Hospital-Based Inter-professional Strategy to Reduce In-patient Admissions and Emergency Department Visits for Pediatric Asthma

Karen Fleming, Brian Kuzik and Chee Chen

Abstract

Pediatric asthma is a common reason for emergency department (ED) visits and in-patient hospital admissions. Evidence demonstrates that asthma management initiated in the ED has limited benefit unless followed by ongoing coordinated inter-professional care (IPC). The Royal Victoria Hospital (RVH) of Barrie, Ontario, has developed a best practice model of care for pediatric asthma. Primary care providers and ED physicians are actively encouraged to refer children with any recurrent respiratory problems consistent with asthma to the Paediatric Asthma Clinic (PAC). Quarterly PAC visits with a certified asthma educator and a pediatrician include lung function measurement, written action plans and primary care provider communication. Ongoing outcome monitoring of patients receiving IPC has revealed that, compared with 12 months prior to enrolment in the PAC, patients show a two-thirds decrease in asthma-related ED visits and an 85% decrease in admissions. The PAC has contributed to an ongoing decline in the rates of pediatric asthma-related ED visits and admissions at RVH, which are currently less than half the rates seen at our peer hospitals.

IPC for chronic diseases is best practice, and our model of care for pediatric asthma continues to provide critical data demonstrating and supporting the advantages of IPC in chronic disease management. RVH modifies practice and policy to meet best practices, optimizing the care provided to children with pediatric asthma.

Inter-professional care (IPC) has been defined in Ontario through the HealthForceOntario Inter-professional Care Steering Committee as "the provision of comprehensive health services to patients by multiple health caregivers who work collaboratively to deliver quality care within and across settings" (Closson and Oandasan 2007: 7). The significance and overall system impact of IPC in Ontario is not a new phenomenon in healthcare. Many teams, such as palliative care and critical care teams, have been functioning with this model of care for years because they recognize the benefits associated with it. These benefits include increased access to healthcare, less tension and conflict among caregivers, a better use of clinical resources and improved recruitment and retention (Closson and Oandasan 2007). In addition, previous research demonstrates that IPC improves outcomes for people with chronic diseases (Closson and Oandasan 2007).

Asthma is a leading chronic illness among Canadian children (Chan et al. 2009; Cope et al. 2009; Garner and Kohen 2008; Simons et al. 2011). The Paediatric Asthma Clinic (PAC) at the Royal Victoria Hospital (RVH) of Barrie, Ontario, has been in operation for over 15 years, with a number of pediatricians and certified asthma educators holding clinics in various locations throughout the hospital. Through a process of attrition and strategic reorganization, the PAC has evolved into a cohesive clinic with a stabilized inter-professional team, with all of its activity relocated into the well-appointed Children's Outpatient Clinic.

Canada has a proud history in standardizing pediatric asthma care; in 2003, it was the first country to develop pediatric asthma guidelines (Cope et al. 2009). The PAC at RVH provides treatment according to the Canadian Paediatric Asthma Consensus Guidelines (Becker et al. 2005), including ongoing monitoring of outcomes. The inter-professional, evidence-based approach of the clinic is recognized as a cost-effective and efficient means of managing pediatric asthma and is based upon the Primary Care Asthma Program (PCAP; To et al. 2008). The PCAP was developed subsequent to an Ontario eight-site provincial pilot project evaluating asthma management protocols and associated outcomes. It was funded by the Ministry of Health and Long-Term Care, starting in 2002. The Primary Care Asthma Care Pilot Project developed a number of tools and resources based on the Canadian Asthma Consensus Guidelines (The Lung Association of Ontario n.d.). Although RVH was not involved in the pilot project, it is currently a recognized PCAP site.

The benefits of IPC include increased access to healthcare, less tension and conflict among caregivers, a better use of clinical resources and improved recruitment and retention.

At the RVH clinic, each child and family is first seen by a certified asthma educator who reviews all aspects of asthma management based upon the most recently published evidence. If the child is a new patient to the PAC, the patient and families are given a brief orientation to the clinic including the following:

- A description of the team members and their role and function within the clinic
- Reassurance that the patient and the family are an active and engaged part of the healthcare team
- A summary of what will occur during each visit: (1) a review of the inhalation technique; (2) a review of all aspects of respiratory care at home, including adherence or changes to the written action plan developed at the previous visit; and (3) a review of environmental control and allergen avoidance
- Information about the collaborative development of a written action plan to be provided to the family at the conclusion of every visit, and a written note to be sent to the primary care provider after each clinic visit

A respiratory assessment of the child, including valuable subjective and historical information from the patient and family, is conducted by both the asthma educator and the pediatrician. Spirometry pre- and post-bronchodilator is completed on all children over the age of five or six years and, more recently, is combined with exhaled nitric oxide testing in select patients. Following these evaluations, the patient is seen by the pediatrician (in the presence of the asthma educator) and action plans are developed and adjusted if needed. The asthma educator then meets with the family once again to reinforce the written action plan and provide a follow-up appointment. A written summary of each visit is sent to the primary care provider as it is the intention that patients will return to the care of their primary care provider once they are stable and an effective care plan is in place.

Our Patient Population

RVH, a 269-bed community hospital, is the only acute care hospital in Barrie and has an estimated primary service population of 230,000 (all ages). Detailed patient demographic data for the PAC at RVH has only been available since 2008 and is summarized in Table 1. We currently follow up more than 400 patients (under age 18 years). The patient mix has remained consistent, with one half under the age of six and approximately 20% without a primary care provider. Patients are followed up quarterly and discharged to their primary care provider when stable. Interim care is provided by the primary care provider, who receives a written report from each PAC encounter. Patients without a primary care provider are followed up indefinitely, but limited clinic resources means that these patients often rely on the emergency department (ED) or walk-in clinics for interim care.

Patients are seen in the PAC by referral only, with the majority of referrals coming from the private practices of local community physicians, who receive an annual reminder of our services. Preschool children may have several different wheezing phenotypes that can account for significant morbidity without a clear diagnostic label of asthma (Brand et al. 2008). Local physicians are therefore encouraged to refer any child with recurring respiratory issues, regardless of age or whether or not there is a diagnosis of asthma. Similarly, children presenting to our ED with symptoms consistent with asthma but without a formal diagnosis are considered to be vulnerable, and we actively encourage the ED physicians to refer these children to the PAC. To support this effort, we routinely post signs in strategic areas of the ED to remind physicians of our services. This strategy has been moderately successful, with a 59% increase in ED referrals in 2010; but the total number of ED patients referred still represents less than one fifth of all children presenting to the ED with wheezing issues.

Impact of PAC

A significant component of the IPC approach in our PAC includes active recruitment of vulnerable patients as well as a strong emphasis on patient and family education. These have been very effective in reducing the burden of asthma in our community, with the associated reductions in healthcare expenditures.

As one of the primary goals of good pediatric asthma control is

TABLE 1.
Patient activity the RVH PAC

	2006*	2007[†]	2008[†]	2009[†]	2010[†]
Pediatricians	4	4	2	2	2
Asthma educators			4	5	6
Patient visits	838	640	568	664	858
Total individual patients			298	342	415
Current active patients at year's end			248	380	415
Age 0–2 years			11%	19%	13%
Age 2.1–6 years			42%	45%	41%
Age >6 years			46%	36%	46%
Patients without primary care provider			20%	26%	22%
New referrals			195	224	232
Source of new referrals:[‡]					
• ED			17%	17%	26%
• Community family doctors			62%	49%	35%
• Community pediatricians			–	19%	16%
• In-patient discharge			4%	7%	8%
• Walk-in clinics			8%	5%	4%
• Other			9%	3%	11%
ED (pediatrics)					
Total visits related to asthma[‡]	747	542	575	426	382
• Age 0–5 years			67%	59%	68%
• Age 6–10 years			12%	15%	14%
• Age >10 years			21%	26%	18%
% of total pediatric ED visits that were due to asthma [‡]	4.2%	3.4%	3.8%	2.7%	2.6%
Total unique patients			502	374	330
Referred to PAC			33	38	61
Admissions to RVH for asthma‡ (pediatrics)	154	98	108	62	86

ED = emergency department; PAC = Paediatric Asthma Clinic; RVH = Royal Victoria Hospital.

Sources of data (detailed patient demographic data for the PAC at RVH has only been available since 2008):

*Dr. G. Rogan, 2006, Adult and Pediatric Asthma Education and Support Service Overview, RVH (internal document, personal communication).

[†]Paula Ritchie, ongoing clinic data collection.

[‡]Decision Support Services, RVH; Canadian Institute for Health Information/RVH – Cactus Discharge Abstract Database and National Ambulatory Care Reporting System, which includes J45.0 to J45.91 Asthma/RAD/bronchospasm; J21.0 to J21.9 RSV bronchiolitis, acute bronchiolitis; R06.2 wheezing; J40 bronchitis; and J20.0 to J20.9 acute bronchitis.

TABLE 2.
PAC patient outcome audit*

Fiscal Year	ED Visits Due to Asthma			Admissions Due to Asthma		
	Pre-PAC	Post-PAC	% Decrease	Pre-PAC	Post-PAC	% Decrease
2006–2007	199	63	68	41	8	80
2007–2008	151	57	62	41	4	90
2008–2009	108	32	70	7	1	86

ED = emergency department; PAC = Paediatric Asthma Clinic; RVH = Royal Victoria Hospital.

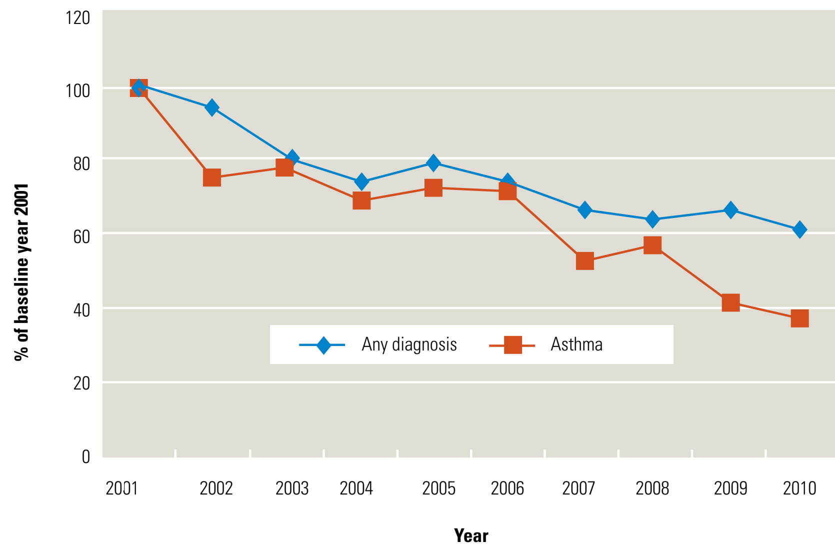
*Comparison of asthma-related activity for new PAC patients in the 12-month period immediately pre- and post-initial clinic visit.

Source: Decision Support Services, RVH; Meditech, Canadian Institute for Health Information/RVH – Cactus Discharge Abstract Database and National Ambulatory Care Reporting System.

to provide caregivers with the tools to safely and effectively manage exacerbations without the need for visits to the ED (Becker et al. 2005), it follows that ED visits for asthma may often represent a failure of outpatient management (Guilbert et al. 2011). For the fiscal years 2006–2009, we completed a patient outcome audit that compared the frequency of asthma-related ED visits in PAC patients over the one-year period immediately prior to and following their enrolment into the PAC (Table 2). With each patient acting as his or her own control, we have consistently demonstrated that enrolment in the PAC is associated with an average 67% decrease in ED visits for asthma in the first year following enrolment. During this three-year period, the total pediatric ED visits at our hospital that were due to asthma fell from 4.2% to 2.7% (see Table 1). This contrasts our peer hospitals in Ontario, which, over the same three-year period, demonstrated a relatively static and three-fold higher rate of 7.9% of pediatric ED visits being due to asthma (according to data from the Canadian Institute for Health Information [Provincial Council for Maternal and Child Health 2010]).

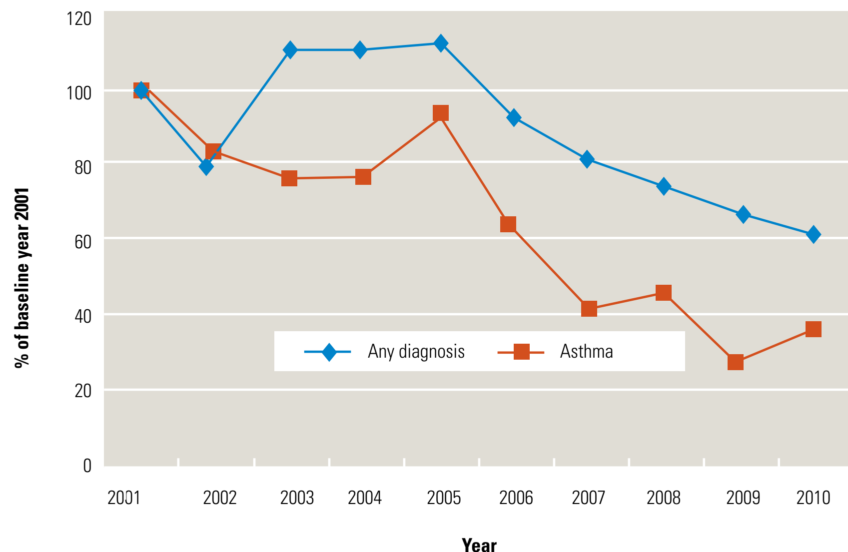
In addition, over the past decade at RVH, there has been a steady decline in pediatric ED visits for all diagnoses, but the decline in asthma-related activity has been consistently greater (Figure 1). We are unable to confirm whether this decline in asthma-related ED patient visits was due to patients attending elsewhere for acute care. This seems unlikely, however, as the patient outcome audit demonstrated that these patients had already established a pattern of attendance at RVH, which is the only acute care hospital in the city – the EDs of neighbouring communities are 30–90 minutes' drive from Barrie. It is therefore proposed that the impact of the PAC has significantly contributed to the observed reduction in

FIGURE 1.
Trends in pediatric emergency department visits at Royal Victoria Hospital



Source: Decision Support Services, RVH; Meditech, Canadian Institute for Health Information/RVH – Cactus Discharge Abstract Database and National Ambulatory Care Reporting System.

FIGURE 2.
Trends in pediatric admissions to Royal Victoria Hospital



Source: Decision Support Services, RVH; Meditech, Canadian Institute for Health Information/RVH – Cactus Discharge Abstract Database and National Ambulatory Care Reporting System.

the burden of pediatric asthma-related visits in our ED.

Similarly, admissions to hospital for treatment of pediatric asthma often represent a failure of ongoing outpatient management (Guilbert et al. 2011). The patient outcome audit also demonstrated that for fiscal years 2006–2009, children enrolled in PAC care at our hospital demonstrated an average 85% decrease in asthma-related hospital admissions in the year following enrolment (see Table 2). In addition, over the past decade asthma-related pediatric admissions at our hospital continued to decline faster than admissions for all other reasons combined (Figure 2). In fiscal year 2009–2010, the percentage of pediatric hospital admissions at RVH that were asthma-related was less than one half of the provincial average for our peer hospitals (Provincial Council for Maternal and Child Health 2010). By the same reasoning as noted above, we cannot confirm but it seems likely that asthma patients were not simply being admitted elsewhere for acute care. It is therefore once again proposed that the impact of the PAC has significantly contributed to the observed reduction in the burden of pediatric asthma-related admissions at our hospital.

We have consistently demonstrated that enrolment in the PAC is associated with an average 67% decrease in ED visits for asthma in the first year following enrolment.

Conclusion

Our data demonstrate that through an IPC model of care in which best practices are employed, ED visits and in-patient admissions for pediatric asthma-related illness decrease. These outcomes support previous research and literature in demonstrating the benefits of an IPC model of care in managing chronic illness. HQ

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