Comprehensive asthma management for underserved children

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Summary

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In response to the 'asthma epidemic', local organisations in San Francisco formed the *Yes We Can* Urban Asthma Partnership, which uses a comprehensive medical/social model for paediatric asthma care. The *Yes We Can* Urban Asthma Partnership reaches out to high-risk children in different clinical settings: urgent visits, the hospital, a comprehensive specialty asthma clinic, and through an expanded community health worker programme. This article highlights the initial development, implementation, and evaluation of the success of this innovative management programme to address the problem of paediatric asthma in underserved urban areas.

Keywords: *asthma treatment*, *hospitalisation*, *paediatric care*, *asthma medication*.

Introduction: defining the 'asthma epidemic' in San Francisco (1995–97)

By the mid-1990s, asthma emerged as a major health concern in the US. According to the National Health Interview Survey (NHIS), the prevalence of asthma in the US doubled between 1982 and 1995, culminating in a prevalence of 5.6% for all ages and 7.4% for children aged 5–14 years. Additionally, the NHIS noted an increased prevalence among African Americans (6.9%), those in urban areas (5.9%), and those living in low-income households (7.9%).[1]

San Francisco, an urban area with a population of nearly 780 000 people in 1995, had several particular risks for a high asthma burden. The city had an ethnically diverse population, and 13% of all San Franciscans and more than 20% of children aged <18 years were living in poverty.[2] The city had unusually high asthma hospitalisation rates, resulting in a significant impact of asthma on the community. Overall, the San Francisco county asthma hospitalisation rate between 1995 and 1997 was 160 per 100 000, slightly above the state of California's rate of 120 per 100 000. However, San Francisco hospitalisation rates for children aged 0–14 years were nearly double this (317 per 100 000). The city's African American population was at particularly high risk. Hospitalisation rates for African Americans of all ages were more than three times as high as the city's overall rates (463 per 100 000). Furthermore, despite overall declines in hospitalisation rates from 1991 to 1997, the rate of decline was smaller among African American children when compared with children of other backgrounds. Latino children also suffered abnormally high hospitalisation rates when compared with Latino children in neighbouring counties.[3]

Concerns about asthma among African Americans in San Francisco prompted a local organisation, the Bayview/Hunters Point Health and Environmental Assessment Task Force, to conduct a prevalence survey in this neighbourhood. In the city's largely African American Bayview/Hunters Point neighbourhood, 52% of the 27 000 residents were living in poverty.[4] This neighbourhood also included a naval shipyard, several industrial sites, two power plants, and a sewage treatment facility,[5] which many in the community believed to be contributing to asthma. In conjunction with the University of California, San Francisco, and the San Francisco Department of Public Health, the Task Force found an overall asthma prevalence of 10%, nearly double the national estimates, and an alarming 15.5% prevalence among children.[6]

Yes We Can: creating an urban asthma partnership (1997–2002)

As information on the 'asthma epidemic' in San Francisco spread,[7] the city began to respond. In particular, a local organisation, Community Health Works, took notice of the problem and moved into action. Community Health Works is a joint effort between City College of San Francisco and San Francisco State University that was formed in 1992. The programme's goal is to help community organisations and the academic community work together to address local health disparities. Community Health Works focuses primarily on improving public health and primary care in underserved communities, introducing education programmes and streamlining access to care.

Responding to the reports of high asthma rates in underserved areas of San Francisco, such as the Bayview/Hunters Point neighbourhood, Community Health Works took the lead in bringing together local medical, civic, and community organisations to form the *Yes We Can* Urban Asthma Partnership in 1997.

Yes We Can had four goals:

1 to develop a comprehensive medical/social model for paediatric asthma care;
2 to promote policy and system changes in asthma care on a local and regional level;
3 to allow programme replication; and
4 to apply the medical/social model to other chronic diseases.

In 1999, *Yes We Can* secured funding supporting implementation of the partnership's comprehensive, community-based asthma programme. The first of the programme's four goals was achieved towards the end of 1999, when *Yes We Can* launched a partnership with the paediatric asthma clinic at San Francisco General Hospital, the university-affiliated public hospital for the city. Several characteristics of the clinic made it a logical choice for the *Yes We Can* implementation. It is located in an urban neighbourhood, serves primarily low-income Latino and African American children, and is embedded in a large paediatric health centre which ensured a steady referral stream of children with asthma. Additionally, the paediatric asthma clinic had already been established and had demonstrated improved outcomes for its patients.[8,9]

Programme implementation and initial evaluation

Details of the *Yes We Can* programme's development, as well a pre/post evaluation of the medical/social model's first 2 years of implementation, have been reported.[10] According to the model, children with asthma were treated at the paediatric asthma clinic for three visits over a 6-month period, followed by yearly follow-up visits. In addition to medical assessment, including skin testing, spirometry, and evaluation by an allergy or asthma specialist, children received comprehensive social support from community health workers working in conjunction with the medical personnel.

Community health workers are a distinguishing feature of the *Yes We Can* programme. They are community members who have completed training in health education and social support, in our case, through an associate-level certificate programme at a local college. The *Yes We Can* community health workers offer culturally sensitive, individualised asthma education, environmental assessments, phone advice/follow-up, and social support for families to supplement the medical components of asthma care. This support is offered during the clinic visits, via telephone contacts, and through optional home visits. When families are willing, the community health workers spend two to three sessions in a child's home, evaluating and reviewing environmental controls, and reinforcing asthma care.

Initial evaluation of the combined medical/social intervention demonstrated that participation in *Yes We Can* was associated with improved use of control medication, increased use of action plans, increased use of mattress covers, and decreased asthma symptoms when compared with historical controls.[10] Additionally, the programme served as a catalyst for change in local systems, including long-term funding for the community health workers, increased support for replication of the *Yes We Can* model at other local sites, and creation of the *Yes We Can* Toolkit, a manual outlining steps for replication of the programme in other communities.[11]

Programme evolution: refining delivery of care to meet community needs

The *Yes We Can* Urban Asthma Partnership has continued to provide comprehensive specialty paediatric asthma care at San Francisco General Hospital and is now institutionally funded. Programme implementation, while successful in many ways, also served to uncover potential weaknesses within the medical/social model. First, comprehensive care takes more

time than conventional care, and only reaches a select few patients. In the *Yes We Can* pilot phase, for example, each child/family spent approximately 15 h in the clinic and received 20 h of phone or home visit support over the course of the 1-year enrolment. This limited the number of children/families who benefited from the intervention, and was a potential barrier to programme expansion. While over the first 3 years of the programme, 656 visits occurred in the asthma clinic for 290 children, this represented only a small proportion of the estimated 6000 children with asthma in the Community Health Network.

Second, the specialty clinic-based, comprehensive approach may not be acceptable to all patients, particularly those at highest risk. For example, the no-show rate for the first visit to the Paediatric Asthma Clinic is 30%, while the no-show rate for those who have been to the clinic at least once in the past is 18%, suggesting that the *initiation* of asthma specialty care is a barrier for some families. In addition, certain aspects of the comprehensive approach appear to be difficult for families to accept. During the *Yes We Can* pilot phase, for example, only 64% of those approached agreed to receive home visits, and 15% of those who initially agreed never completed any home visits.[10] Although the initial evaluation suggested that home visits are effective, this may be due to the fact that families accepting this intervention are more likely to be motivated in multiple areas to improve asthma control. This theory was further supported by a recent evaluation in which we randomised the home visit intervention. Randomisation resulted in a drastic decrease in the number of visits completed, and also decreased the positive effect incurred by the home visits, uncovering the finding that the families at highest risk may also be the most difficult to reach by current methods.

With programme impact and programme acceptability in mind, *Yes We Can* worked to modify its intervention to meet the needs of the community in a more complete and efficient manner. These changes focus on modification of the role of the community health worker, identifying high-risk patients, and education of medical providers.

Modifying the role of the community health worker

Lessons from the pilot had suggested the need to create a programme that did not rely as heavily on home visits, or even the specialty clinic visit itself, for delivery of comprehensive care. As such, the community health worker role was modified to include a greater emphasis on education and support *during* asthma clinic visits and via extensive phone support *between* visits. Home visits are now reserved for those with environmental or social issues that are not adequately addressed in the clinic or over the phone. With less time spent making home visits, the community health workers are now available to provide education and social support to larger numbers of patients and families, including those receiving acute or inpatient care for asthma. As a result, all children hospitalised with asthma now receive asthma education and social support from the community health workers. The same is true for children seen for acute asthma visits, where medical providers enlist the support of community health workers in providing asthma education at the point of care, during an asthma exacerbation. In both the inpatient and acute care settings, the community health workers also facilitate referrals to the asthma clinic for follow-up and communicate with the child's primary medical provider about the visits.

Between 2002 and 2005, the number of children involved in this expanded medical/social model has increased dramatically. The asthma clinic census increased by 25%, from 520 to 690 visits per year, and more than 200 hospitalised children received community health worker services. In the acute care setting, 1574 children were evaluated for acute asthma, and medical providers solicited health worker support in 35% of these acute cases. Overall, the health workers had contact with more than 550 individual patients.

High-risk case finding

Many high-risk children with asthma were being seen in urgent care and inpatient settings, rather than in the asthma clinic. For example, the demographics of patients in the asthma clinic were similar to those of asthma patients seen in other settings within the San Francisco Community Health Network – a group of public health clinics targeting the city's low-income residents (see Table 1). When compared with the general paediatric population in San Francisco, these children were more likely to be African American or Latino and less likely to be from white or Asian backgrounds.[12] In sharp contrast to the San Francisco poverty rate of 11.8% for families with children under 18 years of age,[13] more than 90% of families seen for these asthma visits were living in poverty. These patients represent those most in need of asthma

Table 1. Paediatric primary care and asthma patients at San Francisco General Hospital and in the Community Health Network

	Acute asthma visits (2002–05) *n* (%)	Inpatient asthma admissions (2002–05) *n* (%)	Asthma clinic visits (2002–05) *n* (%)	San Francisco Community Health Network (2005–06)[11] *n* (%)
	n = 1574	*n* = 207	*n* = 1796	*n* = 15 357
Ethnicity				
White	53 (3)	4 (2)	89 (5)	1086 (7)
African American	508 (32)	71 (34)	539 (30)	3304 (22)
Latino	734 (47)	96 (46)	826 (46)	7696 (50)
Asian/Pacific Islander	233 (15)	33 (16)	144 (8)	2375 (16)
Other/unknown	51 (3)	3 (1)	180 (10)	815 (5)
Age (years)				
<2	377 (24)	71 (34)	215 (12)	3170 (30)
2–4	504 (32)	60 (29)	430 (24)	2821 (27)
5–9	394 (25)	39 (19)	718 (40)	2415 (23)
10+	299 (19)	37 (18)	431 (24)	1028 (25)

support – they are all low-income and are predominantly African American and Latino. Therefore, in addition to accepting referrals to the paediatric asthma clinic, *Yes We Can* began a case-finding programme in an attempt to bring more severe and high-risk patients into the comprehensive medical/social model of care.

The programme now engages in active identification of new patients at a particularly high-risk time – during an asthma flare. To accomplish this, a systematic review of the patients seen in the San Francisco General Hospital paediatric urgent care and emergency room for asthma was initiated. Patients were targeted if they had been given a primary diagnosis of asthma, or if they had been given another diagnosis but received a prescription for albuterol and/or an inhaled steroid. Once identified, these patients received a follow-up phone call from the asthma clinic staff to address any lingering issues about their care, such as medication questions, pharmacy problems and basic asthma concerns. Patients were also offered assistance in making follow-up appointments in primary care and with the asthma clinic. More than 1500 patients have been identified through this programme.

Medical provider asthma education

Despite our attempts to expand comprehensive care, we realise that many high-risk patients will continue to receive their primary asthma care and education during acute visits. To meet the needs of these patients, *Yes We Can* has also launched a medical provider education programme. This includes quarterly presentations to paediatric medical providers at San Francisco General Hospital and an ongoing education campaign designed to improve compliance with the national guidelines for asthma management.[14] Guidelines for asthma management and a list of local medical plan formularies have been posted in the urgent care setting and distributed to Community Health Network medical providers. An asthma discharge planning form guides the urgent care clinicians through classifying and appropriately treating persistent asthma according to national guidelines. Asthma clinic staff regularly give providers feedback on their medical management of patients identified through the high-risk case finding. The asthma clinic also offers clinical rotations for residents and faculty who are interested in improving their asthma knowledge and management practices.

After introduction of the provider education interventions, urgent care visits for asthma remained stable, representing just over 3% of all urgent care visits each year. However, hospitalisations for asthma decreased between 2002 and 2005, from 18% to 14% of all paediatric admissions (Fig. 1). Urgent care providers have improved their medication prescription patterns, with prescriptions for spacers increasing from 47% to 75% (Fig. 2) and prescriptions for inhaled corticosteroids increasing from 44% to 56% (Fig. 3). Asthma clinic referrals remained stable over the course of the intervention, with close to 50% of all patients seen for emergency care referred to the comprehensive asthma clinic each year.

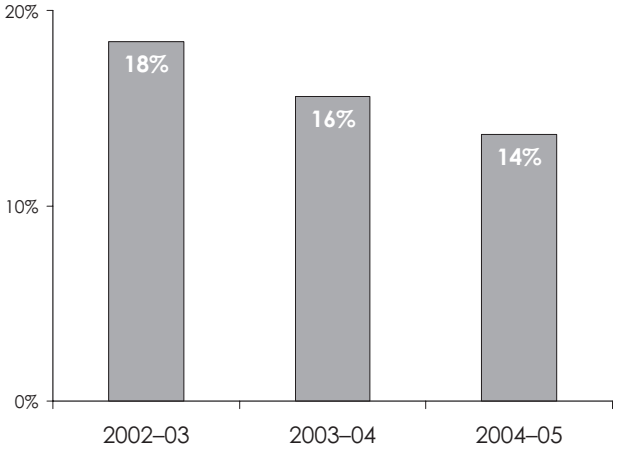

Figure 1. Paediatric asthma hospitalisations as a percentage of all paediatric hospitalisations (2002–05).

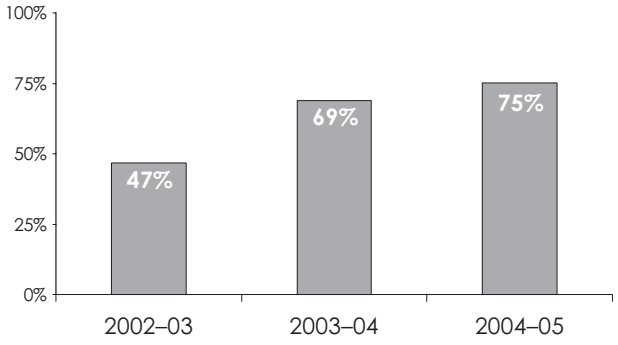

Figure 2. Documented spacer prescriptions as a percentage of all paediatric urgent visits for asthma (2002–05).

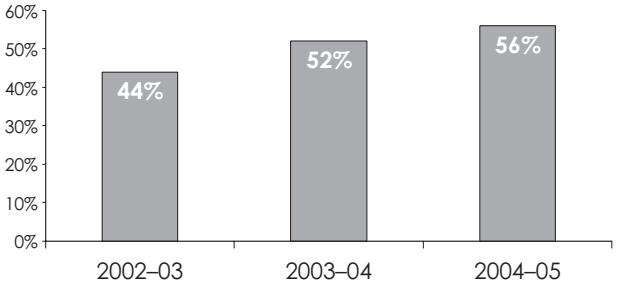

Figure 3. Documented inhaled steroid prescriptions as a percentage of all patients evaluated for asthma (2002–05).

Lessons learned and looking forward

Despite promising results with programmes such as *Yes We Can*, controlling asthma remains a formidable challenge. The most recent NHIS report in 2004 suggests that 12% of all American children have asthma,[15] more than double the reported 1995 prevalence. In California, the lifetime asthma prevalence in children is estimated at 18.4%,[16] and asthma rates continue to differ significantly between ethnic groups. Current estimates include a prevalence of 25.8% among African American children, 13.2–22.8% among Hispanic subgroups, and 10.9–23.8% among Asian subgroups.[17] In San Francisco, the overall asthma prevalence for 0 to 14-year-olds is now at 13.8%, with the hospitalisation rate for African American children aged 0–14 years at more than three times that of non-Hispanic white children.

Hospitalisation rates for Hispanic and Asian children are also significantly higher than rates for white children.[18] Asthma remains the top admitting diagnosis for paediatric patients at San Francisco General Hospital, and acute asthma remains among the top 5 reasons for accessing paediatric emergency services. Clearly, the 'asthma epidemic' continues, with low-income children, those in urban areas, and those from high-risk ethnic groups suffering an undue burden of asthma morbidity.

However, while improved medical therapies and medical/social interventions have not solved the problem, these efforts have made some impact. Overall, asthma hospitalisations are on the decline,[3] and many programmes have demonstrated success in target areas such as medication compliance, environmental trigger abatement and provider education.[9,19–22] Several characteristics seem to predict success among urban asthma programmes: targeting of high-risk patients, disseminating best practices to a wide audience of clinical providers, and ensuring sustainability by integrating programmes into the existing social and cultural infrastructure.

The *Yes We Can* Urban Asthma Partnership reaches out to high-risk children in three clinical settings: at urgent visits, in the hospital, and through a comprehensive specialty asthma clinic. Through the expanded community health worker role, more children at risk have been identified and entered into the programme. Interventions are more tailored to the individual needs of patients – while one patient may need only review of an action plan after a hospitalisation, another may benefit from weekly phone calls and several home visits. The extension of the programme to the urgent care and acute care setting means that the programme now reaches patients during acute asthma flares – a time when they may be more likely to accept the supports offered. As asthma care must be built on a foundation of evidence-based medical care, outreach to medical

providers further extends the programme's impact and has contributed to improved clinical practice.

Yes We Can is the result of a community's response to the growing problem of childhood asthma. Its methods are based on the successful strategies of its founding partners, and its implementation has occurred within a strong community medical setting. A recent publication, the *Yes We Can* Toolkit, outlines the programme's structure and provides guidelines for replication. The implementation requires only modest funding to support the community health workers, making it feasible to implement similar measures in other communities. The evolution of *Yes We Can* may offer insight into the creation, implementation and improvement of similar programmes supporting chronic disease management.

Conflicts of interest

The authors have declared no conflicts of interest.

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