A Process Evaluation of an Intervention to Improve Respiratory Infection Control Practices in Family Physician Offices

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ABSTRACT

Objective: To conduct a process evaluation of a short-term intervention by public nurses for physicians to facilitate the incorporation of new respiratory infection control practices in physicians' offices.

Design: Process evaluation.

Setting: Family physician offices in Ottawa, Ontario, Canada.

Participants: Five public health nurse-facilitators and 53 primary care practices including 143 family physicians.

Method: Effectiveness of facilitator training assessed by self-administered questionnaires. Data assessing process of facilitation collected through activity logs and narrative reports. Physicians' satisfaction assessed by post-intervention questionnaire.

Main Findings: Facilitators reported that training strongly contributed to their knowledge and skills and all were either satisfied or highly satisfied with their facilitation training. All practices received at least two visits by the facilitator and more than half (51%) were visited three or more times. Facilitators identified the provision of the evidence-based Tool Kit and consensus-building with office staff as key factors contributing to the intervention's success. Of the 45% of physicians who completed the questionnaire (65/143), only 5% reported being somewhat dissatisfied with the intervention, 11% reported the visits were not frequent enough, and 9% thought the visits were too close together. The majority (97%) felt the facilitation program should be available to all family physicians and 98% would continue to use the service if available.

Conclusions: It is feasible for public health nurses to be trained in outreach facilitation to improve respiratory infection control practices in physicians' offices and this has been widely appreciated by physicians. This model of public health/primary care collaboration deserves further exploration.

MeSH terms: Infection control; family physicians; physicians' offices; public health nursing

La traduction du résumé se trouve à la fin de l'article.

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The first health care professional to die in the SARS epidemic in Canada was a family physician. Reports regarding the public health response to SARS raised concerns about infection control in health care settings¹⁻³ and there is now evidence on transmission of SARS in physician offices.⁴ Both the Naylor and Campbell Reports raised concerns about information flow to family physicians and the lack of necessary supplies.^{1,2} The Walker Report identified the need for improved training of all health care workers.³ SARS has been perceived as a "dry run" for a larger respiratory infectious outbreak, such as pandemic influenza. The Canadian Pandemic Influenza Plan identifies the federal, provincial and local responsibilities before and during a pandemic, including the need for local implementation of infection control measures.⁵

To address the need for improved respiratory infection control in family physician offices, Ottawa Public Health and the University of Ottawa Family Medicine Department applied an outreach facilitation model to encourage knowledge transfer on best practices in respiratory infection control to family physicians. The facilitation model addresses educational, attitudinal and organizational barriers to change, and tailors interventions to the needs and unique characteristics of the practice.⁶⁻¹⁰

The use of trained facilitators to change practice patterns has been successful in both the United Kingdom and the United States.¹¹⁻¹³ It has also been found that the use of multifaceted intervention strategies rather than single interventions can result in substantial changes in physician behaviour and health outcomes.^{14,15}

The overall objective of our study was to determine whether family physician practice teams would improve their respiratory infection control practices following our facilitator-based intervention. We conducted both an outcome evaluation¹⁶ and a process evaluation. This paper describes the process evaluation. The objective of the process evaluation was to assess the effectiveness of the facilitator training, to characterize how this facilitation was put into practice, and to assess physician satisfaction with the intervention. The study was approved by the Ottawa Hospital Research Ethics Board.

METHOD

Setting

All family physician practices in Ottawa were invited to participate in this study.

Intervention

Evidence-based “best practices” for respiratory infection control were established by an Expert Panel (a family physician, a public health physician and an infectious disease consultant) upon reviewing a summary of the evidence prepared by a research librarian. The Best Practices were: 1) providing a mask for patients with cough and fever, 2) posting a sign in the waiting area for patients and staff on preventive manoeuvres to be followed, 3) disinfecting hard surfaces with wipes, 4) using alcohol gel for disinfecting hands, and 5) ensuring that people with fever or cough sit one metre away from others.

Public health nurses were then trained as facilitators to disseminate evidence-based respiratory infection control guidelines to family physician practices. The objective of the two-week training course was to equip the nurses with the knowledge and skills to champion best practices in respiratory infection control in community-based primary care practices. It provided information on best practices in infection control in community primary care settings, theory and principles on the facilitation process, communication skills, organizational principles, change theory, group behaviour models and motivational strategies. A tool kit was developed that included signs outlining respiratory control guidelines (see Figure 1) and the demonstration of their implementation, a reference listing of major guidelines sources and disease control websites, infection control articles, a box with 50 procedure masks, wall-mounted alcohol gel dispensers with refills, alcohol gel pumps, and hospital grade disinfectant wipes, and order forms for additional supplies (alcohol gel, dispensers, wipes).

The intervention began and ended with an audit of each family practice’s implementation of the five infection control practices. After the pre-intervention audit, facilitators shared with the physicians and their teams the audit’s results (feedback), and helped them to determine their infection control goals (goal setting) and to adapt the implementation of the practices to their circumstances (tailoring).

Figure 1. Respiratory Infection Control Sign developed for posting in patient waiting area in primary care offices

Data Collection

To assess facilitator training, a post-training questionnaire was developed which asked facilitators the extent to which: 1) the training increased their knowledge about best practices in respiratory infection control and the facilitation process; 2) the training provided them with the knowledge and skills to assume their role as practice facilitators; and 3) the content format and delivery of the course were conducive to learning. During training, the knowledge and skills acquired were assessed through role-play and debriefing sessions.

To assess how facilitation was put into practice, the facilitators documented their activities and progress on two structured forms. Activity Logs recorded the number of hours spent on both on-site and off-site activities. Narrative Reports provided detailed information on the activities undertaken and the outcome of each visit, the type and number of participants in meetings, and

a plan for the following visit. In these reports, facilitators identified factors (actions taken, team characteristics, etc.) perceived as contributing to improvements in respiratory infection control behaviour, and challenges or barriers to improved practice performance. The activities in the Narrative Reports were summarized by intervention component to provide an overview of all intervention activity within a practice, and to identify common themes across practices.

After the intervention, physicians completed a post-intervention questionnaire. Physicians were asked to rate the usefulness of components of the intervention on a scale of 1 (not useful) to 5 (very useful) and to rate their overall satisfaction with the intervention. All questionnaires were pre-tested for usability and face validity.

Analysis

Data were analyzed using quantitative, qualitative and descriptive analysis. To

Figure 2. Facilitators' self-assessment of knowledge and skills acquired from training

TABLE I

Hours of Intervention Work Activity and Percentage of Total for 53 Practices
(total hours = 875 (25 days x 5 facilitators x 7 hours/day))

Activity	Total # (%)
Implementing site services	
Audit & ongoing feedback	36 (4.1)
Planning & consensus building	44 (5.0)
Waiting time	17 (1.9)
Travel and Administration	
Travel	117 (13.4)
Administrative duties relating to PH/FM	403 (46.1)
Other: vacation, sick time	258 (29.5)
Total	875 (100)

All figures have been rounded to the nearest hour

determine facilitator satisfaction with training, questionnaire responses were coded and frequencies generated for ratings of the components of the training and the intervention experience. Open-ended questions were analyzed to identify common themes.

To determine how facilitation was put into practice, averages were produced for number of hours spent on project activi-

ties, number of visits per practice, and amount of time spent on each of the strategy components. To determine the time involved to deliver intervention components, the total hours spent at each practice, travel, and administration as a percentage of the total time, and the average time spent on each of the on-site intervention activities were calculated from the Time/Mileage Activity Logs.

To determine physician satisfaction, responses were coded and frequencies generated for each of the intervention components.

RESULTS

A total of 53 practices (143 physicians) participated in the study, for an overall response rate of 22%. From those practices, 95% of physicians participated, and there were no practices that dropped out during the study. There were 5 PHNs who participated in the 2-week facilitator training and then conducted the intervention over a 5-week period. During this time, the Ministry of Health distributed guidelines for respiratory infection control in community settings,¹⁷ which were consistent with the best practices identified by the Expert Panel.

Facilitator satisfaction with training

Overall, the facilitators rated the course content favourably on all dimensions (see Figure 2). Most respondents reported that they had acquired either "A lot more" or "Somewhat more" knowledge in all areas. They identified the following strengths of the course: the small group size, the knowledge and expertise of the trainer, the guest speakers, the opportunity to apply their newly acquired skills and knowledge in a pilot practice setting, and the use of evidence-based medicine. All five facilitators reported being satisfied or very satisfied with the experience, and all indicated that they would be willing to repeat the experience and would recommend the experience to a friend.

Facilitation in practice

Each nurse had 10-11 practices which had an average of 3 physicians. All practices received at least two visits from a facilitator. Twenty practices (38%) received a third visit, and seven (13%) received a fourth visit. The average time spent at each visit was 45 minutes. The most popular time for visits was the lunch hour.

Table I shows the number of hours spent on intervention activities, and on travel and administration relative to the total time of the intervention. The largest proportion of their time (46%) was spent on administrative duties related to the intervention (team meetings, telephone calls, internal reporting, visit preparation), and completing time logs and narrative

TABLE II

Physician Ratings of Usefulness of Components of the Intervention

	Very Useful	Useful	Neither Useful/ Not Useful	Not Useful	Not Useful at All	Not Applicable	Missing Responses
	% (#)	% (#)	% (#)	% (#)	% (#)	% (#)	% (#)
Provision of literature-based information	30.5 (18)	40.7 (24)	15.3 (9)	5.1 (3)	0	8.5 (5)	6
Materials for patients (posters, educational materials)	36.2 (21)	37.9 (22)	6.9 (4)	8.6 (5)	0	10.3 (6)	7
Provision of hand washing/sanitizing signage	57.6 (34)	30.5 (18)	5.1 (3)	0	1.7 (1)	5.1 (3)	6
Provision of masks	53.3 (32)	25 (15)	6.7 (4)	3.3 (2)	1.7 (1)	10 (6)	5
Provision of disinfectant wipes	57.4 (35)	23 (14)	9.8 (6)	0	0	9.8 (6)	4
Provision of alcohol gel and dispensers	82.3 (51)	12.9 (8)	3.2 (2)	0	0	1.6 (1)	3
Assistance to practice in respiratory infection control awareness	37.7 (23)	42.6 (26)	13.1 (8)	0	0	6.6 (4)	4
Feedback of the audit	26.7 (16)	43.3 (26)	13.3 (8)	0	0	16.7 (10)	5
Facilitator	34.4 (21)	45.9 (28)	9.8 (6)	0	0	9.8 (6)	4

forms. A large proportion of time (29%) was taken up by other activities, including vacation time (most taken during the March break). Travel accounted for 13% of the total time. Just 2% of the time was spent waiting at the practices. Nine percent of the facilitators' time was spent on-site facilitating changes to improve respiratory infection control in the practice, with 4% spent on providing audit and ongoing feedback and 5% on planning and consensus-building activities.

Facilitators noted the provision of the evidence-based Tool Kit as a key factor contributing to the intervention's success. The pre-intervention audit and subsequent feedback session were identified as a good method for setting the stage to introduce changes in respiratory infection control practice. Consensus-building with office staff was also identified as a factor contributing to their intervention's success.

Facilitators identified a number of challenges in implementing changes. Practices wanted high-quality, credible evidence to support the infection control guidelines (e.g., written information on modes of transmission of infectious agents and on the specific action of alcohol gel). Other concerns raised by practices included the potential drying effects and skin irritation caused by alcohol gel, ongoing costs associated with implementing the infection control guidelines, and the impact of changes to office practice on clients. Impediments to changing behaviour included an inability of many practices to implement the one-metre isolation rule (for patients with a cough or fever) due to limited seating and/or crowded waiting areas, and issues regarding the efficacy of signage (not available in Chinese, Somali, Spanish, French, Arabic) and cultural barriers to compliance with it. Facilitators felt that the duration of the intervention was too short to enable them to try new strate-

gies and evaluate if changes in practice performance had occurred.

Physician feedback

At the end of the intervention, 45% (65/143) of the physicians responded to the questionnaire about their views on participating in the project. The majority of responding physicians reported being satisfied (17%), somewhat satisfied (40%), or very satisfied (38%) with the intervention, while 5% reported being somewhat dissatisfied. Most were satisfied with the number of facilitator visits (89%) and the amount of time between visits (80%). Eleven percent of physicians felt the visits were not frequent enough, and 9% felt there was too little time between visits. The majority felt the facilitation program should be available to all family physicians (97%) and would continue to use the service if available (98%).

Table II provides a summary of the content of physician responses. Physicians rated as the most useful components of the intervention the provision of alcohol gel and dispensers, followed by hand washing/sanitizing signage, disinfectant wipes, and masks. Many of the physicians rated the facilitator (46%), assistance in respiratory control awareness (43%), feedback of the audit (43%), the provision of literature based information (41%), and educational materials for patients (38%) as somewhat useful.

Eighty-two percent of the physicians reported that they were practicing respiratory infection control more effectively as a result of having a facilitator work with their practice.

DISCUSSION

This study demonstrates that it is possible to train public health nurses as facilitators and facilitate change in family physician

offices to improve respiratory infection control with high satisfaction of facilitators and physicians alike. All the nurses said they would do it again, and 97% of physicians said such a service should be made available to all family physicians. Factors that appeared to contribute to the intervention's success were the facilitation model that included personal interaction, evidence-based recommendations, the Tool Kit, and a willingness to tailor the intervention to meet the needs of the practice.

During the study, formal guidelines on respiratory infection control were issued that became a confounding factor in our study. However, it is more likely to bias the outcome evaluation rather than the process evaluation reported on here. Changing physicians' long-held patterns of behaviour and the environments in which they work is complex. Evidence-based guidelines are not self-implementing. It has been well established that efforts to address physician knowledge alone are insufficient to ensure that change has been integrated and consolidated into new and lasting patterns of behaviour.^{12,18-21}

Physicians responded favourably to the provision of infection control supplies – masks, wipes, gel and dispensers. We believe that the provision of this infection control kit indicated to physicians the clear commitment of public health and its endorsement of particular practices. Physicians had a clear idea of how to address respiratory infection control in their offices, based on this project.

There are several lessons learned and future considerations for improving the delivery of respiratory infection control guidelines through outreach facilitation. Public health nurse facilitators can assist practices to enhance their infection control performance in line with evidence-based

recommendations, are readily accepted by practices, and are seen as mentoring instead of monitoring. It is important to tailor the intervention to the practice setting, as accommodating the particular needs of practices facilitated their receptivity. Interventions need to take into account the multicultural nature of the community served by the practices and tailor their materials accordingly. Consideration should also be given to increasing the duration of the intervention to enable sufficient time to assess the implementation of changes. Reducing the administrative burden of facilitators could increase their time on-site. To increase practice motivation to participate, the intervention should occur in the autumn, concurrent with other influenza preventive activities of public health departments, particularly distribution of influenza vaccine. Finally, consideration should be given to having an ongoing relationship between public health and family physicians to optimize areas of mutual concern. This could include other infection control matters, health promotion activities or even emergency preparedness.

CONCLUSIONS

This short study demonstrates the feasibility of employing public health nurses as facilitators to improve respiratory infection control practices in physicians' offices. It was well received by all parties. The success of the intervention may have been related to its brevity, relevance in a post-SARS era, action orientation, and collaborative approach. Probably the salient limitation of this research is its low response rate and the issue of generalizability that this generates. Although this can be explained by the short recruitment period (three weeks) due to the time constraints under which the research was conducted, the reader should be aware of this caveat. Given this and the encouraging results from the study, this model of public health/primary care collaboration for improved health outcomes presented here deserves further exploration.

REFERENCES

1. National Advisory Committee on SARS and Public Health. Learning from SARS: Renewal of Public Health in Canada. October 2003. Available at: <http://www.phac-aspc.gc.ca/publicat/sars-sras/naylor/> (Accessed August 18, 2006).
2. Campbell A. The SARS Commission Interim Report. SARS and Public Health in Ontario. April 15, 2004. Available at: http://www.health.gov.on.ca/english/public/pub/ministry_reports/campbell04/campbell04.html (Accessed August 18, 2006).
3. SARS Expert Panel Report. Chapter Two: Infection Control. December 12, 2003. Available at: http://www.health.gov.on.ca/english/public/pub/ministry_reports/walker_panel_2003/walker_panel.html (Accessed August 18, 2006).
4. Svoboda T, Henry B, Shulman L, Kennedy E, Rea E, Ng W, et al. Public health measures to control the spread of the severe acute respiratory syndrome during the outbreak in Toronto. *N Engl J Med* 2004;350(23):2352-61.
5. Public Health Agency of Canada (PHAC). Canadian Pandemic Influenza Plan. February 2004. Available at: <http://www.phac-aspc.gc.ca/cpip-plcpi/> (Accessed August 18, 2006).
6. Cohen SJ, Halvorson HW, Gosselink CA. Changing physician behavior to improve disease prevention. *Prev Med* 1994;23:284-91.
7. Hulscher ME, Van Drenth BB, Mokkink HG, van De Lisdonk EH, van Der Wouden JC, van Weel C, et al. Tailored outreach visits as a method for implementing guidelines and improving preventative care. *Int J Qual Health Care* 1998;10:105-12.
8. Main DS, Cohen SJ, DiClemente CC. Measuring physician readiness to change cancer screening: Preliminary results. *Am J Prev Med* 1995;11:54-58.
9. Lemelin J, Hogg W, Baskerville N. Evidence to action: A tailored multifaceted approach to changing family physician practice patterns and improving preventive care. *CMAJ* 2001;164(6):757-63.
10. Baskerville NB, Hogg W, Lemelin J. Process Evaluation of a Tailored, Multifaceted Approach to Changing Family Physician Practice Patterns and Improving Preventive Care. *JFP* 2001;50(3):W242-W249.
11. Dietrich AJ, O'Connor GT, Keller A, Carney PA, Levy D, Whaley F. Cancer: Improving early detection and prevention. A community practice randomised trial. *BMJ* 1992;304:687-91.
12. Fullard E, Fowler G, Gray J. Facilitating prevention in primary care. *BMJ* 1984;289:1585-87.
13. Fullard E, Fowler G, Gray J. Facilitating prevention in primary care: A controlled trial of a low technology, low cost approach. *BMJ* 1987;294:1080-82.
14. Davis DA, Thompson MA, Oxman AD, Haynes RB. Changing physician performance: A systematic review of the effect of continuing medical education strategies. *JAMA* 1995;274:700-5.
15. Oxman AD, Thomson MA, Davis DA, Haynes RB. No magic bullets: A systematic review of 102 trials of interventions to improve professional practice. *CMAJ* 1995;153(10):1423-31.
16. Hogg W, Huston P, Martin C, Saginur R, Newbury A, Vilis E. Promoting respiratory infection control practices in primary care: Primary care/public health collaboration. *Can Fam Phys* (in print).
17. Ministry of Health and Long-Term Care. Preventing Respiratory Illnesses in Community Settings – Guidelines for Infection Control and Surveillance for Febrile Respiratory Illness (FRI) in Community Settings in Non-Outbreak Conditions. March 2004. Available at: <http://www.cco.on.ca/PDF%20files/Preventing%20FRI%20Non%20Outbreak%20Conditions.pdf> (Accessed August 18, 2006).
18. Grimshaw JM, Russell IT. Effect of clinical guidelines on medical practice: A systematic review of rigorous evaluations. *Lancet* 1993;342:1317-22.
19. Stange KC, Kelly R, Chao J, Zyzanski SJ, Shank JC, Jaen CR, et al. Physician agreement with US Preventive Services Task Force recommendations. *J Fam Pract* 1992;34(4): 409-16.
20. Tamblyn R, Battista RN. Changing clinical practice: What interventions work? *J Contin Educ Health Prof* 1993;13:273-88.
21. NHS Centre for Reviews and Dissemination: The University of York. Getting evidence into practice. *Effective Health Care* 1999;5(1):1-16. Available from: <http://www.york.ac.uk/inst/crd/ehc51.pdf> (Accessed August 18, 2006).

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RÉSUMÉ

Objectif : Évaluer en cours d'exécution une brève intervention d'infirmières de santé publique auprès de médecins pour faciliter l'intégration de nouvelles pratiques de contrôle des infections respiratoires dans les cabinets médicaux.

Conception : Évaluation en cours d'exécution.

Lieu : Cabinets de médecins de famille à Ottawa (Ontario), au Canada.

Participants : Cinq infirmières-animatrices en santé publique et 53 cabinets de soins primaires regroupant 143 médecins de famille.

Méthode : L'efficacité de la formation des animatrices a été évaluée à l'aide de questionnaires à remplir soi-même. Les données d'évaluation du processus d'animation-formation ont été recueillies à l'aide de registres d'activités et de rapports circonstanciés. La satisfaction des médecins a été évaluée au moyen d'un questionnaire post-intervention.

Principales constatations : Les animatrices ont déclaré que la formation reçue avait beaucoup amélioré leurs connaissances et leurs compétences, et toutes en étaient satisfaites ou très satisfaites. Tous les cabinets ont reçu au moins deux visites d'une animatrice, et plus de la moitié (51 %) en ont reçu trois ou plus. Selon les animatrices, les éléments ayant le plus contribué à la réussite de l'intervention étaient la distribution d'une trousse d'outils éprouvés et la concertation avec le personnel de bureau. Sur les 45 % des médecins ayant rempli un questionnaire (65/143), seulement 5 % se sont déclarés relativement insatisfaits de l'intervention; 11 % ont dit que les visites n'étaient pas assez fréquentes, et 9 % les ont trouvées trop rapprochées. La majorité (97 %) considéraient que ce programme d'animation-formation devrait être offert à tous les médecins de famille, et 98 % ont dit vouloir continuer à faire appel à ce service s'il était disponible.

Conclusions : Il est possible de former les infirmières et infirmiers de santé publique à l'animation extérieure afin d'améliorer le contrôle des infections respiratoires dans les cabinets médicaux; c'est d'ailleurs un service très apprécié des médecins. Ce modèle de collaboration entre la santé publique et les soins primaires mériterait d'être étudié plus avant.