

ORIGINAL ARTICLE

The *Yes We Can* Urban Asthma Partnership: A Medical/Social Model for Childhood Asthma Management

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Pediatric asthma programs have struggled to integrate children's medical and social needs. We developed and piloted an integrated team model for asthma care for low-income children through the *Yes We Can* Urban Asthma Partnership. Program evaluation demonstrated increases in prescribing controller medications ($p < 0.05$), use of action plans ($p < 0.001$), and the use of mattress covers ($p < 0.001$); and decrease in asthma symptoms ($p < 0.01$). Additional changes occurred within the local system of asthma care to support ongoing efforts to improve asthma management. We conclude that pediatric asthma programs can effectively target the social and medical needs of children in a sustainable manner.

Keywords health disparities, asthma, underserved children, chronic disease management, community health workers

INTRODUCTION

Asthma is the most prevalent chronic disease among children. According to 2002 data, 9 million American children (12% of all children) have asthma, 4 million of whom have experienced an attack in the past 12 months (1, 2). Economic and racial disparities in the prevalence and severity of asthma are well documented, with low-income and minority children more likely to be diagnosed with the disease (1). Even after controlling for this higher disease burden, minorities and the poor are more likely to receive care in emergency departments and require hospitalization for asthma (3–8). Further, they are less likely to receive appropriate therapy to prevent exacerbations (4, 5, 7, 9, 10). This trend is especially marked in the inner city, where minority and economically disadvantaged children are exposed to other asthma-associated factors such as poor housing conditions, environmental tobacco smoke, crowding, air pollution, and other airborne allergens (11).

Asthma, like other chronic conditions, requires regular medical assessment and ongoing self-management. Unfortunately, the combination of suboptimal medical care with social and environmental challenges contributes to poorly controlled childhood asthma. This has negative consequences on children's schooling and parents' work attendance. This article provides background on prior attempts to control childhood asthma and introduces the *Yes We Can* program, addressing some of the medical and social issues we judge to be important for optimizing childhood asthma management. We also report on the pilot phase of this program's implementation and its impact on our community.

Summary of Prior Interventions

Interventions for asthma can be classified into three categories: (1) those that rely on a medical model (2), those that rely on a social model, and (3) those that attempt to incorporate both. Table 1 contrasts the medical and social models of asthma management. In general, the medical model of care targets practitioner knowledge and behavior, whereas the social model works to improve the self-management skills and social and physical environment of the patient and family.

Some interventions have approached asthma care with the goal of improving the medical model, a natural target given practitioners' poor adherence to national guidelines (7, 12–14). Programs include intensive medical case management by nurse practitioners (15), and single-session clinician trainings (16, 17). These programs have shown some success, although the duration of benefit from these interventions is mixed (18–20).

Other interventions have targeted the self-management skills and social environments of children. For many children with asthma, the home, school, and neighborhood are difficult environments to support adherence to medical recommendations (21) and implementation of environmental controls. Environmental triggers are known contributors to asthma morbidity (4, 5, 11, 22, 23). Reducing or removing triggers, while difficult (24, 25), has achieved positive results (26–35). Most encouraging is a multi-site recent evaluation of the impact of community health workers who visited the homes of children with asthma to address environmental exposures. This intervention resulted in a significant reduction in asthma symptoms and urgent health care visits among children receiving these services (36).

Interventions combining both medical and social models promise to have the largest impact for childhood asthma. Not surprisingly, comprehensive interventions have been difficult

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TABLE 1.—Comparison of medical and social models of asthma management.

Component of intervention	Medical model	Social model
Formulation of principal barrier to asthma control	Practitioners do not correctly diagnose asthma or prescribe appropriate pharmacotherapy	Social stressors and environmental triggers exacerbate the underlying disease
Location of intervention	Hospital or clinic	Home or community
Focus of intervention	Appropriate medications	Family empowerment and environmental improvements
Care providers	Usually medically trained practitioners (physicians or nurse practitioners)	Usually less-intensively trained practitioners (social workers, health workers, or nurses)
Level of technology	Often high (spirometry, computerized records, etc.)	Usually low
Behavioral modification efforts	Sometimes	Often
Disease management programs	Sometimes	Rarely
Patient education	Variable level	Variable level
Inclusion of primary care clinician	Sometimes	Rarely
Reinforcement of the other model	Rarely	Frequently

to implement and evaluate, with only a few examples in the literature (20, 37–42). Of note, we are unaware of any programs that work to improve *both* the quality of direct medical care and the social supports for children with asthma. The following is a description of our efforts to address both social and medical components of asthma care for children through the *Yes We Can* Urban Asthma Partnership. Additionally, we present the results of the *Yes We Can* pilot program, implemented in an urban pediatric clinic.

METHODS

In 1997, Community Health Works, a program of San Francisco State University and City College of San Francisco, convened the *Yes We Can* Urban Asthma Partnership in collaboration with 17 local medical, governmental, and social service organizations. The goal of *Yes We Can* was to address disparities in pediatric asthma care in San Francisco, a city with asthma rates and racial disparities similar to those in other urban areas of the United States (43–45). *Yes We Can* is a medical/social care model for clinic-based, community-focused, team-oriented pediatric asthma management. The development, demonstration, and evaluation of this project took place at San Francisco General Hospital (SFGH), and the program was later expanded to two community clinics.

Developed using the Chronic Care Model (46), *Yes We Can* was designed to demonstrate a real-world approach to asthma care that could yield improved health outcomes and could be expanded with relatively modest funding.

Yes We Can had four specific goals:

1. to develop a medical/social team model for asthma care of low-income children;
2. to augment the model's impact through system and policy change, such as improved access to medications, health insurance, and environmental control measures;
3. to develop and disseminate materials to a national audience; and
4. to apply the model to other chronic diseases.

A distinguishing feature of this medical/social model is the use of community health workers. Community health workers are community members who have undergone training in health education and social support, in this case through an associate level certificate program at City College of San Francisco (47). They provide culturally sensitive, focused health education and social support to patients and families in conjunction with and as a supplement to clinical care. Incorporation of community health workers into the care of

asthmatic children aims not only to add this direct family support but also (and equally) to improve the medical care provided by clinicians who get regular feedback about how the medical regimen is working in the family's daily life.

San Francisco General Hospital (SFGH)—the university-affiliated, publicly funded hospital for the city—had an existing pediatric asthma clinic that served as the implementation site for *Yes We Can*. Children with unstable asthma were referred by community providers, public health nurses, and schools. Additionally, children seen for acute asthma visits at sites within our health network were recruited into the program through an aggressive outreach campaign by *Yes We Can* staff.

Yes We Can at SFGH included three components:

1. medical evaluations (conducted by clinic physicians, and nurse practitioners): medical assessment, spirometry, allergy skin testing, and provision of an action plan;
2. social interventions (conducted by community health workers during clinic visits and at separate home visits): review of the asthma care or "action" plan, discussion of environmental triggers and appropriate medication use, and an assessment of other stressors such as housing and health insurance; and
3. integrated efforts (performed by clinicians and community health workers): patient education, social support, and community outreach.

Typically, a patient with unstable persistent asthma received three to five asthma clinic visits, interspersed with two to three home visits. Clinicians and community health workers participated in frequent case conferences, where relevant medical and social information was reviewed and an asthma care plan was created. Feedback, including the asthma care plan, was then given to referring primary care providers after each patient encounter. An overview of the program can be found in Figure 1.

At each asthma clinic visit, patient demographics, as well as medical history and educational interventions, were entered into a database developed by clinic staff. Additionally, community health workers collected information during home visits to track educational and environmental interventions.

In 2002, records were reviewed to gather pre- and post-intervention data related to the pilot program. The following evaluation includes a convenience sample of patients who met these selection criteria: (1) two or more asthma clinic visits within a 12-month period and (2) at least one asthma

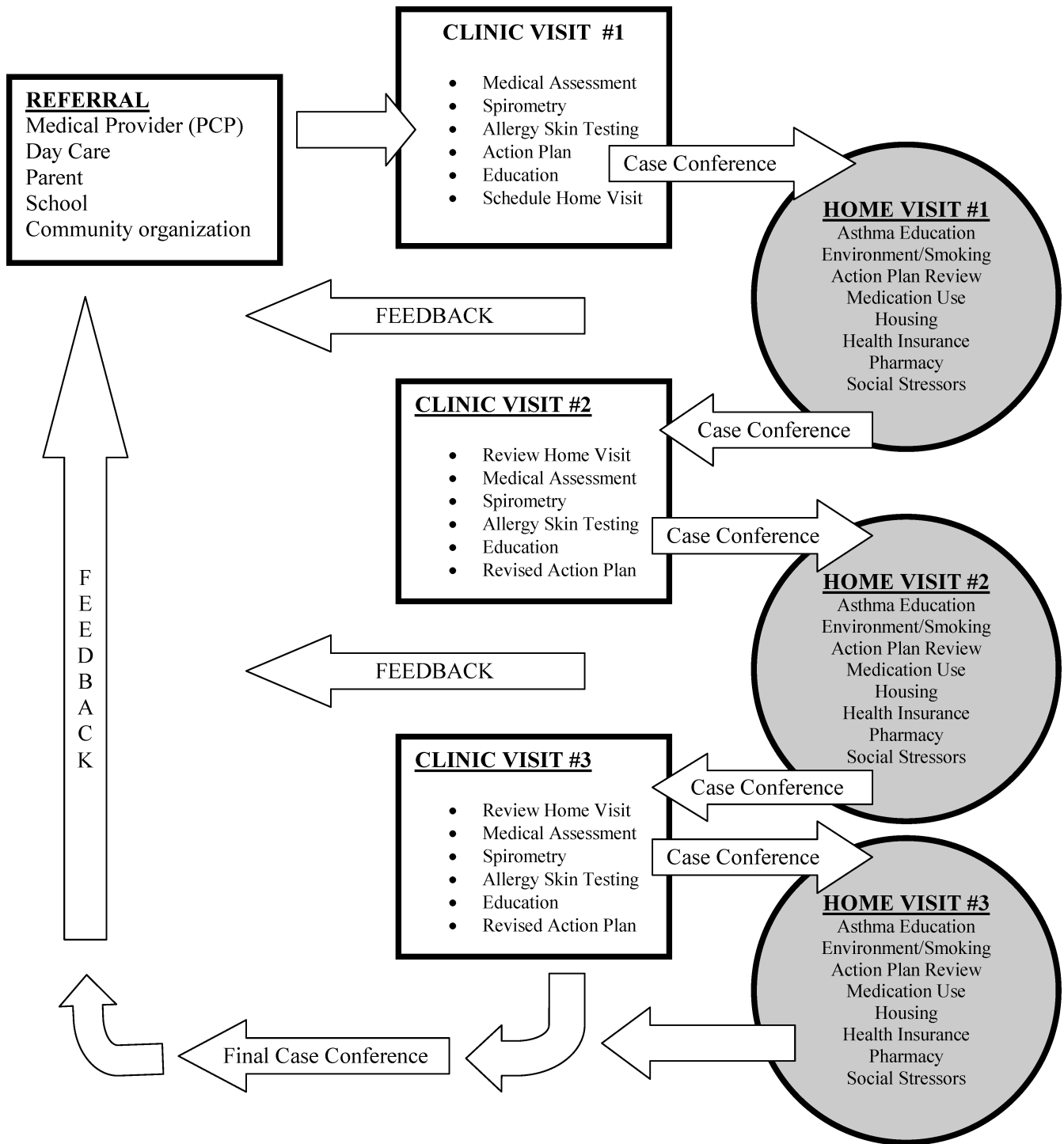


FIGURE 1.—The *Yes We Can* integrated medical/social model for childhood asthma care.

clinic visit after an initial home visit. When two siblings were receiving care, only the sibling who first entered the program was included. Institutional Review Board approval was obtained from the University of California, San Francisco, for this evaluation.

Outcome measures for this evaluation included prescription of controller medications, creation of asthma action

plans by asthma clinic staff, and change in forced expiratory volume in 1 second (FEV₁) over the course of enrollment. Prescription of a controller medication was determined to occur if the patient was diagnosed with “persistent asthma” in the database and was prescribed a daily asthma controller medication (inhaled corticosteroid). Creation of an action plan was determined to occur if the

patient had an action plan in the database after the first clinic visit.

In addition, several patient-reported outcomes were monitored: exposures to tobacco and pets, use of mattress and pillow covers, change in day and nighttime symptoms, and activity impairment. For environmental questions, an answer of “yes” to the following questions: “Are there any pets in your home?” “Are there any smokers in your home?” and “Do you have mattress and/or pillow covers on your bed?” was considered a positive response in our database query. For questions regarding symptoms, we queried a database drawn from intake interviews, using data points such as the number of days reported for daytime symptoms, nighttime symptoms, and activity impairment in the 2 weeks before the asthma clinic visit. Responses in these patient-reported areas were compared between the first and last visits.

Pulmonary function testing was attempted using a KoKo Spirometer (Louisville, CO), using standardized norms for age and race, at all visits for patients greater than 4 years of age. For those who were able to comply with testing at the first and last visits, the database values for FEV₁ were compared from the first to the last visits.

Statistical analysis, using pre- and post-measures, was done using the Wilcoxon Signed Rank test.

RESULTS

Patient Outcomes

One hundred and two new asthma clinic patients met the criteria outlined above during the study period (1999-2001). The parents of 65 of these children agreed to at least one home visit for their child; these children were used as the convenience sample. Information on the reason for refusal was not collected. Although specific outcome data was not collected on those patients who refused home visits, the demographics of the entire eligible population did not differ from that of the home visit group (see Table 2). Patients averaged four clinic visits and were received follow-up for an average of 6.6 months, and 60% received the goal of two or more home

TABLE 2.—Baseline patient demographics for home visit and asthma clinic evaluations.

	Yes We Can patients (n = 65)		Asthma clinic total patient population (n = 102)
	n	Percent	Percent
Ethnicity (self-reported)			
Latino	28	43	43
African American	28	43	40
Asian American	7	11	11
White/other	2	3	7
Gender			
Male	43	66	57
Female	22	33	43
Age	Mean 7.3 years	—	Mean 6.2 years
0-4	24	37	47
5-11	33	51	42
12+	8	12	11
Asthma severity			
Intermittent	11	17	19
Persistent	54	83	81

visits. Of note, 10 patients who had agreed to home visits never received them despite outreach efforts. Data analysis was conducted on all patients who initially agreed to home visits based on the intention to treat.

Table 3 summarizes observations from the *Yes We Can* demonstration project. Following the first clinic visit, prescription of controller medications and creation of an asthma action plan ($p < 0.001$) were significantly increased ($p < 0.01$ and $p < 0.001$, respectively). Additionally, patients reported a significant increase in the use of mattress and pillow covers in the home ($p < 0.001$). Exposure to smoke and pets in the home did not significantly change but trended toward improvement.

Days with asthma symptoms decreased significantly (5.1 to 2.8), as did the number of nights with symptoms (5.0 to 2.7). Activity impairment showed a similar improvement ($p < 0.01$ for all measures). Among children over 4 years of age who were able to complete spirometry, FEV₁ values did not change significantly, although they trended toward improvement.

TABLE 3.—Outcomes from the *Yes We Can* medical/social model (average follow-up period 6.6 months).

	No. of patients (n)	First clinic interview	After first clinic visit	At last clinic visit	p value
Medical interventions					
Patient prescribed controller medication if diagnosis is persistent asthma	65	44%	100%	—	<0.01
Patient has Asthma Action Plan	65	<1%	100%	—	<0.001
Social/environmental interventions					
Patient reports exposed to tobacco smoke	65	36.5%	—	17%	=0.5 NS
Patient reports pets in the home	65	11.5%	—	5.7%	=0.7 NS
Patient reports using bed covers	65	5.7%	—	94.3%	<0.001
Patient outcomes					
Days with asthma symptoms in the past 2 weeks	65	5.1 95% CI 3.5-6.4	—	2.8 95% CI 1.9-3.6	<0.01
Nights with asthma symptoms during the past 2 weeks	65	5.0 95% CI 3.6-5.4	—	2.7 95% CI 1.7-3.7	<0.01
Days with activity impairment in the last 2 weeks	65	4.1 95% CI 2.7-5.4	—	2.5 95% CI 1.5-3.4	<0.01
FEV ₁ (% predicted for age and ethnicity) for children >4 years of age	42	82 95% CI 79-94	—	91 95% CI 84-95	=0.27 NS

Measuring Success in Terms of the Yes We Can Goals

The success of *Yes We Can* should also be measured against the four goals initially established by the Partnership.

1. *To develop a medical/social team model for prevention-oriented asthma care for low-income children.* *Yes We Can* created a medical/social model that successfully targeted and improved two areas of systemic weakness in pediatric asthma care: the lack of appropriate medical therapy for children with asthma and the multiple environmental and social factors that complicate asthma self-management. We defined success in the area of appropriate medical therapy as changes in six areas: (1) controller medication, (2) use of an action plan, (3) decrease in daytime asthma symptoms, (4) decrease in nighttime asthma symptoms (5), decrease in activity impairment, and (6) improvement in FEV₁. We defined success in the area of social interventions as changes in three areas: (1) report of decreased exposure to tobacco smoke in the home, (2) report of decreased exposure to pets in the home, and (3) report of increased use of mattress and pillow covers. For five of the six medical measures and one of the three social/environmental goals, there was significant change.

While this multidisciplinary model's evaluation has shown improvement in several outcomes, the clinic was developed as a site of medical/social care rather than as an extension of an academic research laboratory. At present, we are undertaking more rigorous evaluation of this intervention, including additional patient and provider outcomes, provider effectiveness and cost-effectiveness.

2. *To augment the model's impact through system and policy change.* The *Yes We Can* demonstration catalyzed the development of new systems and local policies. For example, the San Francisco Department of Public Health and the local Medicaid programs now provide a no-cost source of asthma supplies, including spacer devices, medication boxes, educational materials, and mattress/pillow covers.

The San Francisco Department of Public Health and Board of Supervisors showed support for the project by incorporating the community health worker positions into the city budget, a noteworthy step during a time of budget shortfalls. In addition, providers from the asthma clinic offer regular training sessions with clinical staff from the city's health centers, school system, and medical training institutions.

Finally, the original *Yes We Can* work group at San Francisco State University and City College launched a statewide policy initiative aimed at improving Medicaid reimbursement for asthma preventive services on a statewide level.

3. *To develop and disseminate materials to a national audience.* With the success demonstrated at San Francisco General Hospital and expansion to two replication sites, the Partnership outlined the *Yes We Can* approach in a Toolkit, published in early 2004 by Community Health Works, Kaiser Permanente Northern California, and the National Initiative on Children's Healthcare Quality. The Toolkit contains manuals for program managers, clinical care managers, and community health workers, as well as a CD-ROM with the forms and electronic database developed at SFGH. In-

formation on how to obtain the toolkit may be found at www.communityhealthworks.org/yeswecan. A second tool for national replication is an in-depth case study commissioned by the Centers for Disease Control and Prevention (48).

4. *To apply the newly developed medical/social model to other chronic diseases.* This remains a goal for the future of *Yes We Can*. As the asthma intervention is scaled up for replication outside of San Francisco, leadership at San Francisco State and City College is developing a higher education textbook outlining chronic-care core competencies.

DISCUSSION

In contrast to the majority of prior asthma interventions, *Yes We Can* attempts to improve both medical and social aspects of asthma care. Findings from this preliminary evaluation leave us optimistic that *Yes We Can* contributes to improved care for children with asthma, although we are mindful of the limitations of the pre/post design. Decreases in asthma symptoms along with improved adherence to National Heart Lung and Blood Institute guidelines for medication and action plan use suggest that this program can improve clinical outcomes. In addition, social and environmental outcomes suggest that the medical/social model may improve the non-medical components of asthma care. Not surprisingly, significant improvements occurred in areas where the program added something to asthma care (medication prescriptions, action plans, bed-covers), in contrast to the more difficult effort of asking patients to change behaviors or take away something (cigarette smoke and pets). We intend to focus on maximizing *Yes We Can*'s additive components as we expand the program.

Overall, the largest additive component of the *Yes We Can* was the community health workers. In the office, the community health workers promote family self-management through cultural and linguistic competence and through their intense education efforts. They then create a bridge to the home environment, reinforcing optimal asthma care here as well. In both settings, community health workers assume many of the routine aspects of chronic disease management, making more efficient use of health professionals. Their efforts reduce the need for phone calls to the medical providers for refills, clarify issues of medication use, help families navigate the insurance plans and formularies, and provide a personal contact for other troubleshooting, all of which may be responsible for a large amount of the program's success.

Despite the value of this intervention, we did note reluctance among some families to accept home visits as a component of asthma care. When first approached, only 64% originally agreed to home visits; and even among those who agreed to the visits, 15% never completed any visits. We were able review data on those families who had consented to the study and did not complete visits; however, we did not note any particular trends. Anecdotally, issues such as immigration status and stability of housing were factors that may have led to home visit refusal.

The lower than expected acceptance of the *Yes We Can* intervention has led us to review our recruiting strategies and seek other opportunities to supplement medical care with the social supports of the community health workers. Since completion of the pilot, we now offer families a more detailed

explanation of the components of the home visit and we ensure that the community health worker who will be completing the visit personally delivers this information. We have also initiated a randomized controlled trial of this intervention to learn more about the role of community health workers.

At present, we continue to offer home visits. However, we work with families to meet their individual needs. After determining that a child might benefit from augmented asthma management extending beyond the clinic visits—owing to severity of asthma, social barriers to care, or other factors, community health workers help families to determine how to best assist them. If a home visit is not acceptable to the family, the community health worker then offers case management and support through extensive telephone contacts. Additionally, community health workers have become integrated into our urgent care visits for asthma, providing immediate teaching and referral to *Yes We Can* in hopes that the family might be particularly receptive to services after experiencing the stress of an acute visit for asthma.

The overall intention with *Yes We Can* was to assemble a set of best practices and implement them under real-world conditions. This effort is analogous to a phase III drug trial, where best practices are put into place for the population at large. Our intervention used existing infrastructure and required a modest budget, and, following the pilot, *Yes We Can* was permanently funded at our institution. Several other clinical sites in our community have implemented the *Yes We Can* model, and the Toolkit now provides the template for further replication.

Our own experiences and interactions with colleagues underscored the importance of integrating medical and social interventions for childhood asthma. Community health workers operating outside of a primary medical team do not have the social power or organizational traction to improve the practice of medical clinicians. Conversely, even the most effective medical care is too often undermined by complex social factors or cultural barriers that are difficult for the traditional care providers to address. Regardless of the effectiveness of medical interventions or social supports alone, the added value of coordinated efforts is clear.

The *Yes We Can* model provides a valuable example of how to assemble a comprehensive model of asthma care for inner-city children. Linking the medical services to social supports with community health workers participating in both components has potential to build a stronger patient and community support for the integrated medical/social model. Broad dissemination of sustainable community-based preventive health care that addresses both the medical care and the social components of chronic disease is imperative if we are to address today's health care challenges.

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