

Title: Evaluating the Effectiveness of an Emergency Department Based Referral to a Community Asthma Prevention Program on Reducing Emergency Department Utilization for Asthma

Background: Asthma is the most common chronic pediatric illness in the United States. Community Asthma Programs (CAP) and asthma education performed in the emergency department (ED), which requires significant resources, have been shown to successfully reduce the burden of pediatric asthma on families and the health care system. To date, there is scant literature demonstrating the impact of referring ED asthma patients to existing CAP after discharge from the ED on subsequent ED visits and hospitalizations. Methods: A retrospective chart review was conducted on ED patients seen in one academic urban and one children's hospital from July 2013 through October 2014 who experienced asthma exacerbation and were referred to and completed CAP. Data included patient demographics, emergency department visits, and hospitalizations, 1 year before and 1 year after each patient's CAP intervention. The times until ED visits were modeled using a proportional hazards regression model. Results: Of the 81 children identified, 74 were included in the analysis, with a total of 213 ED visits, 139 pre Cap and 74 post CAP. Thirty-three patients (45%) were high risk, 73% were African American, 45% male, mean age was 3.6 years, and most had Medicaid (80%) as their primary insurance. The median difference in ED visits was 1 visit (25th percentile 0, 75th percentile 2). The hazard ratio of ED visits was significantly lower in post-CAP period (HR=0.53, 95%CI 0.40, 0.71, $p<.0001$), which indicates that patients had a lower probability of ED visits post-CAP compared to pre-CAP. The hospitalizations showed a trend to decrease from 15% (21) in the pre-CAP to 10% (7) in the post-CAP, but the decrease was not statistically significant. Conclusion: This study demonstrates and supports that emergency based referrals to a community asthma prevention program for children seen in the ED reduces the subsequent number of asthma-related ED visits. Therefore, emergency physicians should be aware of community-based programs such as CAP and strongly consider referring pediatric asthmatics to local resources for asthma education

Table 1. Demographics

Variable	Category	Overall	Low-Risk Asthma	High-Risk Asthma	P-value
		N=74 (100)	N=41 (55.4)	N=33 (44.6144)	
Sex	Female	29 (39.2)	13 (31.7)	16 (48.5)	0.142*
	Male	45 (60.8)	28 (68.3)	17 (51.5)	
Insurance	Medicaid	59 (79.7)	29 (70.7)	30 (90.9)	0.078**
	Private	12 (16.2)	10 (24.4)	2 (6.1)	
	Other	3 (4.1)	2 (4.9)	1 (3.0)	
Race	Black	54 (73.0)	26 (63.4)	28 (84.9)	0.067**
	White	17 (23.0)	12 (29.3)	5 (15.1)	
	Other	3 (4.0)	3 (7.3)	0	
Age	Mean (SD)	6.0 (3.6)	6.0 (3.5)	5.8 (3.6)	0.764***
	Median (25 th p, 75 th p)	5 (3, 8)	5 (4, 8)	5 (3, 7)	

Data are counts (%) unless otherwise specified;

*Pearson's Chi-square test; **Fisher's exact test; ***Wilcoxon rank-sum test

Table 2. The number of ED visits, Hospital, and PICU admissions

Outcome	Low-Risk Asthma		High-Risk Asthma	
	Pre CAP	Post CAP	Pre CAP	Post CAP
Number of ED Visits	46 (66.7)	23 (33.3)	93 (64.6)	51 (35.4)
Number of Hospital Admissions	3 (50.0)	3 (50.0)	18 (81.8)	4 (18.2)
Number of PICU Admissions	0 (0.0)	0 (0.0)	6 (66.7)	3 (33.3)

Data are counts (%)^{9,24}

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