - institutional outbreaks' was the most frequently (144/276=52%) reported "Disease" (Figure 5). Of the 144 'gastro-enteritis - institutional outbreaks', 41 were Norwalk virus, 7 were Rotavirus, 3 were Astrovirus, 2 were Enterovirus, 32 were other than listed in the RDIS variable "Outbreak Agent/Organism", and 59 were unknown. Of the 26 'food poisoning outbreaks', 2 were *Clostridium perfringens*, 1 Norwalk virus, 11

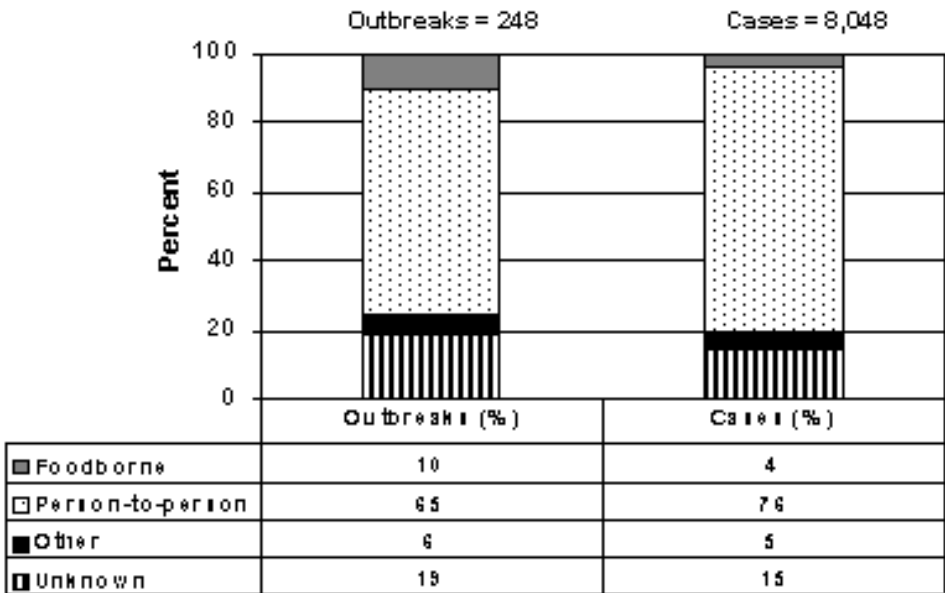
other, and 12 were not reported.

Figure 5. Outbreaks, by Disease, 1998.



The number of outbreaks and outbreak related cases respectively, by specific disease in the 'bacteria and giardia' category, were salmonella (9 and 52), VTEC/HUS (2 and 23), campylobacter (3 and 9), shigella (1 and 9), and giardia (1 and 2).

Figure 6. Percent of Outbreaks and Cases, by Mode of Transmission, 1998

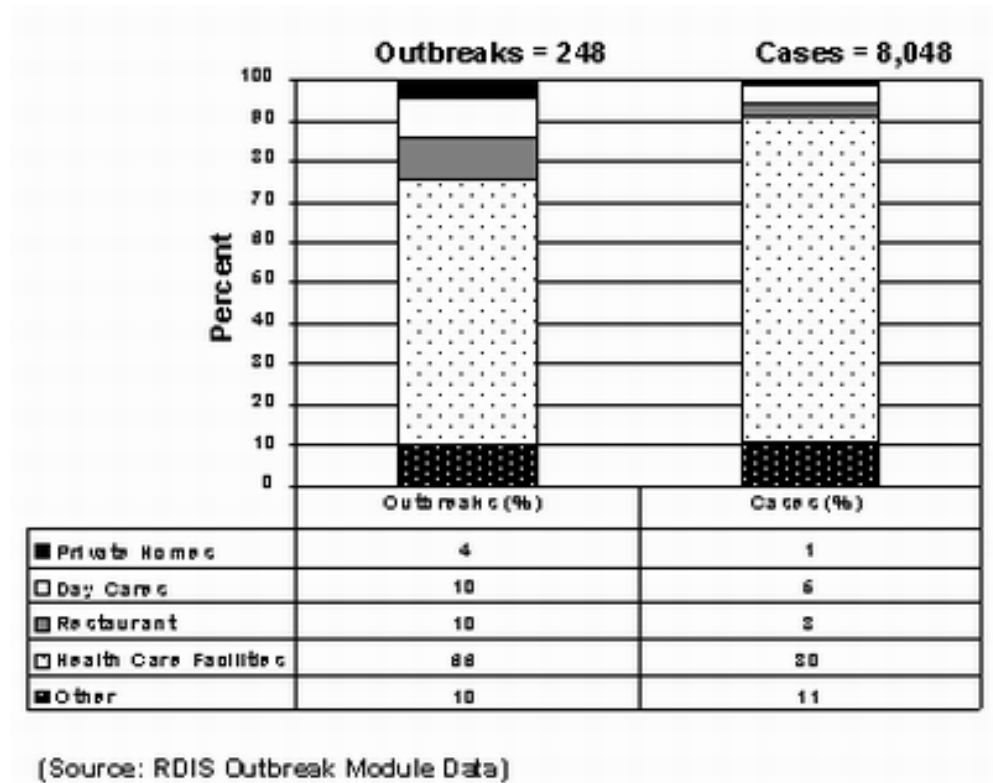


(Source: RDIS Outbreak Module Data)

The "Mode of Transmission" for 65% of outbreaks and 76% of outbreak

associated cases was person-to-person (Figure 6). Similarly, the "Type of Establishment" for 66% of outbreaks and 80% of outbreak cases was health care facilities (Figure 7).

Figure 7. Percent of Outbreaks and Cases, by Type of Establishment, 1998



Results - Reported Hospital Separations (CIHI Data)

The largest number of hospital separations was due to 'Other Infections; Other Organisms Not Elsewhere Classified (8.8)' (Figure 8). There were no hospital separations reported for 'Cholera (1.0-1.9)'.

Figure 8. Reported Hospital Separations, ICD-9 Codes 1.0-9.9 and 70.0-70.1, 1998

The three most frequently reported diseases consisted of 81% of the 13 selected diseases. Individually, campylobacter consisted of 40%, salmonella 25%, and giardia 16% of the selected diseases. At least 4% of

campylobacter and salmonella cases, and 12% of giardia cases were travel associated, however, because 84%, 82%, and 77% of the responses for each organism, respectively, were not completed, the true number is likely closer to the 26%, 22%, and 51% for the cases had a response been provided. These figures for travel associated illness represent a substantial amount of illness that is acquired outside of Canada.

The Ontario Central Public Health Laboratory confirmed a total of 531 cases of *S. enteritidis* during March and April of 1998.⁹ This number represents 72% (531/738) of the *S. enteritidis* cases reported for 1998. RDIS data indicate that 21% (109/531) of the cases identified from the Central Public Health Laboratory were linked to the outbreak attributed to contaminated cheese. These discrepancies indicate that there was a lack of reporting of the individual outbreak associated cases to RDIS.

The 1.5% of VTEC cases reported to have had hemolytic uremic syndrome was slightly less than the 2-7% range reported by Chin.¹⁰

For the 12 diseases shown in Figure 2, the 'unknown' response for the "Probable Source of Infection" ranged from 49% to 82%. 'Food' was the most frequent known "Probable Source of Infection" for VTEC/HUS (42%), salmonella (38%), campylobacter (32%), yersinia (26%), shigella (24%), and hepatitis A (15%), while 'water' was the most frequent known response for giardia (23%), amebiasis (22%), and cryptosporidiosis (17%). The most frequent known response for typhoid was 'water' (18%) and 'other' (18%), and 'other' was the most frequent known response for paratyphoid (25%) and listeria (14%). 'Sexual contact' was only a "Probable Source of Infection" for hepatitis A cases (4%), and 'livestock' and 'pets' were only a "Probable Source" for cryptosporidium cases (12% and 2%, respectively). While the high percent of 'unknown' responses reflect the reality of investigation findings into the source of a particular case, the findings from cases where a probable source was identified are consistent with what is generally known to be the source of these diseases.

If all the agents in this report considered are assumed to be foodborne as in the Foodborne Diseases Active Surveillance Network data from the U.S.A., Ontario data show differences with Canadian and U.S. data in the incidence of certain diseases. The following shows Ontario rates for various diseases followed by Canadian and U.S. rates, respectively, per 100,000 persons - campylobacter (50, 47, and 22), salmonella (31, 23, and 12), shigella (4, 5, and 8), VTEC (4, 5, and 3), yersinia (3, not available, and 1), cryptosporidia (2, not available, and 2), listeria (0.5, 0.2, and 0.5).^{4,11,12} These differences highlight the importance of considering rates of disease that are relevant for your area. Differences in rates of disease are known to occur within Ontario as shown in the *Communicable Disease Control: Summary of Reportable Diseases* report.³ The Foodborne Diseases Active Surveillance Network also note that substantial variation in incidence occurred among the various sites from where their data were collected. Statistical artifacts may account for some of the differences. For example, Ontario, the U.S.A., and Canada

used 1996, 1997, and 1998 population data for rate calculations.

VTEC/HUS and salmonella had the highest percent of "Outbreak Associated" cases with 14% and 12%, respectively. These were markedly higher than for any of the other diseases reported. It is interesting to note that VTEC/HUS and salmonella had 'food' as the highest percent of "Probable Source of Infection" for the 13 diseases.

The five highest case-hospitalization rates per 100 persons with the disease were listeria (59), paratyphoid (25), typhoid (22), VTEC/HUS (19), and hepatitis A (11). These rates are consistent with the known severity of the infection.

Discussion - Reported Enteric Disease Outbreaks (RDIS Outbreak Module)

The 276 reported outbreaks in 1998 were less than the 321 average annual number reported for the period 1994 to 1998.¹³ The 8,048 persons affected in the outbreaks was also less than the average annual 10,854 persons affected for the 1994-1998 period.

The mean (32), median (22), and mode (2) for the number of cases per outbreak were consistent with that reported in the 1994-1998 period. 'Gastro-enteritis - institutional outbreaks' accounted for slightly more than half (52%) of the reported outbreaks. These outbreaks are likely well reported compared with other outbreaks because institutions often have infection control staff on-site, there are usually a large number of persons affected, and the agent, most often a virus transmitted person-to-person, is relatively easy to diagnose.

'Food poisoning' was the second most frequent cause of outbreaks. Norwalk virus and *Clostridium perfringens* were the only two identified causal agents in this category. Most (11/26= 42%) outbreaks were due to agents 'other' than listed in the variable "Outbreak Disease".

As a point of interest, Quebec, with a population base 4 million persons less than Ontario, reported substantially more foodborne outbreaks of selected organisms than were reported in Ontario. Ontario compared to Quebec outbreak reports for 4 diseases were: salmonella (9 vs. 76), campylobacter (3 vs. 29), VTEC (2 vs. 56), and shigella (1 vs. 4).¹⁴ These differences are likely due to under-reporting in Ontario, but are worthy of further exploration.

The number of cases reported for specific diseases in the 'bacteria and giardia' category were all less than the number of cases reported as "Outbreak Associated" from the RDIS sporadic reports. The number of cases reported by disease from the outbreak module is followed by the number that were "Outbreak Associated" from the sporadic reports; salmonella (52 vs. 402), VTEC/HUS (23 vs. 57), campylobacter (9 vs. 25), shigella (9 vs. 22), and giardia (2 vs. 35). In addition, 5 amebiasis, 16

hepatitis A, and 2 cryptosporidiosis cases were identified as "Outbreak Associated" in the sporadic reports. If it is assumed that the higher number of cases reported more closely approaches the true number of cases, these findings indicate that the RDIS database for sporadic reports of disease provide better information about the number of cases that are outbreak related than the outbreak module.

In addition to incomplete reporting of cases associated with the outbreak of *S. enteritidis* linked to contaminated cheese through the RDIS case registry, the enteric outbreak data only had one report of a case linked to the outbreak. While this outbreak was given an outbreak number to be used in the RDIS outbreak module to link all cases in Ontario, there is little experience determining whether the system works well when an outbreak occurs in many health unit areas across Ontario.

The most frequent "Mode of Transmission" was 'person-to-person' and the most frequent "Type of Establishment" was 'health care facilities' by number of outbreaks. This resulted because enteric viruses were the most frequent cause of outbreaks and viruses were associated with each of these categories. In addition, in each of these categories, the percent of persons affected was higher than the percent of outbreaks. For example, health care facilities accounted for 67% of outbreaks and 80% of outbreak cases (Figure 7). This result is not unusual because of the high attack rate of enteric viruses relative to the other outbreak causes.

Discussion - Reported Hospital Separations (CIHI Data)

The largest number of hospital separations was due to 'Intestinal Infections; Other Organisms Not Elsewhere Classified' followed by the 'Intestinal Infections; Other Organisms'. It is difficult to identify the specific agents in both of these categories. 'Viral Infections' ranked third. 'Salmonella; Gastroenteritis' was the most frequent specific organism. 'Salmonella; Various' includes septicemia, wound infections, and an other category in which the primary mode of entry may not be oral. 'Bacterial Food Poisoning' includes staphylococcal, botulinal, *Clostridium perfringens* and other unspecified causes of food poisoning. There were no hospital separations reported for Cholera (1.0-1.9).

While comparing hospitalizations from CIHI data and RDIS data is not valid because the fiscal year was used for CIHI data and the calendar year was used for RDIS data, the following comparison shows moderately good consistency. For the three diseases that can be quantified from the RDIS and CIHI data, the reported number of hospital visits from CIHI data is moderately higher than the number of cases in the RDIS data reported as hospitalized: salmonella (277 vs. 226), hepatitis A (79 vs. 34), and typhoid/ paratyphoid (35 vs. 13).

Discussion - Reported Mortalities (HELPS Data)

The 30 deaths, resulting from the diseases shown in Figure 9, were not a large attributable portion of the 79,300 deaths that occurred in 1996. The high mean and median age (77 and 84 years respectively) suggest that the mortalities occurred in persons vulnerable to complications due to age or underlying medical conditions. The most frequent cause was due to 'Intestinal Infections; Other Specified Bacteria (ICD-9 code 8.4)' with 14 deaths, however, it is difficult to identify the specific bacteria in this category.

Conclusion

This article has attempted to provide a picture of bacterial and viral enteric illness for a one-year period in Ontario through the use of the RDIS reportable diseases database, the RDIS outbreak module, the CIHI database for hospital separations, and the HELPS mortality database. The use of several databases assists in providing a broad picture of epidemiological findings. Where applicable, comparisons of findings between databases showed moderately good correlation between some databases, and poor correlation between others.

The article focused on morbidity from these diseases as the number of mortalities was small relative to the total number of deaths in 1998. Rates for various diseases were noted to differ between the U.S.A., Canada, Ontario, and within Ontario indicating the importance of understanding the profile of disease in your local area. One important finding was the high percent of campylobacter, salmonella, and giardia cases that were associated with travel outside of Canada.

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Source and Contact

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Cost Implications of Reporting Nonpathogenic Protozoa

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Historically, clinical laboratories worldwide have reported intestinal protozoa, both pathogenic protozoa (PP) and nonpathogenic protozoa (NPP), to attending physicians. The majority of these organisms are nonpathogenic; they neither cause harm nor require medical therapy [1,2]. Nevertheless, we

have observed that many patients with NPP are treated and/or referred to infectious diseases specialists or gastroenterologists. At a time when health care programs, including laboratory testing, are targets for cost-cutting, it is worthwhile to re-evaluate this current policy of routinely reporting intestinal NPP. Reducing such reporting would reduce the costs of inappropriate medication, repeated stool sampling, and physician consultations that have little or no impact on health status. The present study, a survey of family physicians, was carried out to determine the number of patients infected with NPP annually in Ontario (1997 population, 11.4 million) and the costs associated with the healthcare management of these patients.

The Ontario Physician Human Resource Data Centre (OPHRDC) database (1996) lists 9869 family physicians. Because only collective attributes and no individual names were available from OPHRDC, we purchased a similar database (9140 names) of Ontario family physicians from a commercial supplier. Similar surveys have yielded response rates of 50%-62.6% [3,4]; therefore, we chose to mail 880 surveys, to yield 370 usable responses for 95% CI, $\pm 5\%$ error.

Costs of medication for treatment of NPP (adult dosage [5] for 1 course of therapy) were obtained from 7 pharmacies across Ontario. The mean costs in Canadian dollars for the 3 medications are as follows: metronidazole, \$11.77; iodoquinol, \$34.88; and paramomycin, \$149.33.

The survey instrument (a confidential, numbered questionnaire) was sent in February 1998, along with a cover letter and a self-addressed, stamped envelope. The questionnaire design was based on Dillman's Total Design Method [6]. Twenty family physicians agreed to pretest the survey instrument. Postcard reminders were sent to all nonrespondents 2 weeks after the initial mailing. Two weeks later, a replacement questionnaire was sent to each of those who had not yet responded.

The adjusted response rate, which accounted for those nonrespondents who would not be eligible to participate, was 62% (494 of 797). The respondents' attributes closely matched those in the OPHRDC database (sex ratio, years in practice, and size of town of practice).

From our survey results we estimated the number of patients with at least 1 NPP. The survey asked family physicians "to recall how many patients you have seen in the past two weeks who were positive for any of the following [NPP], *Entamoeba coli*, *Iodamoeba butschlii*, *Endolimax nana*, or *Entamoeba hartmanni*." We calculated that 1533 patients with NPP were seen in Ontario within a 2-week period. However, this number had to be corrected to account for patients who have both NPP and PP. They occur together 28% of the time, according to our evaluation of 1997 laboratory reports of 372 patients with NPP from both the Centre for Travel and Tropical Medicine (CTTM) and the Toronto Public Health Laboratory (PHL). Thus, we estimated that 28,698 patients annually in Ontario will have at least 1 NPP, without PP.

Annual costs associated with medication were calculated with the knowledge that 68.5% (SE $\pm$ 4.3% [95% CI]) of respondents would treat their symptomatic patients who had NPP. From our clinical observations, we estimated that 70% of patients with NPP alone would be treated with metronidazole, 25% with iodoquinol, and 5% with paramomycin.

Costs associated with referrals were calculated with the knowledge that 21% (SE $\pm$ 3.7% [95% CI]) of family physicians would refer their symptomatic patients with NPP for evaluation by specialists who bill \$105.00 per patient [7].

Costs associated with repeated stool samples were calculated with the assumption that those physicians who would medicate would also have their patients resubmit stool samples. The cost per sample for processing each parasitology stool sample, as estimated by the PHL is \$27; for the private laboratories, which process 78% [8] of parasitology samples in Ontario, the cost is \$25.85 [9]. Collectively, we estimated costs for medication, referrals, and repeated stool samples associated with management of NPP in Ontario to be \$1,629,974 annually.

The calculated cost may be an underestimate, since additional stool samples or endoscopic procedures were not considered. Furthermore, indirect costs may be even more significant: delay in diagnosis of a treatable disease such as inflammatory bowel inflammatory bowel disease or *Clostridium difficile* associated diarrhea, drug toxicity from unnecessary medication, and lost time from school or work. Alternatively, the calculated cost could be an overestimate if family physicians overestimated the number of patients seen with NPP in a 2-week period.

Considerable cost savings would result if a policy was adopted in Ontario of not reporting NPP, or, in cases where NPP are identified, of reporting with a written notation to the attending physician that the organisms are "not medically significant."

Based on the numerous comments written on the survey instrument, we conclude that physicians would appreciate guidance on the management of intestinal protozoa; we present table 1 as a guideline.

Table 1. Management of patients with intestinal protozoa

Organism	NPP or PP	Symptomatic patient	Asymptomatic patient
<i>Giardia lamblia</i>	PP	Treat	Do no treat ^a
<i>Entamoeba histolytica</i>	PP	Treat ^b	Treat ^b
<i>Dientamoeba fragilis</i>	PP	Treat	Do not treat

<i>Crptosporidium parvum</i>	PP	Treat ^c	Do not treat
<i>Cyclospora</i>	PP	Treat	Do not treat
<i>Entamoeba coli</i>	NPP	Do not treat	Do not treat
<i>Entamoeba hartmanni</i>	NPP	Do not treat	Do not treat
<i>Endolimax nana</i>	NPP	Do not treat	Do not treat
<i>Iodamoeba butschii</i>	NPP	Do not treat	Do not treat

NOTE. NPP, nonpathogenic protozoa; PP, pathogenic protozoa. For treatment data see[5]

^aexcept food handlers, immunocopromised hosts, or to control an outbreak.

^bInfections due to *E. histolytica* should always be treated; *Entamoeba dispar* is nonpathogenic and patients with this organism need not be treated

^cNo effective treatment currently recognized

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Newborn and Infant Hearing Screening and Early Identification Program

Summary

Since April 1997, the Ontario government has introduced several initiatives to give children a better start in life. During his Budget Speech on May 2, 2000, the Finance Minister announced a Newborn Hearing Program for Ontario. This new \$7M initiative will be a comprehensive program including universal newborn hearing screening and follow-up communication development interventions. This exciting new program will bring Ontario in line with international practice and strengthen its commitment to prevention and early identification to give young children the best possible start in life.

Background

In Ontario, the current average age of identification of hearing loss is over two-and-a-half years of age. Yet, if not identified early, hearing disabilities can cause severe delays in communication development, as well as cognitive, psychosocial and academic problems, almost all of which are preventable. Research has shown that the earlier the hearing loss is identified, the better the language development, psychosocial well-being, readiness to learn and overall academic success. The American Academy of Pediatrics (1999) recommends that all infants with significant congenital

hearing loss be identified by 3 months of age and receive appropriate and necessary intervention by 6 months of age.

Infant hearing screening is mandatory in various parts of the world. For example, in late 1999, the US Congress passed *The Newborn Hearing Screening and Intervention Act*, making the provision of universal hearing screening a requirement in all states. Although other provinces in Canada are developing hearing screening services, no province has implemented universal hearing screening and intervention programs for newborns and infants. Ontario is now taking leadership in implementing such a program.

Prevalence

Approximately 1 to 3 per 1000 newborn babies in the well-baby nursery population and about 2-4% of infants in the neonatal intensive care unit population have significant bilateral hearing loss (American Academy of Pediatrics, 1999). In addition, about 50% of these infants have no risk factors that may indicate a need for testing (Kanne, Schaefer and Perkins, 1999) providing a case for universal hearing screening. In Ontario, approximately 135,000 babies will be eligible to be screened each year and an estimated 600-800 identified with hearing loss or deafness.

Which Hearing Screening Protocols are Recommended?

The current tools for infant hearing screening include:

- Auditory Brainstem Response (ABR) and Automated Auditory Brainstem Response (AABR),
- Otoacoustic Emissions (OAEs)
- OAE/ABR combination screener. (However, this is very new technology and studies examining and evaluating its properties are not available).

Auditory Brainstein Response (ABR/AABR)

ABR uses electrodes that are placed on the child's scalp and connected to the ABR machine to evaluate the function of the auditory pathways. This is achieved by recording electrical responses to sound stimuli as they travel from the inner ear to the brain. A wave with five peaks is produced, which provides information about the child's hearing sensitivity by analyzing the size of the peaks. ABR screening techniques have been enhanced by the additional technology of the Automated ABR (AABR) system, which allows for computerized interpretation and pass-fail reporting. Whereas ABR needs to be administered by a skilled professional, such as an audiologist, AABR can be administered by personnel from variable backgrounds and training (Mehl et al., 1998; Downs, 1995). Comparison testing has found very high agreement between AABR and ABR (National Center for Hearing Assessment and Management or NCHAM, 1999).

Otoacoustic Emissions (OAEs)

OAEs measure sound waves generated in the inner ear (cochlea) in response to clicks or tone bursts emitted and recorded via miniature microphones placed in the external ear canals of the infant. This procedure allows for computerized interpretation and pass-fail reporting.

Criteria for Selection of a Screening Method

The National Institute of Health and Human Services (NIH) Consensus Statement (1993) recognizes that recent technological developments have produced screening methods that are rapid, reliable, sensitive and easily administered. The three technologies that both the NIH and the American Academy of Pediatrics (1999) acknowledge as meeting the standards of infant hearing screening include ABR/AABR, and OAEs. These tests can be done alone or in combination.

The American Academy of Pediatrics (1999) recommends that the methodology used in screening should have a false-positive rate of less-than or equal to 3%. That is, less than 3% of infants should fail the screening test when their hearing is normal. The referral rate for audiological assessment from the screening should not exceed 4% (the overall identification of hearing loss being under 1%). The methodology used in screening ideally should have a false-negative rate (i.e. the proportion of infants with significant hearing loss missed by the screening program), of zero.

Strengths and Weaknesses of AABR and OAEs

The strength and weaknesses of two single methodologies, AABR and OAEs, are summarized in the table below.

Screening Method	Strengths	Weaknesses
Automated Auditory Brainstem Response	Does not require behavioural responses from the child	Infant must remain still to get accurate readings
	Non-invasive	Cochlear pathologies may be missed ¹⁰
	Easy to perform	Studies show that AABR used alone produces referral rates of 8% (recommended referral rate is 4% or lower) ⁴
	High Sensitivity ¹⁰	
	High Specificity	
	Reliable	

	Screener needs minimal Training and experience^{3&5} Not affected by vernix in the external ear canal	
Otoacoustic Emissions	Does not require behavioural responses from the child Test results do not rely on the infant remaining still Non-invasive Easy to perform Rapid High Sensitivity High Specificity Reliable Screener needs minimal training and experience	Retrocochlear lesions may be missed¹² Vernix of fluid in the external canal or middle ear, which may not clear in newborns until 24 hours after birth, may result in referral rates as high as 20%¹if screening is done within the first 24 hours

Using a Combination of Screening Methods

The American Academy of Pediatrics' (1999) recommendation for a referral rate of less than 4% is not achievable by a single screening methodology. Consequently, many hearing programs use a combination of AABR and OAE methods. AABR and OAE complement each other, as each of the tests produce different information about the auditory system. OAEs provide information about cochlear functioning whereas ABR provides information about retrocochlear functioning. Referral rates of less than 4% are generally achievable with OAE combined with Automated ABR in a two-step screening system (Mason & Herrmann, 1998; Mehl et al., 1998; Vohr, Carty, Moore & Letourneau, 1998; Barsky-Firsker & Sun, 1997; Downs, 1995; Mauk et al., 1993; NCHAM, 1999).

Introducing an Infant Hearing Program in Ontario

The introduction of this program will provide integration of all components of service required by infants with hearing loss and their families. It is proposed that a combination screening method will be used to identify babies for

referral to audiological assessment. Approximately 135,000 babies will be eligible to be screened each year and of that number approximately 5,400 could be referred to audiology services. Approximately 800 children per year could be identified with hearing loss or deafness. Following identification of a hearing loss, parents will be able to access a variety of communication options for their child and will be fully informed of the choices available.

Conclusion

The Newborn/Infant Hearing Program announced in the May 2000 budget will establish universal newborn/infant hearing screening in Ontario. Through the early identification of hearing loss and the access to communication development services, which will also be part of this program, children in Ontario born with a hearing loss or deafness will have the opportunity to achieve maximum communication development, cognitive abilities and academic success.

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Community Computing to Support Population Health: Technology Access, Services, Perceptions, and Policies in Hamilton-Wentworth

Summary

The purpose of this research was to investigate community service members' perceptions about public technology access and uses of technology to support population health. Perceptions about policies regarding the provision of technology access to the public were also pursued. Results report findings from qualitative semi-structured interviews with service providers in the community. Respondents believe that computers are here to stay, they can provide a valuable means for information access and have potential to support communication in local communities. Perceived barriers are also identified.

Introduction

Community competence as conceived by Cottrell¹ is the ability to collaborate in identifying community needs, reach consensus on goals and activities to meet the goals and, collaborate effectively on community actions. Community based computer networks have enormous potential to enhance participation, build collaborative relationships with health and social service professionals, increase civic participation, improve communication and, support community empowerment initiatives ²³⁴.

To benefit from community computing, access must be ensured. Statistics Canada's⁵most recent Household Internet Survey⁶ reports that Internet use by at least one person in a household has increased 44% from 1997 to 1998 which represents 23% of all Canadian households. U.S. and Canadian census data show that computer ownership is associated with higher education and income Dickinson & Ellison⁷; McConnaughey & Lader⁸. Libraries are one of the principal public access points for community information and technology access. Internet cafés, malls, schools, community centres, churches, and non-profit community computing centres, and youth centres have also provided access. No studies about public access to computers and community computing in Canadian urban centres were found.

Research Purpose

This purpose of this paper is to examine the perceptions of community agencies about access, use and policies related to community computing for the general public in a large urban community in Ontario. The following research objectives were defined:

1. Which community agencies/organizations offer public computer and/or Internet access to the public, including children, adolescents and adults? What types of services are provided and used?
2. What policies do they have?
3. How do they view the potential risks and benefits in providing public computer access to the public?
4. How do they perceive their role in relation to providing computer access to the public?
5. How do they perceive the idea of offering the public access to computers and computer mediated communication (CMC) to aid them in communicating with residents and health and social service workers about community issues?

Methods

One-hour semi-structured interviews were conducted with representatives from five community organizations and one business in an urban centre of a population of 400,000. A public library, culture and recreation (C&R)

department, an employment resource centre (ERC), a public health department (PH), a children's museum and an Internet café chain were included in the sample. The C&R and PH departments do not currently provide computer access to the public. However, because they are well integrated and are visible in local neighbourhoods, they were felt to offer a valuable perspective regarding current thinking about computing access to the public. Interviews were conducted with the person responsible for decision making about technology issues or a manager where this role did not exist. All organizations six participants who were invited, completed the interview. Interviews were audio taped upon obtaining written consent, transcribed and analyzed by the author using a qualitative approach. Findings from the descriptive analysis were circulated to those interviewed for member checking to increase accuracy and credibility of the findings.

Results

High speed Internet access is provided at no cost at two sites while unrestricted access for a fee is offered at the Internet café. Software (CD-ROM) and hardware (fax, copying and word processing) are offered at some sites to support organizational mandates namely, assistance in obtaining employment (ERCs) and general information and education (Library). The museum offers off-the-shelf CD-ROM educational programs to complement exhibits.

Participants spoke of the high demand for public computer access. In libraries the "demand is very alive. At 9:00am they come surging in, just to make sure they can get their time booked". The wear and tear on the museum computers from frequent use demonstrates that they are worthwhile. The general tone of participants was that computers are "here to stay." Other possible sites for public computer access included: schools, the college and university, community health centres, hospitals, the local tourism office, small business service centres and technology training centres.

Many perceived benefits of public computer access were identified which include: increased access to information, meeting consumer demands, stronger communication about community services and increased efficiencies. "Ensuring that people can access information about their world" was the main benefit from the library's perspective. One example is the SMART Communities Project Industry Canada⁹, a "one stop shop" index of governmental and non-governmental programs and services. In general web sites were viewed as creative strategies to improve community awareness of programs and services.

Computers were often used for communication. The Internet café reported that participation in "chats" was the most popular activity. Library patrons, particularly youth, frequently used computers for email and chat. This was initially questioned by staff, who has since reassessed the practice stating that "...it's not the primary purpose of having them use it, but it is a good and valid thing for them to be doing." The demand from patrons has led to the

development of email courses.

Another cited benefit was the potential to network with experts and neighbouring communities and the potential for interactive learning. Getting electronic feedback from patrons about community services was also mentioned.

Commonly perceived issues and risks related to the provision of public computer access included the need for human supports and training, access to content deemed inappropriate (adult material), the need to keep up with technology, the potential for the downloading of viruses, costs to establish, maintain and provide technical support, confidentiality, and an increased demand for access and potential misuses of the technology. The library keeps computers in open public view as a security measure as well as to encourage access to staff for assistance for searching and printing. The demand is "iterative" as people come back wanting help with more complex skills. Other concerns raised were that public use of computers could not interfere with day to day agency computer operations and that privately donated equipment was not eligible for technical support from agency staff.

Policies for acceptable use are clearly displayed to users in the library and the ERCs. Use of ERC computers not directly related to job searches are considered inappropriate. The C&R and museum staff shared a concern about the potential for youth to access pornographic sites and felt a need to restrict access. The Internet café also sees potential risks from a content perspective for minors. However, although the library's policies state that "overt sexual images are not allowed", "the library has no control over the information accessed through the Internet and is not responsible for its content." The library contact reported that they have a degree of intellectual control as library materials are selected by them, whereas, such control does not exist with the Internet.

Participants were asked about their perceived roles regarding their organization and the provision of public computer access. The library saw their role expanding "simply as an extension of what we've always done in print. We've always had to help people learn how print indexes are structured, for example, how to use them, what they mean when they look at it, how you then go and retrieve information, how you evaluate information. Where the difference lies, is that we normally, except for perhaps our literacy centre, have not had to teach people how to read." The museum viewed computers supporting their mandate of education while C&R felt computers could provide an alternative medium for information about services and programs. PH saw their role as participating in a coordinated approach with other agencies in community computing initiatives. They could offer expertise in health promotion, effective communication skills, community connections, technology, ethics and confidentiality issues.

Respondents shared their thoughts about the provision of public computer access and CMC to support geographically based communities in

community based initiatives such as community development projects. Would they be able and willing to provide public computer access? The library contact could provide "access to the means to do so." The C&R and ERC participants felt concern about providing access to computers for communication around broad community issues as conflicts could arise if issues raised are unrelated to agency mandated services. However, online discussions were seen as a useful way for the public to share feedback around community programs. They could also help to voice opinions of youth. Also, some felt there was inherent value in communicating with other communities about common issues. An example mentioned was the potential to learn from a neighbouring region about how they coped during a crippling ice storm.

Other challenges identified were: the potential for information overload, higher staffing needs to screen out and respond to messages, confidentiality, difficulty in upgrading staffs' skills in technology and the risk of flaming. There was also a fear that electronic communities' input may not be representative of the general community.

Discussion

The library's easy access, their supportive policies regarding Internet access, as well as their educational programs provide a strong start to providing accessible public computer access. The Canadian Library Association's position statement¹⁰ provides guidelines for communities' access to information. They state "access to information and telecommunication network services should be available and affordable to all regardless of factors such as age, religion, ability, gender, sexual orientation, social and political views, national origin, economic status, location, and information literacy." Dugas, Saravanamutto, Wilson, Bartman, Danilaviciute¹¹ report of a survey of 2,649 Canadians stated that "they are most likely to rate public libraries at the top in terms of appropriate locations, along with schools" for public computer access. However, groups who are: low income, with less secondary education, identified as 'non users', living in smaller communities and elderly demonstrated lower levels of support for public access through libraries.

Sharing community information with the public was seen as an important role for community computing. Willingness for organizations to collaborate to increase community access to regional information and resources is evident. Although using computers to support communication was in high public demand, there were no known public community on-line threaded discussion lists or other online communication systems that supported neighbourhood dialogue about local community issues. Participants voiced interest in this idea, in particular for groups who are most vulnerable. However numerous challenges and barriers were also voiced. It is not surprising that no agency feels that the provision of community technology access to support community dialogue fits directly under its mandate. Factors such as limited public computer access, as well as inadequate provision of comprehensive

technological services by any given agency, lends support to the development of independent community computing centres in low income neighbourhoods.

Technology access centres in the U.S. provide a useful model for community computing Chow, Ellis, Mark & Wise¹². The electronic superhighway has the potential to support connections and dialogue between business, organizations, government and residents and build a neighbourhood information infrastructure. Community computing needs to support communities to actively produce rather than passively consume information, in order for technology to truly become an empowering tool Shaw & Shaw¹³. Community dialogue must involve equal partnerships with community members, community workers and researchers whose mutual aim is to improve the health of communities.

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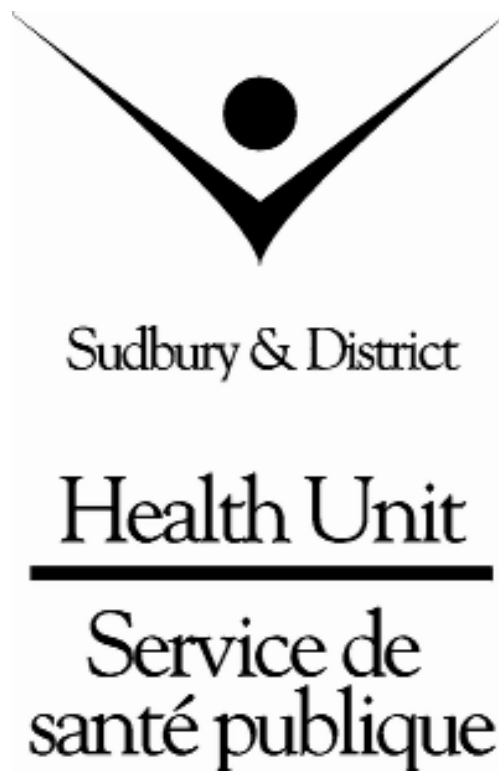
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TOP 

Communiqué

Public Health Research, Education and Development Program



Videoconferencing As a Dissemination Strategy

Introduction

In 1998-1999, Ontario's six Public Health Research, Education & Development (PHRED) Programs undertook three provincial projects* to enhance the practice of public health in Ontario:

1. a provincial health status report - Report on the Health Status of the Residents of Ontario (2000) and a companion Francophone health status report, Rapport sur la santé des francophones de l'Ontario (2000),
2. the Effective Public Health Practice Project which systematically reviews the literature and identifies effective public health interventions, and
3. benchmarking which is an ongoing, systematic process that seeks to identify and understand the best practices of others and customize those practices to one's own setting.¹

Consistent with the mandate of the PHRED Program, a decision to offer regional workshops was made to disseminate the findings from these three initiatives to all Ontario health units. From November 1999 until January 2000, eight regional workshops were delivered, including two by videoconference.

This paper describes an evaluation of videoconferencing as a medium to disseminate information to regional partners. The purpose of the evaluation was to examine the advantages and limitations of videoconferencing as

seen by the participants, the small group facilitators and the workshop leaders, to make recommendations for future use of videoconferencing and to assess whether or not videoconferencing made this regional event more accessible.

*During this same period, the PHRED Programs also provided regional library services to all health units in the province. Library services continue to be available from PHRED Programs for an annual subscription fee.

A Workshop Template

Project leaders from each of the three initiatives developed a generic skill development workshop template that PHRED Programs used in each of their regions. The workshop package included marketing materials, the workshop flyer, speaker notes, overheads, PowerPoint slides, handouts, small group activities and an evaluation tool. The goal of the workshop was to disseminate the findings from these three provincial projects, to illustrate the linkages between the initiatives, and to engage participants in applying the findings to a scenario, thereby demonstrating the relevance of the initiatives to program planning and evaluation in public health.

Facilitators were recruited to assist the PHRED leaders with the small group scenario exercise. PHRED programs provided guidelines and/or orientation sessions to help facilitators prepare for their role.

The workshop target group was Medical Officers of Health, senior staff, program managers and practitioners involved in program decision making. Each participant received a workshop package that included key resources and a copy of the workshop slides.

An Opportunity

The Northern region of the province encompasses both the Northeast and the Northwest. This region covers 89% of Ontario's landmass for a total of 814,447.3 square kilometers. In recognition of the vast geographic size of the Northern region and costs incurred by health units for both travel and lost time on the job to attend regional workshops in a centralized location, the Sudbury and District Health Unit's PHRED Program proposed offering the regional workshop by videoconference. This decision was supported by the provincial PHRED program because it provided an opportunity to explore and evaluate new ways of disseminating information.

A consultant was hired to assist in the planning and to coordinate the logistics for the delivery of the workshop. Her tasks included preparing and disseminating workshop packages, coordinating registrations, training facilitators, liaising and confirming arrangements with each site, securing the necessary technology for delivering the workshop by videoconference to multiple sites and forwarding a set of overheads to each site to be used in the event of technical difficulties.

The pilot videoconference was held on December 10, 1999. Since two Northern health units were not available at that time, a second videoconference was planned for January 19, 2000. The December workshop was scheduled to accommodate two time zones. Six health units participated at seven different sites (one health unit area used two sites) in the first session and three health units were represented at three sites for the second videoconference. Participants from the Sudbury and District Health Unit attended both videoconferences. For the initial videoconference, all workshop leaders were at the Sudbury site, but for the second workshop one leader was in London bringing the total number of sites for the second workshop to four. The combined attendance of 104 (including workshop leaders) far exceeded expectations.

Literature Review

Generally speaking, technology is now widely accepted as a "solution to the triple challenge of quality, access and cost".² This acceptance is in great part attributed to increased access to the various technologies, recent technological innovations and improved interactive capabilities of new technologies.

The study of learning technology and its evaluation is relatively new³ and consequently, rigorous research is limited. Much of the existing literature tends to focus on the use of learning technologies in educational institutions.² Some literature is beginning to explore the impact of such technologies as a training and learning tool in the workplace. Based on a survey of 540 randomly selected private U.S. firms of 50 or more employees, the use of learning technologies in the workplace represents only a small proportion of all training delivery and was estimated at 5.8% to 7.3% of all training time in 1998. At that time it was reported that the use of learning technologies would increase by an estimated 20% to 35% by the year 2000.⁴

The report by the Office of Learning Technologies on the effectiveness of learning technologies is based on the assumption that education delivered through learning technologies can be as effective as education delivered through the classroom medium. Research suggests that this can be true provided that some caveats are heeded. The first is that the content and learners should be considered before the medium or the technology is determined. Clearly the learners and the content rather than the technology should drive the process.² The second caveat is that the effectiveness of the technology is dependent upon the consideration given up-front to access, to training provided to presenters and users of the technology and to the quality of the material being presented.⁴

Videoconferencing is but one example of a variety of types of existing learning technologies which can range from audio tapes, to computer-based training, to use of the Internet. Every medium presents advantages and

disadvantages. The greatest advantage of videoconferencing is that the interaction between participants is immediate and direct. The main limitations of videoconferencing are that learners must be present during the same period of time as the videoconference and that access to sites is limited.²

Participant Description

All levels of staff including front line staff, middle and senior managers and Medical Officers of Health participated in the videoconference. Of the 88 who responded to that question, 55.7% described themselves as frontline staff, 18.2% as middle managers and 26.1% as senior managers. The majority (57.7%) of participants had no previous experience with videoconferences. For those who did have previous experience (n=44), the majority indicated a high level of satisfaction with their past experience of using videoconferencing as a learning medium (mean=3.93, s.d.=0.728, where 1=dissatisfied and 5=satisfied on a 5 point scale). Experience with the videoconferencing format included being a presenter, a participant, an observer, an evaluator or being responsible for coordinating a videoconference. With the exception of one workshop leader, the remaining four had had some exposure to videoconferencing. However, only two of the workshop leaders had previous experience presenting by videoconference.

Methodology

A generic content evaluation tool was provided to all who attended the eight PHRED regional workshops throughout the province. A report of this evaluation, which includes the two workshops conducted by videoconference is in progress. Participants (n=87), facilitators (n=12) and leaders (n=5) from the Northern PHRED workshops were requested to complete an additional evaluation specific to their workshop role. The purpose of this questionnaire was to determine the effectiveness of videoconferencing as a tool for staff development. All who attended completed the evaluation questionnaires, representing a response rate of 100%. The workshop leaders completed the Workshop Leaders' Questionnaire for the first videoconference only.

Respondents used 5 point Likert scales to rank their overall satisfaction with using videoconferencing for the regional workshop, their past experience with videoconferencing, their assessment of the technology, their satisfaction with the pre-workshop package and with the level of interaction with other sites, their own site and with the leaders. Each questionnaire provided space for further comments. In addition they were asked whether or not they would recommend videoconferencing for future PHRED educational events, and if so, if they had any suggestions to improve videoconferencing as a dissemination tool.

In addition, facilitators were asked to comment on their role and their satisfaction with the pre-workshop training provided by the workshop

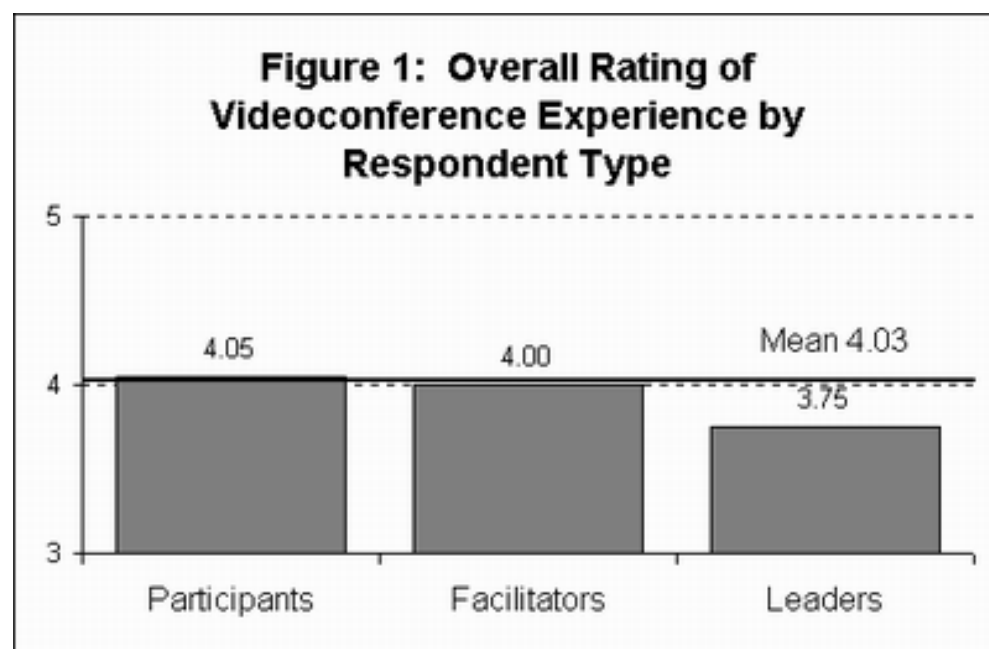
organizers. Similarly, workshop leaders were asked to critique their experience, including the training provided and their sense of comfort with videoconferencing. Facilitators, workshop leaders including the workshop consultant also tracked activities and the time required preparing for the workshop.

Data were analyzed separately for the December and January videoconferences and then grouped for simplicity and clarity of presentation. Where evident, differences between the two conferences are identified.

Findings

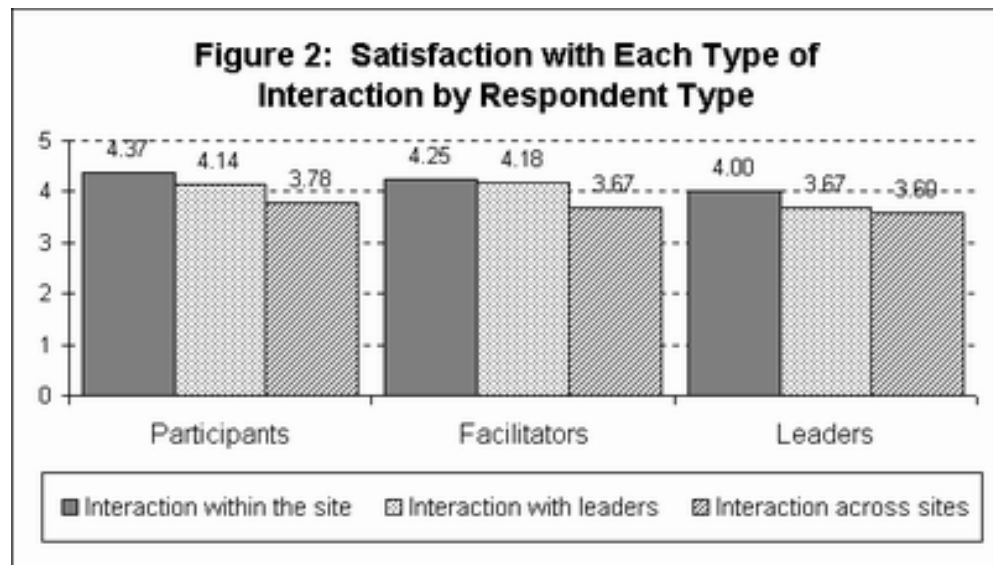
Overall Satisfaction

Respondents were asked to rate their previous experiences with videoconferencing. As illustrated in Figure 1, respondents rated the overall videoconference experience very positively. Figure 1 further breaks down how participants, facilitators and leaders rated their experience. The workshop leaders rated their experience, slightly less favourably than participants or facilitators.



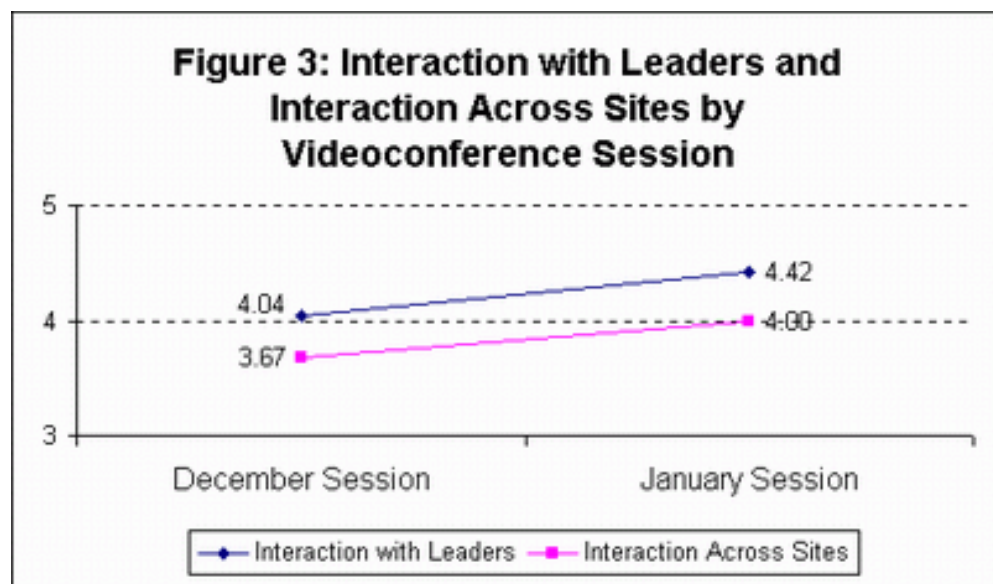
Workshop Package

The vast majority of participants (mean=4.21, s.d.=0.738) and facilitators (mean=4.33, s.d.=1.073) rated the workshop package provided as useful or very useful. The package was identified as "excellent", and as an "important tool that assisted in the success of the event". Some respondents commented that the package helped participants "to follow the presentation when technical difficulties were encountered". Several requested that the package be sent out earlier and one respondent suggested that participants should be encouraged to read the package ahead of time.



Interactions

Respondents were asked to rate their level of satisfaction with the interactions that occurred with the workshop leaders, with other sites and at their own site. As demonstrated in Figure 2 the results indicate a high degree of satisfaction with interactions overall, although interaction across sites was consistently rated the lowest by all respondent types. When participants and facilitators were combined, the January session was rated more positively than the December session in terms of interaction with leaders and across sites (Figure 3). Statistical significance could not be established between the two sessions due to small cell sizes.



Benefits

Content analysis of the comments by participants, site facilitators and workshop leaders identified five main themes related to the perceived benefits of videoconferencing:

Access: Several respondents indicated that reduced travel increased access to the workshop:

- . "didn't spend 7 hours travelling but everyone was there; many more can participate",
- . "time efficient, learn from information and participate without having to leave N.W. (the Northwest)".

Cost-saving: Many felt the videoconference represented cost savings in terms of time and travel:

- . "saves time, travel and money".
- . "financially feasible - more staff involved".
- . "more sites were accessed in a shorter period of time".

Networking: Appreciation was expressed at being able to communicate with a large number of colleagues across distances:

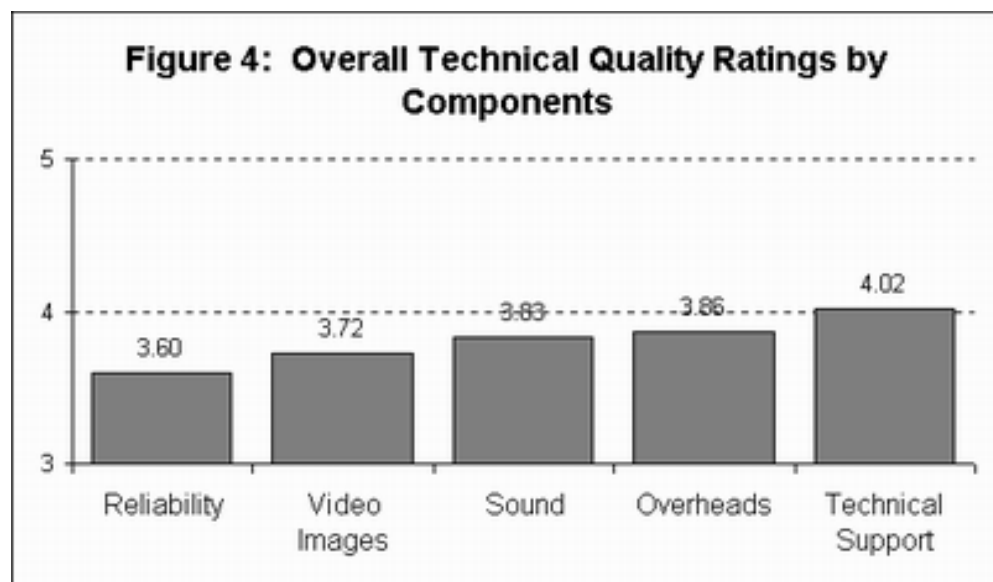
- . "linkages with health units from the north and PHREDs".
- . "networking with colleagues across the north without travel costs".
- . "networking with health units in the north, new information, stimulates discussion".

Value of Interaction and Visual Contact: Respondents reported that there was value in the visual and interactive aspects of the videoconferencing technology:

- . "more interactive than teleconference".
- . "keeps up attention, audio & visual".
- . "visual impact with being with people at remote sites".
- . "access to experts".

Workshop Format: Some positive comments were shared regarding the workshop format:

- . "discussion periods were good, brought up different and interesting information".
- . "agenda followed, participation from multiple areas/skill mix".
- . "experts available to present, more people, more ideas".
- . "hands on learning, facilitated very well".



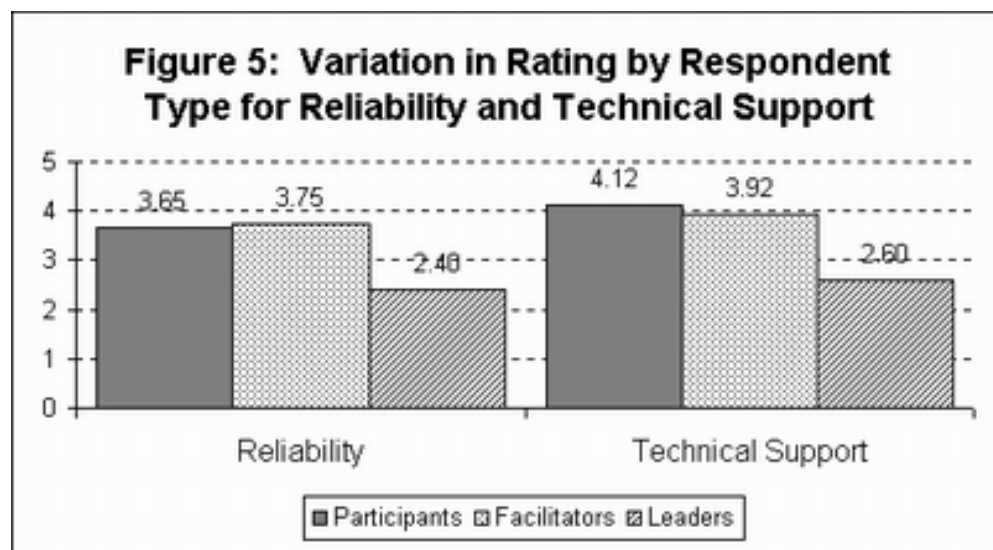
Limitations

Similarly participants, site facilitators and workshop leaders were requested to comment on any limitations of the videoconference. The main issues identified were technological difficulties and limitations associated with the technology such as the delayed sound and image and the need for additional microphones. Despite these concerns, respondents' mean scores regarding satisfaction with the technology ranged from 3.6 to 4.02 (Figure 4). In contrast, workshop leaders were much less satisfied with the reliability of the technology and with the technological support provided than their counterparts (Figure 5). Statistical significance could not be established due to small cell sizes. These comments by the workshop leaders likely reflected some of the technical difficulties experienced such as a defective cable causing interruptions in the workshop. Comments were also made regarding the physical setup of some sites and the lack of proper ventilation.

Although networking was identified as a benefit for many participants, others identified it as limited:

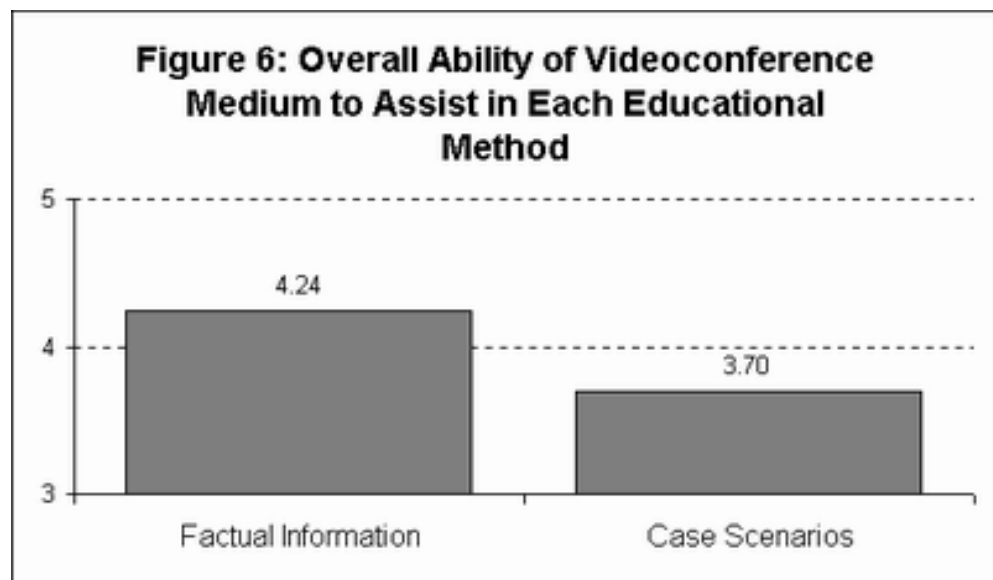
- . "small group work with colleagues limits new perspective of others from different areas",
- . "less interaction with other sites, therefore less networking",
- . "large number of sites reduced opportunities for interactions between sites".

The workshop leaders also highlighted the impact of videoconferencing on group interaction and the need for a less active presentation style to accommodate the technology.



Future Uses

Despite these limitations, the majority of respondents felt that videoconferencing was an appropriate method to disseminate factual information. This medium was rated highly and more positively in its ability to assist in the dissemination of factual information (mean=4.24, s.d.=0.664) than in its ability to facilitate small group work and case scenarios (mean=3.70, s.d.=0.927) (Figure 6).



Respondents unanimously recommended videoconferencing for future PHRED educational events. Results indicate that half recommended it "as is" and the other half recommended it "with modifications". Suggested modifications commonly identified related to planning, technology and process:

Planning:

. "ensure sites are conducive to a day long videoconference e.g. adequate space, well ventilated, and available technical support".

. *"receive workshop package earlier and come prepared"*.

Technology:

. *"adequate microphones, and more reliable and sophisticated equipment"*.

. *"develop a checklist for presenters and participants re videoconference etiquette and limitations of the medium"*.

. *"less camera action on sites, liked camera on speaker during question period"*.

Process:

. *"let the presenter know if site has questions; needs to be seamless, the interruptions lose momentum"*.

. *"have PHRED representative at each site if possible"*.

Facilitator Experiences

Facilitators (n=12) were equally divided between those who had previous experience with videoconferencing and those with no experience. Those (n=6) with previous experience indicated a high level of satisfaction with videoconferencing as a learning medium (mean=4.0, s.d.=0.0). Fifty percent of all facilitators felt that facilitating this videoconference was no different than facilitating a similar workshop, where the workshop leaders are on site. Just over half (58.3%) felt adequately prepared for their role as a facilitator. In terms of suggestions for what additional preparation was needed, the comments were not specific to videoconferencing but rather related to the workshop content, such as: *"more information on benchmarking.."*.

A review of the facilitators' tracking forms indicated that many of the activities noted such as reviewing workshop materials, distributing registration forms, setting up rooms and practice sessions are not unique to delivering workshops by videoconferencing. Four of the 12 facilitators did make site visits to familiarize themselves with the setting including the technology prior to the videoconference. Similar to other PHRED regional workshops where orientation sessions were held, a teleconference was held prior to both workshops to assist facilitators in preparing for their role and to clarify expectations.

Facilitators guesstimated that with the usual format of one on-site session in the Northwest and one in the Northeast, total attendance would have been approximately 39 participants and facilitators. This number is consistent with previous attendance of similar regional workshops using the traditional format. The majority of the facilitators added that videoconferencing allowed more staff to participate and would keep costs down.

Workshop Leader Experiences

A review of the workshop leaders' tracking forms indicated that unlike other mediums, additional time was required to learn how to present by videoconference (ie. speaking more slowly, limiting movement, etc). Extra

time was also required to rewrite or modify the workshop materials to accommodate the videoconference format and to make necessary revisions following the first videoconference in preparation for the next.

All of the workshop leaders received written material about videoconferencing to assist them in preparing for the workshops. Four of the five leaders received on-site training and had a practice session using the technology prior to the workshop. The other leader received orientation through a CD-ROM. Overall, the workshop leaders were relatively satisfied with their training (mean=3.40, s.d.=0.548, where 1=ineffective and 5=effective). Having a practice session with "live" equipment and having equipment set up exactly as it would be for the conference were identified as additional training that would have been beneficial. Other suggestions included receiving tips on how to maximize interactions between sites and the need for improved facilities and video equipment.

After delivering the workshop, all leaders indicated that they were more comfortable using videoconferencing (mean=4.00, s.d.=0.0) to deliver the workshop information than prior to the session (mean=2.75, s.d.=0.500). Similarly, after delivering the workshop, all five workshop leaders ranked their satisfaction with videoconferencing as high.

Discussion

A mix of all staff levels from eight Northern health units took part in this videoconferencing pilot project. The group was highly motivated and appreciative of the opportunity to attend this workshop close to their place of work. The interest in using videoconferencing is reflected in the number of participants and the 100% response rate on the evaluation questionnaire.

Although the videoconference was rated very positively overall, some interesting trends do emerge. The workshop leaders for example, generally rated their experience lower than the participants and facilitators. This difference may be due to the fact that the leaders were more affected by technical difficulties and their limited previous experience with the medium increased presentation anxiety.

The January 19th group also consistently rated their answers higher than the earlier December 10th group. This might be explained by the benefits of previous experience and the smaller number of sites.

Finally, the Sudbury respondents rated the workshop slightly higher than their colleagues elsewhere possibly because their videoconference experience was somewhat different. Sudbury participants and facilitators had the advantage of having all the leaders present in the first workshop and four of the five leaders present in the second workshop.

Interestingly, the level of interaction was seen as both a benefit and a limitation. Some respondents indicated it was interesting to see and network

with colleagues from other health units while others indicated this networking was limited. Some comments suggest videoconferencing may be seen as an improvement over teleconferences but a limitation when compared to face-to-face presentations. Differences were noted as to the type of interaction. Respondents rated site-specific group interaction most positively, followed by interaction with leaders. Group interaction across sites was rated lowest although the findings suggest the effect may be mediated by a smaller number of sites. Experience with the technology may also be a factor.

Not surprisingly, videoconferencing was rated more positively as a vehicle for the sharing of factual information than for the group work related to the case scenarios. The workshop leaders anticipated potential difficulties with the interaction and attempted to maintain a personal element throughout the workshops. Questions were encouraged for example at regular intervals, food was provided and gifts were used as icebreakers. The mix of videoconferencing time with local small group work was seen as essential for a day long event.

Benefits were categorized into five main themes: increased access, reduced costs, increased networking, increased interaction (including the visual aspect) and satisfaction with workshop format. The access that videoconferencing provided through reduced time and travel was clearly the greatest benefit.

Criticisms were often worded very cautiously or were accompanied by a positive comment (i.e. "*very much enjoyed this new format despite the few glitches*"). Limitations of the medium were generally related to two themes: the technology and the physical setting. The first limitation is the technology. The five second delay in the transmission of the video picture and the sound was somewhat distracting and required some getting used to. The length of the delay is related to the available number of telephone lines which can range from two to six. Only two sites had access to the superior number of lines. As a result the organizers were limited to the lowest common denominator and the workshops were transmitted across two telephone lines. Had all sites had access to six telephone lines the video and sound delays would have been minimal. In addition, the reliability of the technology rated lowest when respondents were questioned regarding the quality of the videoconference.

The second limitation was related to the physical setup at the different sites. For example, one videoconference site was in a portable classroom setting. Respondents commented on the general layout, ventilation and temperature.

Overall, facilitators did not feel their experience of facilitating this videoconference workshop was very different from facilitating a similar on-site workshop. In contrast to this, workshop leaders reported that the videoconferencing format required a substantial amount of time and energy. The presenters reported having to learn how to present by videoconference

(i.e. becoming familiar with the technology, modifying the presentation style to slow speech and minimize movement) and were required to modify and reduce the workshop content to suit the medium. The leaders did however report an increased level of comfort with the medium following the first workshop. These comments are consistent with the literature. To maximize success, investing time and energy in content preparation and technology training are essential.⁴ In addition, it is reported that this initial time requirement is reduced dramatically after the individual has gained experience and a measure of comfort in using the learning technology.² Leaders also expressed excitement from learning and experimenting with a new medium. The experiences from this pilot demonstrated the importance of having a person assigned to plan and to coordinate the logistics required by videoconferencing.

Limitations of the Evaluation

It must be noted that this evaluation was limited to surveying respondents regarding a specific videoconferencing experience. This evaluation did not attempt to compare this medium to the traditional face-to-face delivery used in the other six PHRED workshops in terms of knowledge gained, etc. In addition, leaders were only surveyed after their delivery of the first workshop and not after the second workshop.

Many of the respondents assumed that the videoconference represented a cost savings and thus increased access to more participants. This assumption may or may not be correct. A cost-benefit analysis is currently underway. The cost of the technology is significant and can vary (in our case from \$150.00 to \$250.00 per site per hour). This cost may of course be mitigated by the increased number of participants.

Several decision-making models exist in the literature which are designed to help determine what technology is best used under what circumstances. The Office of Learning Technologies (1998) reports that all models encompass three types of groupings: instructional, technological and resource. The instructional grouping involves the determination of the content to be delivered and the characteristics of the learners. The technological category includes the identification of the learning technology options and their capabilities. The resource grouping refers to the required organizational support as well as the issue of cost.²

Recommendations and Conclusion

The following recommendations were identified based on the respondents' experience with videoconferencing:

1. Consult decision-making models to determine the most appropriate technology and consider videoconferencing as a dissemination strategy.
2. Secure the services of a reliable videoconference or learning

technology service provider.

3. Keep the number of sites manageable to encourage interaction and reduce distractions.
4. Provide sufficient time and resources for planning, preparation and training. Presenter comfort with the technology is an important factor. This recommendation is especially important when beginning to use learning technologies.
5. Provide participants with comprehensive pre-conference materials to help them prepare for and participate in the event. These materials are also essential if technical difficulties are experienced.
6. Develop a back-up plan to be used in the event of technical difficulties. For example, forward back-up material (i.e. overheads) to each site.
7. ALWAYS test the technology well in advance to increase reliability, to heighten presenter comfort and to identify potential technical difficulties.
8. Provide ample opportunities for interaction when using learning technologies to increase the interpersonal component.
9. Maximize the benefits of the visual component when videoconferencing by focusing on the speaker, not only the slides.
10. Remain informed regarding the available learning technologies and their capabilities. Due to the climate of rapid change in this area, the technology is continually improving.

In summary, this pilot project has proven to be a positive learning experience. Respondents were unanimous in recommending videoconferencing for future educational events. This option may be particularly appropriate where access is an issue such as in the North, rural settings or when province-wide reach is required. Videoconferencing and other learning technologies should not however be viewed as a panacea for disseminating information. The factors of content and the skill of the presenters remain key in their successful use. Cost benefit analysis of this videoconferencing experience will provide much needed data for informed decision-making about the future use of this technology in public health.

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