Promoting best practices for control of respiratory infections

Collaboration between primary care and public health services

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ABSTRACT

OBJECTIVE To determine the effectiveness of a short-term intervention to promote best practices for control of respiratory infections in primary care physicians' offices.

DESIGN Before-after observational study.

SETTING Family physicians' offices in Ottawa, Ont.

PARTICIPANTS General practitioners and office staff.

INTERVENTIONS Four infection-control practices (use of masks, alcohol-based hand gel, and signs, and asking patients to sit at least 1 m apart in the waiting room) were observed, and 2 reported infection-control practices (disinfecting surfaces and use of hand-gel dispensers in examining rooms) were audited before the intervention and 6 weeks after the intervention.

MAIN OUTCOME MEASURES Percentage of patients asked to use masks and alcohol-based hand gel, number of relevant signs, and percentage of patients asked to sit at least 1 m away from other patients. Percentage of surfaces disinfected and percentage of physicians using hand-gel dispensers in examining rooms.

RESULTS Of 242 practices invited, 53 agreed to participate (22% response rate), and within those practices, 143/151 (95%) physicians participated. Signs regarding respiratory infection control measures increased from 15.4% to 81.1% following the intervention ($P<.001$). At least 1 patient with cough and fever was given a mask in 17% of practices before the intervention; during the observation period after the intervention, at least 1 patient was given a mask in 66.7% of practices ($P<.001$). Patients were instructed to use alcohol-based hand gel in 24.5% of practices before the intervention and in 79.2% of practices after it ($P<.001$). Instruction to sit at least 1 m from others in the waiting area was given in 39.6% of practices before the intervention and in 52.8% of practices following the intervention ($P<.001$). Before the intervention, the percentage of practices using all 4 audited primary prevention measures was 3.8%; after the intervention, 52.8% of practices were using them ($P<.001$), demonstrating a 49% increase in adoption of best practices.

CONCLUSION A multifaceted intervention by public health nurses successfully promoted best practices for control of respiratory infections in primary care offices. Collaboration between public health services and primary care can promote best practices and warrants further study and development in areas of common interest.

EDITOR'S KEY POINTS

- This study assessed whether a short-term outreach intervention was effective in improving practices for controlling respiratory infections in family physicians' offices.
- Outcomes were the percentage of offices following the 4 observed infection-control practices (masks, alcohol gel, spaced seating, and signs) and the 2 reported infection-control practices (disinfection of potentially contaminated surfaces and use of hand-gel dispensers in examining rooms).
- Before the intervention, all 4 infection-control practices were observed in fewer than 4% of offices; 6 weeks following the intervention, more than 50% of offices were using the infection-control practices.
- This study is the first to use a facilitator-based intervention to promote guidelines for control of respiratory infections.

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Severe acute respiratory syndrome (SARS) disturbed the medical community's complacency about control of respiratory infections. Severe acute respiratory syndrome disproportionately affected health care workers and innocent bystander patients[1,2] and revealed the potential for spread of respiratory infection in primary care offices.[3] More recently, occurrences of avian influenza in Asia, Europe, and North America with occasional spread to humans has increased concern about the risk of pandemic influenza.[4] Added to these concerns is the recognition that common microbial pathogens are becoming increasingly resistant to antimicrobial therapy. In the face of a re-emerging threat of respiratory infections, prevention is increasingly important.

Several guidelines on control of respiratory infections were issued both before and after SARS.[5-10] Guidelines, however, are not always implemented. There is a well documented gap between what ought to be done and what is being done. It is now clear that programs designed only to increase physicians' knowledge, such as traditional continuing medical education courses, are ineffective in changing physicians' behaviour.[11-13]

Growing evidence indicates that interventions involving multiple strategies are more likely to result in improved practice behaviour than single-strategy interventions are.[14-18] Bero et al[19] looked at 18 systematic reviews covering more than 400 research papers on improving professional performance and concluded that multifaceted facilitation interventions are effective in persuading physicians to incorporate good preventive practices into routine care. More recent reviews[20-22] indicate that more research is needed to clarify whether multifaceted interventions are better than single interventions. Interventions tailored to overcome barriers appear to be the most effective.

One of the most effective multifaceted strategies is outreach facilitation. Outreach facilitation involves having trained professionals working directly with physicians in their offices and uses audit of current practice, evidence-based best practices, planning and consensus building, and feedback on performance change as means to improve practice.[23] Several randomized controlled trials have shown outreach facilitation to be successful in improving delivery of preventive services and prescribing.[24-28] One trial done in Ontario[29] showed an absolute change of 11.5%, or a relative improvement of 36%, in preventive practices after an intervention, a result similar to those found in comparable trials.[20,30-35]

In keeping with the post-SARS recommendation that primary care and public health services work more collaboratively,[36] this research was a joint initiative of the University of Ottawa's Family Medicine Department and the City of Ottawa's Public Health Branch. We trained public health nurses in outreach facilitation so they could conduct the intervention. We evaluated both process and outcomes. This paper focuses on outcomes. Our study was designed to assess whether a short-term outreach facilitated intervention could be effective in improving practices for control of respiratory infections in family physicians' offices.

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METHODS

Setting

Ottawa, Ont, is a bilingual city with a population of approximately 800 000 people living in both urban and rural areas. The study was conducted between February and May 2004.

Study population

We identified all 638 family physicians in 242 practices in Ottawa and faxed them an invitation to join the study. Nonrespondents received a second fax and a follow-up telephone call. Because of time constraints (the project had to be implemented in 12 weeks), participating practices were self-selected. Recruitment continued until the required number of practices had been enrolled. We estimated that a sample of 49 practices would have 95% power to detect a 15% improvement in the primary outcome measures. We included practices with 2 or more physicians participating in the study even if not all doctors in the office agreed to participate. The smallest clinically significant difference was determined to be a 15% improvement in practices for control of respiratory infections. All practices joining the study gave written consent. The study was approved by the Ottawa Hospital's Research Ethics Board.

Identification of best practices

At the time of our intervention, there were Ontario guidelines on best practices for control of respiratory infections in hospitals[37] and long-term care facilities[38]

but not in ambulatory care settings. We convened an Expert Advisory Committee to review literature from the Cochrane Library database; medical literature databases (MEDLINE); and major guideline, public health, and relevant professional association websites in Canada and abroad. We found fairly consistent advice on best practices for control of respiratory infections in primary care[5-10]:

- give masks to patients with cough and fever;
- direct patients with cough and fever to clean their hands with alcohol-based gel;
- ensure patients with cough and fever sit at least 1 m from all others in the waiting area;
- have signs to inform patients about these practices and prepare them to follow the directions;
- disinfect surfaces that might have been contaminated with respiratory secretions following coughing or sneezing (arms of chairs, toys, etc); and
- provide masks and alcohol-based hand gel to physicians and staff who have contact with patients.

Training nurses in outreach facilitation

Five public health nurses took 2 weeks' training in outreach facilitation and best practices for control of respiratory infections. A mnemonic was developed for both the nurses and physicians to summarize best practices: MASKS (**M**asks for patients with cough and a fever, **A**lcohol gel for sanitizing hands, **S**eat potentially infectious patients apart from others, "**K**leen" by disinfecting hard surfaces, and use **S**igns). A more detailed description and evaluation of the nurses' training is given in the process evaluation.[39]

Before–after audit

Professional nurse auditors gathered data once before and then 6 weeks after the intervention. Auditors sat for an hour in physicians' waiting rooms and noted whether signs informed patients of practices for control of respiratory infections and whether patients who presented with cough and fever received masks, were instructed to clean their hands with alcohol-based gel, and were instructed to sit at least 1 m away from others. Auditors also inquired how often potentially contaminated areas were cleaned with disinfectant and whether alcohol-based hand gel was used in examining rooms. Auditors were blinded to the outcome measures and aware only of data-gathering requirements.

Intervention

The intervention began with facilitators providing feedback to physicians and other practice staff on the baseline audit of practices for control of respiratory infections. Information on evidence-based best practices and a facilitative "tool kit" was presented directly to physicians or indirectly through them to other staff. The tool kit contained colourful signs outlining best practices for control of respiratory infections, a poster demonstrating proper hand-washing technique and use of alcohol-based gel, references listing the main sources of guidelines and websites, 4 articles on infection control,[6-9] a box of procedure masks, wall-mounted alcohol gel dispensers with refills, alcohol gel pumps, and hospital-grade disinfectant wipes. During the 5-week intervention, the facilitators worked independently but corresponded with the project team daily and attended scheduled meetings each week to share information and strategies.

Outcome measures

Primary outcome measures were the number and percentage of offices that followed the 4 infection-control practices (masks, alcohol gel, spaced seating, and signs) both separately and together. A practice was considered implemented if it was executed at least once during the observation period. Secondary outcome measures included the 2 reported infection-control practices (disinfecting potentially contaminated surfaces and use of hand-gel dispensers in examining rooms).

Data analysis

Audit forms were coded and entered into SPSS, version 12.0. The quality of data entry was checked by initial frequency runs on all data elements to ensure that responses were correct and consistent. Frequency tables were generated and descriptive statistical procedures conducted. To compare practice performance over time, change in how often preventive measures were used was estimated. Paired *t* tests were applied to changes using SAS (version 8.1) to determine whether they were statistically significant.

RESULTS

Response rate was 22%; 53 of the 242 practices invited agreed to participate in the study. All 53 practices completed the study, and 95% of physicians within the practices (143/151) agreed to see the nurse facilitators. There was an average of 4 physicians per practice (range 1 to 13). About 40% of physicians were male (**Table 1**).

Each public health nurse had primary responsibility for 10 or 11 offices. Each office was visited at least twice during the 5-week intervention; 28 offices (55%) received a third visit, and 7 (13%) received a fourth visit. Most meetings were held during the lunch hour.

Statistically significant differences were observed in all 4 primary outcome measures, both together and separately (**Table 2**). Before the intervention, all 4 infection-control practices were observed in fewer than 4% of offices; 6 weeks after the intervention, they were observed in more than 50% of offices. The practice most frequently followed was posting signs about infection

control guidelines in waiting areas for patients. Before the intervention, 15% of offices followed this practice; 6 weeks after the intervention, more than 81% of offices did so. The practice least frequently followed was offering masks to patients with fever and cough. Only 17% of offices did this before the intervention, but about 66% did so after the intervention.

Table 1. Characteristics of the 53 participating offices and 110 physicians: *110 participating physicians reported information on certain characteristics before the intervention; 7 physicians did not respond to either of the last 2 questions, so means were calculated on the basis of 103 respondents.*

CHARACTERISTICS	NO. WITH CHARACTERISTIC
PRACTICES	
Solo	21 (39.6%)
Group (2-4 physicians)	23 (43.4%)
Group (≥5 physicians)	9 (17.0%)
PHYSICIANS	
Male sex	42 (38.2%)
Mean year of graduation	1986
Mean no. of hours of booked appointments per week	26 .77 h
Mean no. of patients seen per half-day	14 .55

DISCUSSION

To our knowledge, this is the first study to use a facilitator-based intervention to promote guidelines for control of respiratory infections. Few family physicians' offices followed these guidelines before the intervention. There was a marked improvement after the intervention with almost a 50% increase in adoption of the evidence-based best practices recommended in the guidelines.

Strengths of the study include sufficient statistical power from an adequate sample size and separation of the intervention from the data collection, so that physicians, office staff, and nurse facilitators were blinded to outcomes.

Limitations

This was an uncontrolled study. Factors that might lead to overestimation of the intervention's effectiveness are the relatively low response rate of 22%, which

Table 2. Results of before-after audit of best practices in control of respiratory infections in family physicians' offices: P = *.0001 (N = 53).*

PREVENTIVE PRACTICES	BEFORE THE INTERVENTION N (%) 95% CI	AFTER THE INTERVENTION N (%) 95% CI	% CHANGE* 95% CI
PRIMARY MEASURES			
Signs about control of respiratory infections observed in reception area	8 (15.4)† 5.2-25.5	43 (81.1) 70.2-92.0	67.3 54.1-80.5
Patients with cough or fever			
• Given masks or instructed to wear masks	9 (17.0) 6.5-27.4	34 (65.4)† 52.0-78.8	48.1 34.0-62.1
• Instructed to clean hands with alcohol gel	13 (24.5) 12.6-36.5	42 (79.2) 68.0-90.5	54.7 38.9-70.5
• Instructed to sit at least 1 m away from others	21 (39.6) 26.0-53.2	39 (75.0)† 62.8-87.2	34.6 20.1-49.1
Practices that applied all 4 primary measures	2 (3.8) 0-9.1	28 (52.8)† 38.9-66.7	49.0 35.1-63.0
ADDITIONAL MEASURES			
Masks available in waiting area	10 (19.2)† 8.2-30.3	37 (69.8) 57.0-82.6	51.9 36.8-67.0
Alcohol gel available in waiting area	20 (38.5)† 24.8-52.1	47 (88.7) 79.9-97.5	50.0 34.9-65.1
Average number of alcohol dispensers in whole office	3.2 2.3-4.1	7.33† 6.1-8.6	4.2 3.0-5.3
Contaminated areas cleaned with disinfectant wipes	20 (37.7) 24.2-51.2	46 (86.8) 77.4-96.2	49.1 32.3-65.8

CI—confidence interval.
*Percent change might not reflect the difference between percentages in the before and after columns exactly due to rounding or to missing data.
†Valid percentages are used (ie, missing data have been removed).

suggests that only highly motivated physicians were involved; the release of provincial guidelines, Preventing Respiratory Illnesses in Community Settings,[36] during the study; and practice staff's awareness that they were being observed (Hawthorne effect). Despite efforts to minimize bias, auditors might have inferred the desired infection-control practices owing to their nursing background. They derived no benefit from the success or failure of the study, however.

With a low recruitment rate and without a control group, it is impossible to determine the extent to which the changes were brought about by release of the guidelines or by the intervention or to determine whether the sample of physicians was representative, thus limiting the generalizability of the findings. Previous research, however, suggests that publishing and distributing guidelines alone is rarely effective in changing physicians' behaviour.[11-13] Factors that might have led to underestimation of the intervention's effectiveness include the short intervention period of 5 weeks and the timing of the intervention near the end of the respiratory infection outbreak season.

Conclusion

This before-after study demonstrated that facilitation of a multifaceted intervention by public health nurses helped promote best practices for control of respiratory infections in primary care offices. These findings add weight to the growing evidence that outreach facilitation is an effective strategy for knowledge transfer. A logical next step would be to offer this facilitated approach in a broader context. This could be done as part of a multicentre randomized controlled trial or through a broader program developed jointly by primary care and public health services. Finally, this study suggests that collaboration between public health services and primary care is possible and can lead to positive outcomes for all concerned.

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Contributors

Drs Hogg, Huston, Martin, *and* **Saginur** *developed the study concept, the methods, and the plan for data analysis.* **Drs Hogg, Huston, Saginur,** *and* **Soto** *and* **Ms Vilis** *and* **Ms Newbury** *developed and reviewed the drafts of the article.* **Dr Martin** *reviewed and commented on drafts of the article.* **Dr Huston** *was the main person obtaining financial resources for conducting the study.* **Dr Hogg** *contributed human resources and oversaw data collection.* **Ms Newbury** *and* **Dr Soto** *contributed to data analysis and editing and modifying the paper.*

Competing interests

None declared

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