Towards Excellence in Asthma Management: Final report of an eight-year program aimed at reducing care gaps in asthma management in Quebec

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BACKGROUND AND OBJECTIVES: Asthma care in Canada and around the world persistently falls short of optimal treatment. To optimize care, a systematic approach to identifying such shortfalls or 'care gaps', in which all stakeholders of the health care system (including patients) are involved, was proposed.

METHODS: Several projects of a multipartner, multidisciplinary disease management program, developed to optimize asthma care in Quebec, was conducted in a period of eight years. First, two population maps were produced to identify regional variations in asthma-related morbidity and to prioritize interventions for improving treatment. Second, current care was evaluated in a physician-patient cohort, confirming the many care gaps in asthma management. Third, two series of peer-reviewed outcome studies, targeting high-risk populations and specific asthma care gaps, were conducted. Finally, a process to integrate the best interventions into the health care system and an agenda for further research on optimal asthma management were proposed.

RESULTS: Key observations from these studies included the identification of specific patterns of noncompliance in using inhaled corticosteroids, the failure of increased access to spirometry in asthma education centres to increase the number of education referrals, the transient improvement in educational abilities of nurses involved with an asthma hotline telephone service, and the beneficial effects of practice tools aimed at facilitating the assessment of asthma control and treatment needs by general practitioners.

CONCLUSIONS: Disease management programs such as Towards Excellence in Asthma Management can provide valuable information on optimal strategies for improving treatment of asthma and other chronic diseases by identifying care gaps, improving guidelines implementation and optimizing care.

Key Words: *Asthma; Asthma treatment; Continuing medical education; Disease management; Guidelines implementation; Knowledge transfer*

Vers l'excellence dans les soins aux personnes asthmatiques : Rapport final d'un programme de huit ans visant à réduire les écarts dans les soins de l'asthme au Québec

HISTORIQUE ET OBJECTIFS : Les soins de l'asthme au Canada et dans le monde ne parviennent pas à un traitement optimal. Pour optimiser les soins, une démarche systématique visant à repérer les lacunes, à laquelle participaient tous les intervenants du système de la santé (y compris les patients), a été proposée.

MÉTHODOLOGIE : Plusieurs projets d'un programme de prise en charge multidisciplinaire, élaborés pour optimiser les soins de l'asthme au Québec, ont été menés sur une période de huit ans. D'abord, on a fait deux cartographies pour repérer les variations régionales de la morbidité reliée à l'asthme et prioriser les interventions en vue d'améliorer le traitement. En deuxième lieu, on a évalué les soins courants au sein d'une cohorte de médecins et de patients, confirmant les nombreuses lacunes dans la prise en charge de l'asthme. En troisième lieu, on a mené deux séries d'études d'issues révisées par des pairs, visant les populations à haut risque et des lacunes précises dans les soins de l'asthme. Enfin, on a proposé un processus afin d'intégrer les meilleures interventions au système de la santé et un programme pour faire progresser la prise en charge optimale de l'asthme.

RÉSULTATS : Les observations clés tirées de ces études sont le dépistage de schèmes précis de non-observance thérapeutique des corticoïdes en aérosol, l'échec d'un meilleur accès à la spirométrie dans les centres d'éducation sur l'asthme à susciter un plus grand nombre d'aiguillages en éducation, l'amélioration transitoire des capacités éducatives des infirmières participant au service d'aide téléphonique sur l'asthme et les effets bénéfiques d'outils de pratique conçus pour faciliter l'évaluation des besoins de contrôle et de traitement de l'asthme par les omnipraticiens.

CONCLUSIONS : Des programmes de prise en charge de l'asthme comme Vers l'excellence dans les soins aux personnes asthmatiques peuvent fournir de l'information précieuse sur les stratégies optimales afin d'améliorer le traitement de l'asthme et d'autres maladies chroniques grâce au dépistage des lacunes des soins, à l'amélioration de la mise en œuvre des lignes directrices et à l'optimisation des soins.

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Many chronic diseases are continuously increasing in prevalence, particularly with the aging of the population, and they represent an increasing burden for all health care systems. In Canada, the prevalence of asthma has significantly increased in the past two decades and is now considered to affect more than 10% of the population (1,2). The cost of health care for asthma in Canada was close to $600 million in 1994, and this cost has likely significantly increased in the past decade (3). Traditional management approaches should be reviewed and revised with new evidence to further reduce the clinical and social burden of these diseases, and move toward optimal care (4,5). Innovative ways of delivering the best care need to be developed and adapted to specific human and economical situations.

There are, however, many barriers to the improvement of knowledge transfer to health care professionals and patients, as well as the application of adequate measures to improve health (6,7). Because physicians, allied health professionals, patients and the general population are facing an increasing load of information, current developments in the management of diseases must be translated into specific, adapted and optimal interventions to ensure appropriate behaviour change.

The cost-benefit ratio and applicability of recommended interventions and options should be discussed and offered to both practitioners and patients. Common messages and goals should be expressed by health care providers, and health care authorities should support infrastructures allowing adequate guidelines implementation (7,8).

Unfortunately, studies performed in the past decades have identified significant 'care gaps' in Canada and elsewhere (7,9). A 'care gap' can be defined as the difference between current and optimal care. For asthma, such gaps include under- and overdiagnosis of asthma, particularly due to insufficient use of objective measures of variable airway obstruction (7,10,11), inadequate assessment of control or severity of asthma (12,13), overuse of rescue short-acting bronchodilators, inappropriate use or misuse of inhaled corticosteroids (ICSs) or combined ICS plus long-acting bronchodilators (14,15), insufficient patient education (16-18), and others related to patients' lack of understanding of asthma and inappropriate behaviour (19,20).

DEVELOPMENT OF THE TOWARDS EXCELLENCE IN ASTHMA MANAGEMENT PROGRAM

In 1994, the Quebec Asthma Education Network (Réseau québécois pour l'enseignement sur l'asthme), now the Quebec Asthma and COPD Network (QACN) (Réseau québécois de l'asthme et de la MPOC – www.rqam.ca), was developed to promote the inclusion of asthma education in the treatment of those with this disease (7,21). The network has established more than 100 asthma education centres (AECs) across Quebec, and developed training programs for asthma educators and physicians. Most educators had taken part in the provincial Asthma Educators' Program and some also successfully completed the Canadian Certification Program. In 1996, Merck Frosst Canada developed patient health management (PHM) and disease management programs in partnership with health care professionals, academics, and officials from government and other institutions (22). The framework for the programs is based on a continuous care improvement loop. Interventions, guided by repeated measurement and feedback, are aimed at generating continuous quality improvements in clinical and population health. The PHM model provides stakeholders with measurements and feedback on the care delivered and how patients use it.

In 1997, the executive committee of the Quebec Asthma Education Network met with representatives from the PHM department of Merck Frosst Canada (Kirkland, Quebec) to discuss the possibility of establishing a large-scale disease management program for asthma in the province of Quebec. This led to the development of the Towards Excellence in Asthma Management/Vers l'Excellence dans les Soins aux Personnes Asthmatiques (TEAM/VESPA) program. Participants included undergraduate and postgraduate students enrolled in education programs for health care professionals, physicians involved in continuing medical education (CME) programs (currently from the four Quebec medical schools), professional associations, licensing authorities, education networks (eg, QACN), health and medical research authorities (Quebec Ministry of Health and Quebec's health research funding agency – Fonds de la recherche en santé du Québec [FRSQ]), as well as other commercial (Merck Frosst Canada, AstraZeneca [Mississauga, Ontario]) and nonindustrial partners.

To achieve the objectives of the TEAM/VESPA program a population-based approach was used. The program included the development, implementation and evaluation of innovative care improvement strategies that would affect clinical management, dissemination and adoption of best practices through clinical expertise and continuing education, as well as through reinforcement of patient self-management via education. The main objectives of the TEAM program were to reduce asthma-related morbidity, improve patients' quality of life, and optimize the use of health system resources to improve asthma treatment and to encourage patient self-management.

TEAM STRUCTURE AND MANAGEMENT

The infrastructure of TEAM/VESPA included an executive committee consisting of representatives from the QACN, a family physician, a pediatrician, a respirologist, a representative from corporate partners and a program director responsible for the overall planning, timelines, budget and communication plan for diffusion of results. A steering committee comprised principal investigators from all substudies, the program director, regional medical leaders and coordinators, and a representative from AstraZeneca Canada (the second pharmaceutical partner of TEAM). This committee provided a forum to discuss and plan research projects for improving asthma care in Quebec. Finally a consultative committee was composed of representatives from health professionals' associations, patient information associations and regional health authorities. A communication plan was developed for internal communications within the research teams and the TEAM's various committees, and for external communications.

The executive committee also established criteria for the selection of research intervention studies (Table 1). Research protocols were then evaluated and ranked by an independent peer-review committee established by the FRSQ. Subsequently, interventions were selected by the executive committee based on recommendations of FRSQ, and supported by the TEAM Research Fund from the QACN.

The program included four phases: first, mapping of asthma-related morbidity in the province of Quebec; second, identifying

TABLE 1
Criteria for selecting interventions

Mandatory criteria

- Research question: The research question must first address one of the topics of the general objectives of TEAM (optimal medical practice, adherence, environment, quality of life, burden of illness, cost)
- Baseline measurement: The intervention must include one or more baseline measurements that will be comparable with re-measurements after the intervention to be able to evaluate the tangible impact of the intervention that was implemented
- Medical need: The targeted intervention must address a true population-based need
- Morbidity and mortality: The measurement data must be directly linked to morbidity-mortality factors
- Recruitment calendar: The intervention must include a recruitment schedule in keeping with the intervention phase calendar
- Budget: The budget of the intervention must be acceptable and within the TEAM budget

Optional criteria

- Quebec environment: The intervention must be generalizable for the Quebec population
- Timeline: The intervention must be completed within 18 to 24 months (including data collection and analysis)
- Integration within another structure or other program: The intervention can be integrated into an existing structure or another program already in place
- Cost and efficacy: The intervention will address the question of resource use
- Originality: The intervention must not be a repetition or duplicate of an existing program or existing tool
- High-morbidity population: The intervention is potentially beneficial for a high asthma-related morbidity population
- Postpilot project: The intervention is supported by data that show its efficacy

**Priority of interventions rated according to a total score. TEAM Towards Excellence in Asthma Management*

care gaps in asthma management through patients' and physicians' cohort studies and substudies; third, testing a first wave of interventions; and fourth, introducing a series of interventions covering other care gaps previously identified.

DATA GATHERING

TEAM/VESPA obtained data on current asthma-related morbidity and care gaps using population maps and analyses of patient-physician cohort studies and substudies.

Maps (morbidity mapping)

During the course of the program, two population maps of asthma were produced to identify regional variations in asthma-related morbidity. Using data from Quebec's medico-administrative databanks covering 1992 to 1996, a first mapping established an annual mortality rate, hospitalization rate, and emergency visit rate for each health district in Quebec for people between the ages of five and 44 years (23). Thirty-two high-morbidity areas were identified, mostly located in the south-central region of the province of Quebec; these were targeted for interventions. The second mapping was a cross-sectional analysis of asthma-related mortality rates, hospitalizations, prevalence of treated asthma, medical visits, emergency room visits, and use of asthma medication in the province of Quebec between 1999 and 2001. A total of 93 deaths occurred in 1999, with an age-standardized mortality rate of 1.29 per 100,000 people. In 2000, the number of deaths diminished to 55 with a mortality rate of 0.76 per 100,000 people. The decrease in mortality rate was probably due, in part, to a modification in the coding of causes of death, although the death rate from asthma has been steadily declining since 1987. Among patients five to 44 years of age, the standardized rates of hospital admissions for asthma per 100,000 people were 1.24 and 1.05 for 1999 to 2000 and 2000 to 2001, respectively. The data on pharmaceutical services and visits paid to physicians on a per-act basis were obtained from the medical services databank of the Régie d'assurance maladie du Québec. This study also revealed a slight decline in hospitalization rates and in the prevalence of people diagnosed with asthma who have had a medical visit, and an increased prevalence of those who have used asthma medication.

Physicians' and patients' cohort study

A cohort study was conducted with 77 physicians recruited between 2001 and 2002 from six regions of the province of Quebec. The regions were categorized as low- (Quebec City), intermediate- (Laval, Montérégie and the Eastern Townships) and high- (Montreal and Saguenay-Lac-Saint-Jean) morbidity areas. These physicians then recruited 290 patients (191 adults and 99 children) who were followed for one year, with visits at baseline and at six and 12 months (20). Physicians and patients were asked to fill out a questionnaire at each visit. This analysis showed suboptimal disease control simultaneously existing with the belief by patients and physicians that the disease was under control. Medical care was also frequently not in keeping with current guidelines recommendations.

Such surveys' value is limited by the fact that usually, the most interested and knowledgeable physicians take part. This may explain why, in this study, no significant differences in asthma control and management between high and low asthma-related morbidity were identified. Nevertheless these data were illustrative of real-life patterns of practice and as such were useful indicators of unperceived learning needs that were addressed by our CME partners in building educational practice-based activities.

Assessment of asthma compliance to therapy

The aim of this project was to evaluate the patterns of compliance of ICS use in adult patients with persistent asthma using an electronic inhaler (24). This study showed that there were various patterns of compliance, and approximately one-half of asthmatic patients took significantly less medication than prescribed.

FIRST SERIES OF INTERVENTIONS

The third phase of TEAM/VESPA (2001 to 2004) included interventions specifically aimed at targeting deficiencies identified in the second phase and in recent studies. Each intervention was aimed at improving either medical practice or the asthmatic patient's disease control and quality of life. Moreover, an evaluative component accompanied each intervention to quantify its effect and to determine its potential for generalization or integration into medical practice. In this phase, seven projects were completed and are summarized herein.

Impact of access to spirometry in AECs

This study was designed to assess the influence of increased access to spirometry in AECs on the number of patient referrals to these centres by general practitioners (GPs) (25). This was a one-year, prospective, randomized, multicentred, parallel-group study conducted in two consecutive periods of six months each. Results from a randomly selected group for spirometry showed that there were 48 medical referrals during the first six-month period and 32 during the second period following the proposed added spirometry. AECs that did not offer spirometry received five referrals during the first period and seven during the second period. These results showed that referrals to AECs are not yet fully integrated into primary care. In addition, more rapid access to spirometry in AECs does not seem to be a significant incentive for such referrals.

Impact of a continuing education program on the quality of telephone interventions on adult asthma by a nurse-staffed hotline

In Quebec, 'Info-Santé centre local de services communautaires' (CLSC) is a nursing telephone triage service, accessible 24 h a day, seven days a week, in all regions of the province. The role of the Info-Santé CLSC nurses consists of evaluating the health condition of patients, providing necessary information and advice, and directing them toward appropriate services. As a result of a growing number of asthma-related calls and the continual evolution of treatment for this disease, nurses from various regions of Quebec had requested additional training to improve the quality of their interventions with these patients. The objectives of this study were to assess the effects of CME on the clinical evaluation and advice provided by nurses working for Info-Santé CLSC triage service (26). The educational strategies used included provisions of information on asthma-related morbidity in their region, location and method of referral to AECs, steps in the evaluation and intervention of asthma-related respiratory problems, signs and symptoms to evaluate the severity of acute asthma, asthma medication, asthma exacerbations action plan, and application of concepts learned through case studies and group discussions. In addition, the nurses were encouraged to use an updated computerized nursing protocol on asthma.

The study revealed two interesting findings: neither the level of knowledge nor the degree of confidence was significantly associated with the quality of the clinical evaluation (knowledge, P=0.79; confidence, P=0.94); and neither the level of knowledge nor the degree of confidence was associated with the quality of advice given (knowledge, P=0.60; confidence, P=0.85). The authors concluded that the continuing education activity undertaken in this study led to some changes in the clinical evaluation of the health condition of asthmatic callers as well as in the type of advice provided. However, these changes did not appear to be sustained over time. As a result, it may be advisable to provide nurses with repeated training in the form of direct supervision or providing intervention tools specific to asthma.

A new clinical tool for enhancing asthma guidelines knowledge and implementation by primary care physicians

This study evaluated the effect of a new tool on the knowledge of Quebec-based GPs regarding the Canadian clinical practice guidelines (CPGs), and on patient outcomes. The tool was a memory aid in the form of a self-inking paper stamp checklist for assessing asthmatic patient control and therapy (13). The study used a prospective randomized, controlled design that included 104 GPs who initially responded to questions on the CPGs. The GPs were then randomly assigned to one of four groups, all of whom received the traditional written copy of the CPGs by mail. Group 3 also received the paper stamp by mail with a one-page written instruction sheet. Groups 1 and 2 were introduced to the paper stamp and given a written stamp instruction sheet during a CME event. The paper stamp consisted of a description of the eight criteria for asthma control (27) followed by a reminder to check the environment at home and work, smoking status, inhaler technique, referral to an AEC, anti-inflammatory and add-on therapy, and written action plan. The GPs were retested six months later, and patient outcomes assessed for one year. There was no significant improvement in the knowledge of the control group (Group 4), which had received only the consensus guidelines by mail. A significant improvement was found in the medical doctors' knowledge of the CPGs in all the groups of physicians that received a stamp.

The stamp significantly improved physicians' knowledge of the CPGs and reduced the number of emergency visits and hospitalizations of patients. The results of this study suggest a high benefit at low cost for the use of the stamp in the primary care physician's clinic.

Optimization of the treatment and referrals of patients treated for acute asthma at the emergency department to AECs

An initial project, supported by the Fonds d'adaptation des services de santé, was aimed at providing education and automatic referral to AECs. This project demonstrated that it was possible to increase the quality of care provided in the emergency ward for acute asthma, while also increasing the number of referrals to the AECs for patients at risk (28). Therefore, the project's main objective became the enrolment of emergency health care professionals from regions with a high morbidity rate for asthma, into this program that automatically refers asthmatic patients to AECs. Through ongoing training, asthma treatment should improve and become standardized in emergency wards. However, because of important administrative barriers, the program was only implemented into three hospital centres and very few statistics were obtained following these interventions. Nevertheless, the data demonstrated a discrepancy between the answers provided by the physicians on the questionnaires and the answers provided by their patients. The authors also observed a low proportion of referrals to the AECs. This project showed that the medical treatment of acute asthma in emergency departments is not optimal, and that there is a

need to provide better adapted and more accessible training to emergency physicians.

Emergency management of asthma attacks in children aged one to 14 years: Evolution and impact of an educational intervention designed for medical teams

Several studies have demonstrated suboptimal practices with regards to the management of asthma exacerbations in children evaluated in the emergency department (29,30). The main objective of this project was to assess management practices for children between the ages of one and 14 years admitted to the emergency department of five hospitals in the greater Montreal area, using a retrospective evaluation of 120 medical charts in each centre, from 1997 to 2003. In the four centres where the required number of charts was met, the data disclosed an improvement in practices from 1997 to 2003, most notably in implementing oxygen saturation measures before treatment and the prescription of ICSs. Such improvement was, however, not observed for all indicators.

Efficiency of a psychocognitive educational approach to influence the decision-making process concerning the eviction of a domestic animal

The efficacy of a short individualized educational intervention program, based on Prochaska's transtheoretical model (31), was evaluated for a six-month period with a population of adult asthma patients living with domestic animals but sensitized to these pets. A randomized controlled study using a pretested questionnaire before intervention and then at three and six months after intervention was conducted: 29% of the intervention group (n=11) and 21% of the control group (n=8) had departed from their pets within six months ($P>0.35$). The two groups showed a similar improvement in their perception of the benefits of removal of pets, and in their level of belief that they could achieve this goal. The experimental group showed a greater improvement in knowledge acquisition about asthma and allergies ($P<0.05$). Both experimental and standard educational interventions were effective in facilitating progression through the stages of behavioural change. Overall, the results do not support the utility of using a behavioural-change educational intervention tailored to the transtheoretical model stage of the individual, in the context of convincing patients to remove their pets from their homes. However, the decision-making aid appears to be helpful in raising awareness of the problem of asthma and allergy in the patient, and in acquiring the appropriate knowledge.

Impact of pharmacists' training on the quality of drug use in asthma treatment

This study assessed the impact of an asthma education program for community pharmacists practicing in four different regions with significant asthma-related morbidity. It studied the influence of the training program on pharmaceutical interventions with the asthmatic patient or his physician, and on adequacy of asthma drug use by the asthmatic patient. It also explored the impact of the intervention on the pharmacists' knowledge and on attendance at AECs. A total of 103 pharmacists took part, 43 in the control group and 60 in the intervention group. Intervention group knowledge significantly improved, as did the number of interventions related to overtreatment or undertreatment of the patient, and the number of asthmatic patient referrals to an AEC ($P<0.05$).

SECOND SERIES OF INTERVENTIONS (2004 TO 2007)

Asthma provincial plan

The asthma provincial plan is a multistage CME program on asthma, initiated in the past two years of the TEAM/VESPA program. Its objectives are to improve medical practice and provide support to primary care practitioners to better implement the Canadian consensus guidelines on asthma. The asthma provincial plan includes a phase of dissemination of knowledge, followed by a facilitation process to integrate these ideas into current care, and finally a phase of reinforcement of these changes. The program is currently provided as a collaboration between both CME offices at Université Laval (Quebec City, Quebec) and Université de Montreal (Montreal, Quebec). An initial survey of physicians' needs with regard to perceived skills and knowledge improvements was conducted. Two practice tools were included: the previously described paper stamp and a 'prescription-action plan' document. The first has been validated and tested (13), while a validation study is ongoing for the second. A total of 114 physicians were enrolled in the province of Quebec, and analysis of the results will be performed in 2008.

Improving communications between patients and physicians

This project looked at the quality of interventions offered by physicians during patient visits, and their influence on patient compliance with treatment, health care use and asthma control. This topic has been previously studied but needs further evaluation (32). This study involved 632 physicians and 282 patients. The study found that patients who demonstrated a significant interest in health problems, who showed a good integration of knowledge on asthma, who wished to be more involved in their care, and who were from families with a high level of activity showed better control of their asthma three months after their visit. Asthma control was independent of the number of medical visits, age, sex, education level, walk-in or scheduled clinic visit, income level and of the participation of the patient in the discussion during the medical encounter. Further analyses are ongoing.

Medical Office of the Twenty-First Century subproject

This project is part of a large program aiming at providing electronic tools for medical practice (7,33). There is consensus that substantial improvement in health outcomes for chronic conditions can only be achieved by identifying effective methods to enhance evidence-based practice in primary care, and by instituting mechanisms for regular surveillance, patient education and follow-up. The objective of this study was to develop and implement a computerized asthma algorithm that could guide primary care physicians to treat asthma according to current practice guidelines. The algorithm is linked to an electronic prescription database, which incorporates medications previously dispensed to the patient. Together with a short assessment of control, which the physician completes with the patient, the algorithm guides the physician to the most appropriate treatment plan, including automated prescriptions and action plans. Analysis of this project is ongoing.

RESPIRE: An intervention program for asthmatic patients in an integrated care system

The objectives of the RESPIRE program are to measure the clinical and economical impact of implementing an integrated care system for asthmatic patients between the ages of 12 and

TABLE 2
Main Towards Excellence in Asthma Management/Vers l'Excellence dans les Soins aux Personnes Asthmatiques accomplishments

- Development of a primary care disease management model
- Population-based mappings of asthma-related morbidity
- Additional information on asthma care gaps from patient-physician cohorts and various studies
- Development and evaluation of a series of interventions aimed at improving asthma management
- Development of a joint collaborative university-based medical educational program
- Development and validation of various practice tools and intervention programs for health professionals
- Series of more than 50 presentations of programs and studies, and more than 20 peer-reviewed publications

45 years. More specifically, the parameters assessed were the impact of the program on quality of life, asthma control, use of emergency health services, reduction in daily activities, behavioural and nonbehavioural factors, and factors predisposing, reinforcing and facilitating asthma control. Furthermore, the study also comprised an examination of the implementation of the integrated care process, participation of patients and professionals, and the costs and benefits of the program from a societal perspective. A quasi-experimental cohort study design was used. Patients receiving asthma treatment were recruited by their pharmacists. Patients in the vicinity of the city of Alma, Quebec, were exposed to integrated care offered by a team of physicians and nurses working in a family medicine group, pharmacists, an educator and local Centre de Santé et de Services Sociaux staff. Patients from the other regions received standard care. All participants were questioned on enrolment and at 12 and 18 months postenrolment. Regression analyses performed on the data collected suggest that adequate knowledge about asthma medication, feeling healthy, not using a spacer and having seen a respirologist in the past year were all associated with adequate use of medications. Furthermore, nonsmokers and those using their medication appropriately experienced better asthma control. Finally, improved asthma control was associated with improved quality of life.

DISCUSSION

TEAM/VESPA has completed an eight-year cycle of research to develop new methods and tools designed to fill the gap between actual and optimal asthma care in Quebec. This project has benefited from a close collaboration among numerous health care system stakeholders, including the QACN, various researchers and many medical, paramedical and research organizations (including the FRSQ and Quebec universities), as well as the support and collaboration of industry partners. This large-scale program completed a series of multilevel interventions and outcome research projects. The program also developed new methods to identify health care needs and care gaps by building new databases and using 'asthma mapping' to more clearly identify regional variations in asthma-related morbidity, and to target interventions for the Quebec regions and individuals with the greatest need. The various projects have led to improved identification of the main barriers and problems to achieving our goals of improving the management of chronic diseases, in this instance asthma, and helping people improve their quality of life and reduce their reliance on acute care and rescue medicines (Table 2).

Among new approaches developed by TEAM, we initiated a data gathering process to identify both population-based (provincial mappings) and local-regional disease-state burdens, in addition to the disease's management and main care gaps (Table 3). Second, a call for innovative interventions – associated with peer-reviewed evaluation – of the impact of specific target interventions has led to the development of various new strategies to optimize asthma care.

Third, a data analysis and communication process, via discussions at joint or individual meetings between researchers and the executive committee, has focused on the key results of the different projects, with the aim of developing more effective interventions and a wider dissemination of interventions (Table 4). This continuous process helped to triage the interventions, allowing key components of successful interventions to be further improved, while unsuccessful interventions were abandoned.

Fourth, the model stressed the need to target specific at-risk populations with a high degree of asthma-related morbidity as well as a high incidence of the main care gaps observed, to optimize the use of resources and to improve the program's effectiveness, while improving care where improvement is most needed.

This program involved key players from the provincial health networks, universities and education networks, allowing the interventions to be integrated into day-to-day care via already-existing educational or care-providing structures. This approach also improved the chances for these interventions to be continued after the end of the program, and the integration of these interventions into current health care structures and programs.

TEAM, a multidisciplinary program, has explored how to get health professionals to work together, and how to involve patients and their families in asthma care. It has tested various tools and resources to achieve best care and helped to develop patient self-management skills so patients can better evaluate their condition and more efficiently use therapies available to them. It also assessed the deficiencies with regard to communication between health professionals and patients.

Finally, TEAM may be used as a model for many other chronic diseases, taking into account the specifics of the individual patient's disease severity and environment. There are currently significant efforts to help translate discoveries and advances in health promotion into current care as soon as possible to reduce the burden of chronic diseases. In Canada, various programs have offered training, workshops and various implementation strategies to help optimize asthma care. Joint efforts are being developed to better coordinate and improve

TABLE 3
Main projects of the Towards Excellence in Asthma Management program

Interventions	Main Goals
Populational cartographies	Identify regional variations in asthma-related morbidity
Physicians' and patients' cohort study	Identify care gaps in current treatment and patients' behaviour
Impact of access to spirometry on asthma education	Assess the influence of increased access to spirometry in asthma education centres on the patients referred by their physicians
Improvement of interventions by 'Info-Santé'	Improve the quality of interventions on asthma by nurses involved with hotline service to the population
The facilitated medical visit with a new practice tool (stamp)	Assess the effect of a new tool on knowledge and patient outcomes of primary care physicians
Optimization of emergency department care	Provide education and automatic referral of asthmatic patients seen at the emergency department to an asthma education centre
Assessment of asthma care for children in the emergency department	Assess management practices for children at the emergency department
Improvement of environmental control with regard to domestic animals in sensitized asthmatic patients	Determine the efficiency of a psychocognitive educational approach on the decision-making process regarding eviction of a domestic animal
Assessment of asthma compliance to treatment	Evaluate the variations and compliance to asthma therapy by electronic monitoring
Asthma provincial plan	Multistage program of continuing medical education on asthma
Improvement of patient-physician communications	Assess the quality of interventions on asthma by physicians during patient visits
Medical Office of the Twenty-First Century project	Development and implementation of a computerized asthma algorithm for primary care physicians
The RESPIRE program	Assessment of the clinical and economical impact of implementing an integrated care system for asthmatic patients

TABLE 4
Key messages from the Towards Excellence in Asthma Management program

- Populational cartographies of regional variations of asthma-related morbidity can help to identify targeted populations for interventions aimed at reducing care gaps
- A multipartner, multidisciplinary disease management program can help to optimize asthma care
- Cohorts of physicians may not always reflect overall regional care because they probably enrol mostly interested physicians with a good knowledge of current guidelines
- Various patterns of noncompliance can be identified with regard to asthma therapy and should be addressed by specific interventions
- Various care gaps exist in medical practice, particularly with regard to referral to asthma education, but unfortunately access to spirometry does not necessarily improve such references
- Educational abilities of nurses involved in asthma hotline telephone service could be improved but should benefit from repeated training sessions to ensure long-term quality of interventions
- Support to medical practice using tools (such as stamps on asthma control criteria and management, or computerized asthma algorithms) have the potential to improve physician knowledge of current guidelines and reduce asthma-related patient morbidity
- Interventions that have been proven beneficial to reduce care gaps should be integrated into current health care network

communications with regard to these initiatives (7,34). Structured programs from other countries have also provided much information about barriers to optimal care in primary care (including lack of time, resources and remuneration) and will be helpful to develop strategies to address those care gaps (35,36). Structured programs such as those developed in Finland have stressed the importance of multidisciplinary work (35). This was also a priority of TEAM, which also is an example of a guidelines implementation or knowledge transfer program that builds on previous experience in a continuing process developed by a multidisciplinary team.

The global effects of such programs remain to be assessed, although intangible results that may nevertheless improve care make such assessment difficult. Still, better articulation and assessment of interventions that improve care should be pursued. More resources should be devoted to this evaluation process, to avoid the risk of pursuing ineffective and sometimes costly programs.

PERSPECTIVES

Discussions with the various asthma-related stakeholders were conducted to further disseminate and generalize the most successful TEAM/VESPA programs. The QACN, Quebec universities, the provincial health network and health authorities were informed of the TEAM/VESPA results, and most agreed to pursue the work initiated. For example, the emergency department program has been extended by the QACN and a practice network of interested health professionals has emerged. The asthma provincial plan will continue to be sustained by Quebec universities, and the asthma control criteria

stamp will be distributed to more than 2000 GPs. Workshops will be offered on the use of the stamps with the help of universities and industrial partners.

Apart from the diffusion of results and exchanges on how to make the most effective use of the information gathered, TEAM/VESPA has not only promoted the multipartner efforts developed during these eight years, it has also created an incentive to pursue research in this field and to improve knowledge transfer, patient self-management, and good communication among caregivers, patients and their families.

Therapeutic management programs are an innovative way to improve patient health and use of therapies and resources, using evidence-based medicine recommendations to fill current care gaps. The TEAM/VESPA model should be explored for other major chronic diseases such as diabetes, obesity and hypertension.

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