



THE Children's  
Health FUND

**Benefits of Best Practice:**

**Asthma Care for High-Risk Children**

The Children's Health Fund

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## Overview

Asthma is among the most common chronic conditions of childhood. If not properly treated and controlled, asthma can result in serious activity limitations and compromised quality of life. Health utilization and costs can be very high, including hospitalizations and emergency room visits. In rare cases, children may die of complications arising from asthma.

The health care costs associated with asthma more than doubled from 1985 to 1994, from \$4.5 billion to \$10.7 billion. This trend has continued, and currently the Pew Environmental Health Commission projects a cost of \$18 billion for asthma by 2020. Health care costs for children with asthma are 88% higher than for the general pediatric population, with nearly 3 times as many annual prescriptions, 65% more acute care visits, and double the number of in-patient hospital days.

## Childhood Asthma Prevalence and Disparities

The U.S. Centers for Disease Control and Prevention (CDC) surveillance data show that lifetime asthma prevalence – whether or not an individual has ever been diagnosed with asthma or had asthma symptoms in the preceding 12 months – increased through the 1980's and 1990's. By 2000, the number of people in the U.S. with asthma doubled.

Racial-ethnic disparities are also notable. Compared to Caucasians, African-Americans have more than three times the rate of emergency room use, and more than four times the rate of asthma deaths. Similarly elevated rates of asthma are found among Latino children, with a lifetime asthma prevalence rate of 17.9% having been established. There are also age and geographic disparities: The highest rate of increase in asthma

prevalence and highest rate of emergency room use occurred among children under five years of age. Urban children, whether or not they are poor, are at higher risk for pediatric asthma.

In 1995, the CDC National Health Interview Survey (NHIS) found pediatric asthma prevalence of 7.5%. More recent NHIS data show a lifetime child asthma prevalence of 12% for 2004. The New York Program of The Children's Health Fund (CHF) treats patient populations with far higher asthma prevalence rates.

### Pediatric Asthma in New York City

Data from the New York City Department of Health and Mental Hygiene show that despite a 9% decline in pediatric asthma hospitalizations from 2004 to 2005, city children still have a higher asthma hospitalization rate than the national average, 5.4 vs. 3.1 per 1,000 children. Disparities continue, with the highest rates occurring in the city's low-income neighborhoods, East Harlem and Central Harlem (nearly four times the national rate), the South Bronx, and Williamsburg-Bushwick in Brooklyn. Of the five boroughs, the Bronx had the highest asthma hospitalization rate in 2005, more than 60% higher than the city as a whole.

### CHF Asthma Surveillance Study

From 1998-2002, CHF conducted a population-based asthma surveillance study at several New York City homeless family shelters to determine asthma prevalence for children as they enter the shelter system. In addition to asking parents whether a child had ever been diagnosed with asthma, a validated asthma screening tool was used to identify children with moderate to severe asthma symptoms who had not been diagnosed.

After a peak 40% asthma rate (the highest ever documented) for 1998-1999, asthma prevalence for homeless children on shelter entry leveled off during 2000-2002 at 32%. Overall, 16% of children with at least moderate asthma symptoms (subsequently corroborated on medical exam) had not been diagnosed.

Similar methodology was used by The Harlem Children's Zone (HCZ) to determine asthma prevalence in the Central Harlem community it serves. Central Harlem is one of the communities of origin for newly homeless families, so we would expect the asthma rate there to be consistent with that found by CHF in shelter surveillance. This was the case – HCZ found an asthma prevalence rate, including symptomatic but undiagnosed children, of 30%.

#### Undertreatment and Asthma Morbidity

In 1997, best practice guidelines were issued by the CDC, National Institutes of Health, National Heart, Lung, and Blood Institute (NHLBI). The NHLBI guidelines describe best-practice methods to accurately assess asthma severity and make the appropriate medication prescriptions to control the patient's asthma, preventing acute exacerbations and reducing hospital and emergency room use. For patients with persistent asthma, prescription and use of inhaled corticosteroids is associated with significantly lower rates of hospitalization, annual emergency room visits, and lower overall medical costs.

Studies done after the NHLBI guidelines were issued found that poor, inner city children are significantly less likely to have an asthma control medication prescribed when one is needed. In one study, for example, only 22% of children with asthma in East Harlem had a controller prescribed. Cumulative CHF homeless asthma surveillance data

for 1999-2002 show that upon shelter entry, only 15% of children diagnosed with asthma were on a prescribed inhaled corticosteroid, and 63% had used the emergency room at least once during the preceding year.

#### The Children's Health Fund Childhood Asthma Initiative

In 1997, CHF began its Childhood Asthma Initiative (CAI) in one of its flagship programs, The New York Children's Health Project (NYCHP), which is an affiliate of the Children's Hospital at Montefiore (CHAM). The NYCHP serves homeless children and families at city shelters through mobile medical units or on-site clinics in a comprehensive medical home model. Through CAI, the NHLBI guidelines were adapted for use in primary care to ensure accurate asthma severity assessment and treatment, and to track hospital and emergency room use over time. The first CAI expansion was to CHF's South Bronx Health Center for Children and Families (SBHCCF), a federally qualified health center in the Hunts Point-Mott Haven section of the South Bronx also affiliated with CHAM. This predominantly Latino community is home to many recent immigrants. City Department of Health and Mental Hygiene data report asthma prevalence in the community of 16%.

The demographics for the combined homeless and health center pediatric population in CHF's New York Program are: 56% Latino; 38% African-American; 2% White; 4% other. More than three fourths, 78%, have a family income below 150% of poverty. Together, the NYCHP and SBHCCF saw approximately 9,000 patients, two-thirds of whom were children, in 2004. The NYCHP asthma rate is 31.5%, and, adopting City Department of health Data, the asthma rate for SBHCCF patients is 16%.

### Outcomes of NHLBI guideline-based care

To assess CAI program outcomes, we focused on representative sample of 202 consecutive asthma patients of the NYCHP (53%) and SBHCCF (47%) who had kept at least one follow-up appointment. The mean follow-up interval was six months. The average age of this follow-up sample was 5.7 years on initial asthma assessment. Initial and follow-up data for key outcome indicators are shown in the Table One:

**Table One: Key Outcome Measures**

<b>Indicator</b>	<b>Initial</b>	<b>Follow-up</b>
Persistent asthma, on a controller med	27%	73%
Hospitalized	28.6% (mean, 1.9 times)	2.2% (mean, 1 time)
Used emergency room	61.3% (mean, 3.3 times)	19.4% (mean, 1.4 times)

In this patient population, overall asthma severity was driven by night time symptoms, which were significantly more severe ( $p < 0.01$ ) than daytime symptoms. More severe night time asthma symptoms are associated with more missed school days and worse academic outcomes, suggesting that one benefit of effective asthma management will be improved school performance. In this population, asthma severity improved to a statistically significant degree ( $p < 0.01$ ).

### Limitations of the Data

Because of the transient nature of sheltered homeless families, we were not able to get a representative number of NYCHP annual assessments to compare 12 month hospital

and emergency room use on follow-up to baseline. We relied on follow-up assessment data, which report hospital and emergency room utilization for only part of the year. To check for bias in these data, in consultation with a health economist, we analyzed all of the follow-up assessments in our data base and found that there were no significant variations in hospital or emergency room use by month or season of follow-up visit. We also compared the results of follow-up data with outcomes from a smaller number of annual to baseline comparisons, and found the results to be consistent within a 95% confidence interval.

Nonetheless, we must raise the concern that the mean number of emergency room visits or hospitalizations for hospital users may be slightly higher than reflected in follow-up results. To control for this, we adopted conservative estimates in our savings analysis, using cost data that do not reflect recent inflation.

#### Savings Associated With These Outcomes

For an assessment of health care savings associated with the CAI, we applied costs in place during the last year of data collection for 2004 at the Children's Hospital at Montefiore. These were \$400 for an asthma emergency room visit, and \$4,320 for an asthma hospitalization. In New York State, hospitalization rates vary from one institution to another. The State Department of Health reports that there is a cap on Medicaid payments for emergency room visits that is lower than actual cost at any of the state's hospitals. The cost of preventable hospitalizations and emergency room visits is therefore borne by both government and hospitals.

During 2004, CAI managed asthma care for 1,277 patients in New York. After consultation with a health economist (from Mailman School of Public Health, Columbia

University), we applied the initial and follow-up percentages hospitalized and multiplied by the mean number of hospitalizations to get the initial and follow-up number of asthma hospitalizations in this pediatric population. We repeated this procedure for emergency room use. This yielded an initial hospitalization cost of \$2,639,520 (for 611 in-patient stays), and an initial cost of \$1,033,200 (for 2,583 visits). On follow-up, there were 49 hospitalizations (for a cost of \$211,680) and a savings of \$2,427,840. There were 421 emergency room visits on follow up (for a cost of \$168,400) and a savings of \$864,800. **This yields a total annual savings attributable to guidelines-based asthma care of \$3,292,640.**

#### Summary

The application of NHLBI guidelines-based care can be predicted to benefit the child by reducing asthma severity and morbidity (hospital and emergency room use), which also reduce the cost of asthma for the health care system.

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The Childhood Asthma Initiative is partnership between The Picower Foundation and The Children's Health Fund.

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