Sinai Asthma Program: Helping People Breathe and Thrive

The Asthma Initiatives of the Sinai Urban Health Institute and Sinai Children’s Hospital

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A Proud Member of Sinai Health System
One in twelve people nationally are living with asthma; of these 25 million people, nearly 73% are adults. Asthma is the most common chronic disease of childhood, affecting 13% of children nationally and in Chicago. The prevalence of current asthma is rising with studies documenting a disproportionate increase in mortality and hospitalization rates among urban residents. Unfortunately, in Chicago some poor, minority communities experience a disproportionate burden of asthma. Sinai Health System, located in the heart of Chicago’s poverty-stricken primarily African American and Latino Westside, sees a disproportionately high number of children and adults with asthma each year. In 2002, the Sinai Urban Health Institute (SUHI) implemented the largest door-to-door community health survey ever conducted in Chicago. The survey focused specifically on six Chicago Community Areas. The Sinai Improving Community Health Survey revealed several pivotal findings, including the revelation that in some Chicago communities pediatric asthma rates reach and even exceed 25%. As one specific example, nearly one in four children have asthma in North Lawndale, the Black community area in which Sinai Health System is located. Not only are children in North Lawndale more likely to have asthma than their counterparts in other Chicago communities, but the survey also revealed that only 15% of children in North Lawndale with diagnosed symptomatic asthma are on proper medications and that nearly half are exposed to tobacco smoke on a daily basis.

Since 2000, SUHI and Sinai Children’s Hospital have implemented a series of seven comprehensive interventions aimed to decrease asthma-related morbidity and improve the quality of life of children with asthma and their families. Each program, building on the successes and learning from the shortcomings of its predecessors, has taught SUHI a great deal about how to best address the unacceptable problem of pediatric asthma disparities in underserved populations. In addition, some of the programs revealed the need for comprehensive asthma interventions for adults, expanding SUHI’s reach to anyone with uncontrolled asthma.

At the heart of each program is the Community Health Worker (CHW) Model.

Interventions vary in length from six months to one year and consist of three to six home visits by a trained CHW. CHWs are recruited from the specific communities targeted by the interventions and provide one-on-one individualized home-based asthma education to children and their families. “Hands-on” in their approach, they not only teach but demonstrate skills; for example, proper medication techniques or how to remove asthma triggers from the home environment. CHWs also serve as a link between families, individuals and medical and social services. They encourage regular primary care physician (PCP) visits, while providing referrals to those without a PCP. They also work with the PCP, individuals, children and their families to develop Asthma Action Plans. To date, five interventions have been completed, and two are in process. Our findings (see Table 1) suggest that individualized, one-on-one asthma education provided by a trained, culturally competent CHW in the home environment is an effective means of improving asthma. Each of the five completed interventions, and the ongoing Asthma CarePartners program, is associated with significant decreases in asthma-related morbidity. In more recent interventions, also documented were significant increases in Quality of Life and Asthma Knowledge.

In short, the lives of the individuals and families served by the projects have dramatically improved.
Past Sinai Asthma Initiatives (2000-2013)

Sinai first responded to issues of pediatric asthma in July 2000 with the launch of Pediatric Asthma Initiative-1 (PAI-1). The central hypothesis of this sequential randomized clinical trial was that the most economic and effective path to improving the health of inner-city children with asthma is through a process of case specific, reinforced health education combined with case management services. Children with asthma were randomized into three groups: Group One received a single, one-on-one asthma education session with a trained asthma educator; Group Two received the same initial asthma education session, but that education was reinforced via phone on a monthly basis; and Group Three received reinforced asthma education with the addition of case management. Participants in all three groups utilized significantly fewer emergency health care services in the follow-up year. Averaged across all three groups, the magnitude of the decline in utilization was enormous. The PAI-1 project also proved to be cost-effective, resulting in an estimated $4,503 saved per patient/ per year over costs incurred during the baseline year. This translates to $7.79 saved per dollar spent on the intervention.

In 2004, Pediatric Asthma Initiative-2 (PAI-2) was initiated. This project differed from PAI-1 in that CHWs delivered case-specific asthma education in the home environment. CHWs visited the homes of clients three or four times over a six month period. They also served as a liaison between the family and the medical system. PAI-2 resulted in significant decreases in hospitalizations and urgent health care utilization, as well as a clinically significant change in caregiver Quality of Life (Table 1). The intervention was associated with significant cost-savings of $2,562/ participant. Displayed another way, one might expect $5.58 to be saved per dollar spent on the intervention.

In 2006, the promising results of PAI-2 led the Illinois Department of Public Health to include the PAI-2 model as a key component of a larger state-wide initiative, Controlling Pediatric Asthma Through Collaboration and Education (CPATCE). Six diverse target areas within Illinois were chosen based on their having asthma hospitalization rates in excess of the State average. SUHI undertook two specific activities. First, the model was expanded to additional Chicago neighborhoods to more completely cover the “hotspots” of asthma in Chicago, along with hiring more CHWs, including a Spanish-speaking CHW. Secondly, an Asthma Training Institute was developed to coordinate the training of CHWs in the six areas identified by IDPH and to implement the CHW model on a wider scale. Three of the six target areas saw statistically significant decreases in asthma morbidity, reduction in asthma triggers, and statistically significant increases in Quality of Life. The results of CPATCE show that the SUHI CHW model translates well to other environments.
With funding from the Centers for Disease Control and Prevention (CDC), in September 2008, SUHI and SCH initiated *Healthy Home, Healthy Child: The Westside Children's Asthma Partnership* (HHHC). This year long CHW-based intervention focused exclusively on children with poorly controlled asthma living on Chicago’s Westside. Building upon previous models, HHHC developed a more comprehensive, multipronged approach by adding referrals to legal, housing, and social service partners, making it more feasible for families with competing priorities to effectively focus on asthma. All measures showed significantly positive results (see Table 1). Most impressively, a 1.3 point increase in the validated and widely used Juniper Asthma Pediatric Caregiver Quality of Life Score was demonstrated. An increase of this magnitude has been shown to be associated with significant clinical improvements in asthma control. The intervention was associated with cost-savings of $4.54 per dollar spent.

Armed with such positive and consistent findings, SUHI began advocating for the long-term sustainability of CHW programs to improve asthma outcomes. Furthermore, SUHI began to explore possibilities for the expansion of this model to other high-risk communities.

In 2010, SUHI, in partnership with the Chicago Housing Authority (CHA), received funding from the Department of Housing and Urban Development (HUD) to implement the two-year *Helping Children Breathe and Thrive in Chicago’s Public Housing* (HCBT) program. HCBT officially began in March 2011 to work with children only, but the need for services for adults quickly became apparent. Thus HCBT worked with 73 adults and 85 children living in six CHA buildings on Chicago’s Westside. CHWs were CHA residents. Once hired, the CHWs were trained to conduct comprehensive asthma and healthy homes education. Adults received four home visits over the course of six months and children received five to six home visits over the course of one year. Outcomes strongly indicate the success of the partnership with the CHA in integrating SUHI’s CHW model into a large public housing system (see Table 1). Children saw an 83% decrease in ED visits and a 75.8% decrease in overall urgent health care utilization. Additionally, asthma-related caregiver quality of life increased by 0.7 points, a clinically and statistically significant change. Outcomes were similar for adults, which prompted SUHI to seek further funding from HUD to focus exclusively on adults with asthma.
Current and Ongoing Sinai Asthma Initiatives

**Asthma CarePartners (ACP)** is a comprehensive asthma management program for children and adults living with the disease. The program started in the summer of 2011, when SUHI formed partnerships with a private insurer and a Medicaid funded managed care organization, to provide the program to identified individuals. The ACP program marked the beginning of providing an asthma management program to privately insured individuals in addition to those with Medicaid. The program is offered at no cost to selected members and its goal is to help adults with asthma and caregivers of children with asthma improve asthma control. The program is delivered by CHWs in the participant’s home and includes monthly follow up calls on months with no home visit. Participants may receive up to six home visits and six monthly phone calls. During these interventions participants expand their knowledge and understanding of asthma through education and hands-on demonstration of proper medical device technique. As with previous interventions, home environmental assessments remain a critical aspect of the program and of helping participants to positively impact their health. Outcomes for Medicaid participants, children and adults, who have completed 12 months in the program indicate a reduction in symptom frequency and a dramatic reduction in emergency department visits and hospitalizations. There was a 73% reduction in emergency department visits ($p<0.0001$) and a 75% reduction in hospitalizations ($p=.007$) between the year prior to and the year following the intervention. Nights where sleep was disturbed by asthma over a two-week period was decreased from 6.8 nights at baseline to an average of 2.3 over the intervention period ($p<0.0001$). Caregiver Asthma-Related Quality of Life scores improved from 5.0 to 6.6 at the 12-month follow-up ($p<0.0001$), a clinically and statistically significant improvement.

In 2013, SUHI applied for and received additional funding from HUD to continue its partnership with the CHA in implementing *Helping Chicago's Westside Adults Breathe and Thrive (HCWABT)*. This three-year program is one of the first in the U.S. to test the feasibility and effectiveness of a CHW home-based asthma intervention with adults. CHWs carry out the full home-based 12-month intervention with adults who have asthma living in six different zip codes on Chicago’s Westside. The project is open to both CHA and non-CHA residents living in the targeted zip codes. Referrals come from CHA, Sinai’s ED and inpatient units, physicians, and community organizations. Program staff conduct quarterly community education sessions open to all community members (not limited to those enrolled in the program) on topics such as Integrated Pest Management, asthma and COPD, and smoking cessation, in order to raise asthma and healthy homes awareness and empower the community to take steps towards improving their overall health.

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**Table 1. Sinai Asthma Program Outcomes**

<table>
<thead>
<tr>
<th></th>
<th>PAI-1&lt;sup&gt;1&lt;/sup&gt;</th>
<th>PAI-2&lt;sup&gt;2&lt;/sup&gt;</th>
<th>CPATCE (Sinai)</th>
<th>HHHC&lt;sup&gt;3&lt;/sup&gt;</th>
<th>HCBT</th>
<th>ACP***</th>
</tr>
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<tbody>
<tr>
<td><strong>N</strong></td>
<td>56</td>
<td>50</td>
<td>160</td>
<td>151</td>
<td>59</td>
<td>68</td>
</tr>
<tr>
<td><strong>Asthma Emergency Dept. Visits</strong></td>
<td>74.3% decline</td>
<td>73.5% decline*</td>
<td>47.6% decline*</td>
<td>69.0% decline*</td>
<td>83.3% decline*</td>
<td>73.5% decline*</td>
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<tr>
<td><strong>Asthma Hospitalizations</strong></td>
<td>86.2% decline</td>
<td>71.4% decline*</td>
<td>50.0% decline*</td>
<td>62.7% decline*</td>
<td>50.0% decline*</td>
<td>95.9% decline*</td>
</tr>
<tr>
<td><strong>Urgent Health Care Resource Utilization</strong>&lt;sup&gt;^&lt;/sup&gt;</td>
<td>79.6% decline*</td>
<td>69.3% decline*</td>
<td>50.0% decline*</td>
<td>54.7% decline*</td>
<td>75.8% decline*</td>
<td>73.6% decline*</td>
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<tr>
<td><strong>Nighttime Asthma Symptoms</strong></td>
<td>-</td>
<td>51.6% decline*</td>
<td>63.6% decline*</td>
<td>43.8% decline*</td>
<td>73.3% decline*</td>
<td>61.5% decline*</td>
</tr>
<tr>
<td><strong>Pediatric Asthma Caregiver’s Quality of Life</strong></td>
<td>-</td>
<td>Increased by 0.8*&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>Increased by 0.4*&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>Increased by 1.2*&lt;sup&gt;¥&lt;/sup&gt;</td>
<td>Increased by 0.7*&lt;sup&gt;¥ £&lt;/sup&gt;</td>
<td>Increased by 1.0*&lt;sup&gt;¥ £&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Cost-savings per Participant</strong>&lt;sup&gt;^&lt;/sup&gt;</td>
<td>$4,503.44</td>
<td>$2,561.60</td>
<td>$1,402.87</td>
<td>$2,119.81</td>
<td>$813.03</td>
<td>$3,200.05</td>
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<td><strong>Cost-savings/$ spent on the program</strong>&lt;sup&gt;^&lt;/sup&gt;</td>
<td>$7.79</td>
<td>$5.58</td>
<td>$3.38</td>
<td>$4.54</td>
<td>$2.33</td>
<td>$5.79</td>
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</tbody>
</table>

*Statistically significant p<0.05

<sup>^</sup> Sum of ED visits, hospitalizations, and urgent clinic visits

<sup>¥</sup> An increase of 0.5 is clinically significant

<sup>£</sup> Ns vary because parent is unit of analysis not child. HCBT N=42, ACP N=50

<sup>^</sup> Cost-savings after accounting for program costs

<sup>¥</sup> Cost Savings per $ spent = Healthcare Cost Savings/Cost of Program

**Table is pending publication

***This data is representative of the children who have completed 6 months in the ACP program

