

# Referral Patterns to Pediatric Pulmonology for Asthma-like Symptoms



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## Introduction

The decision to refer to a pediatric specialist is critical for healthcare quality, but access to specialty care is worsening. This is partly due to a shortage of specialty physicians and increased rates of referral to specialty physicians, with long wait times adversely impacting care. There are often also shortcomings in the appropriateness, clarity, and completeness of referrals, causing both underuse and overuse of specialists.

## Research Question

The purpose of this study was to describe referrals for asthma-like symptoms to a pediatric pulmonology clinic, evaluate results of the pulmonology consult, and identify opportunities for improving access to care.

## Materials and Methods

This was a retrospective chart review of patients ages 5-18 years who were referred to the pediatric pulmonology clinic at Phoenix Children’s Hospital (PCH) between July 2016 and July 2019. The PCH IRB granted an exemption as the project was deemed quality improvement. Charts were reviewed to extract demographics, insurance type, prior asthma diagnosis, prior inhaled corticosteroid (ICS) use, compliance with ICS, reason for referral, and post-referral treatment. ICS Step at time of referral was determined according to National Asthma Education and Prevention Program guidelines. An appropriate referral was defined as patients with prior asthma and ICS at Step 3 (medium dose ICS) or higher.

## Results

A total of 171 study subjects were included in the chart review, with prior asthma diagnosis in 105 (61%). Among 104 patients with prior asthma and ICS data available, 76% had prior ICS use. Of those on ICS, 76% were at Step 2 and 24% were at Step 3. The rate of appropriate referrals was 0.11 (95% CI: 0.06-0.16), including only 19 patients at Step 3 or greater. Among 151 inappropriate referrals, there were 44% without asthma diagnosis, 16% with asthma but no prior ICS use, and 40% with asthma at ICS Step 2. During the pulmonology visit, 10 (53%) of 19 patients appropriately referred received an ICS step up. For the 151 inappropriate referrals, ICS was initiated for 60% and increased for 30%. Education was provided to all patients during the pulmonology consult.

Factor	All Patients N=(171)	Prior Asthma		P-value
		Yes N=(105)	No N=(66)	
Age, Mean (SD) Median (Q1, Q2)	9.4 (3.8) 9.0 (6.0, 12.0)	9.3 (3.8) 9.0 (6.0, 12.0)	9.6 (3.8) 9.5 (6.0, 12.0)	0.68 <sup>1</sup>
Gender, N (%)				
Female	71 (42)	42 (40)	29 (44)	0.64 <sup>2</sup>
Male	100 (58)	63 (60)	37 (56)	
Insurance, N (%)				
AHCCCS	97 (57)	69 (66)	28 (42)	0.003 <sup>2</sup>
Private (Missing N=1)	73 (43)	35 (34)	38 (58)	
Referral reason, N (%)				
Allergies	1 (0.5)	0 (0)	1 (1.5)	< 0.0001 <sup>3</sup>
Asthma	30 (53)	78 (67)	28 (30)	
Bronchitis	2 (1)	1 (1)	1 (1.5)	
Chest pain	2 (1)	1 (1)	1 (1.5)	
Cough	60 (35)	28 (27)	32 (48)	
Dyspnea	1 (0.5)	0 (0)	1 (1.5)	
Pneumonia	3 (2)	1 (1)	2 (3)	
Shortness of breath	8 (5)	2 (2)	6 (9)	
Wheezing	4 (2)	2 (2)	2 (3)	
Prior ICS, N (%)				
Yes	79 (46)	79 (76)	0 (0)	< 0.0001 <sup>2</sup>
No (Missing N=1)	91 (54)	25 (24)	66 (100)	
Intervention, N (%)				
ICS	91 (54)	25 (24)	66 (100)	< 0.0001 <sup>3</sup>
None	22 (13)	22 (21)	0 (0)	
Step Down	2 (1)	2 (2)	0 (0)	
Step Up (Missing N=1)	55 (32)	55 (53)	0 (0)	
Education, N (%)				
Yes	171 (100)	104 (100)	66 (100)	1.00 <sup>2</sup>
No (Missing N=1)	0 (0)	0 (0)	0 (0)	

Table 1: Factors according to previous asthma diagnosis among 171 pediatric patients referred to pulmonology.

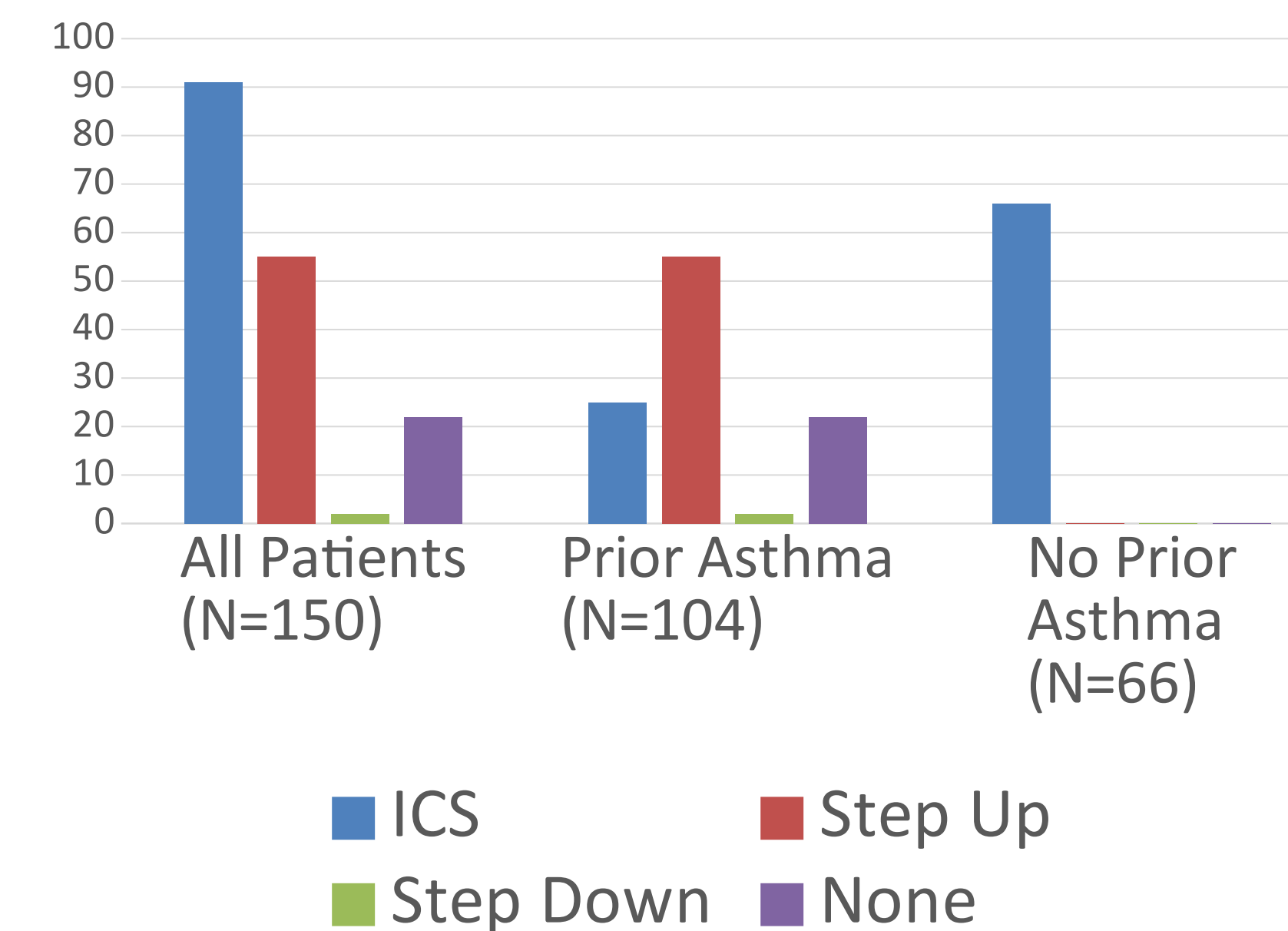


Figure 1: Intervention of pulmonology consult according to previous asthma diagnosis. ( $p < 0.0001$ ).

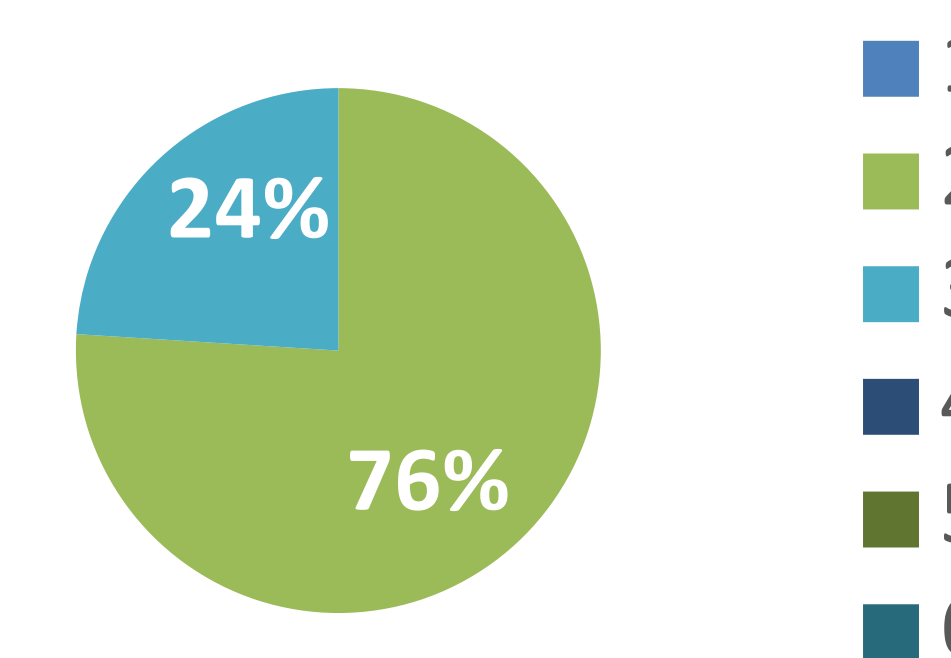


Figure 2: ICS step at referral in patients with prior asthma diagnosis and prior ICS use (N=79).

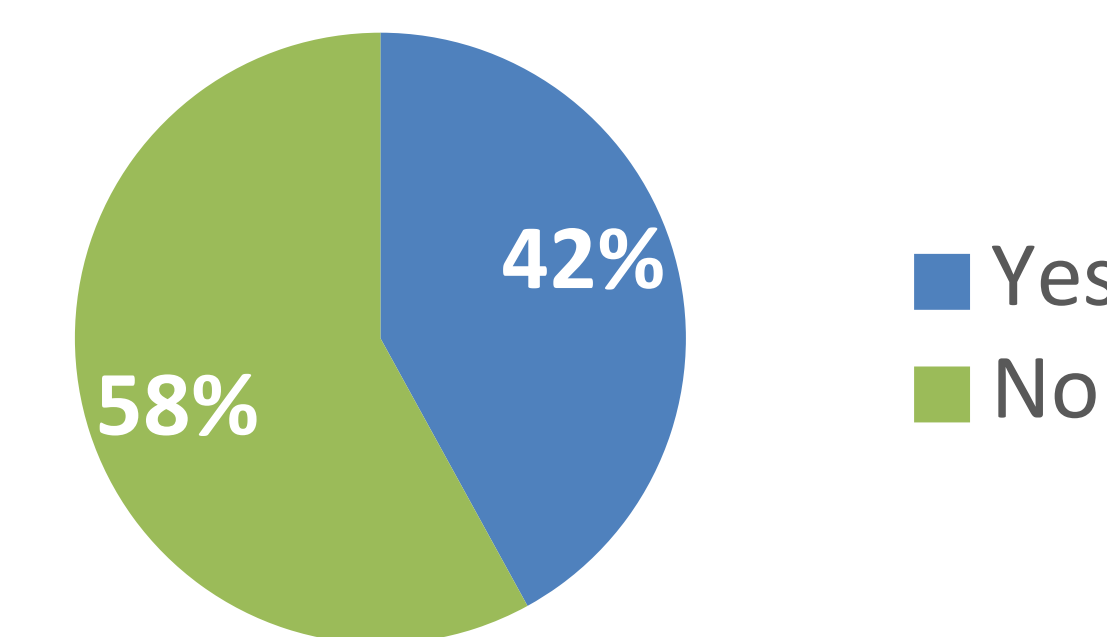


Figure 3: Spacer compliance issues in patients with asthma and prior ICS use (N=79).

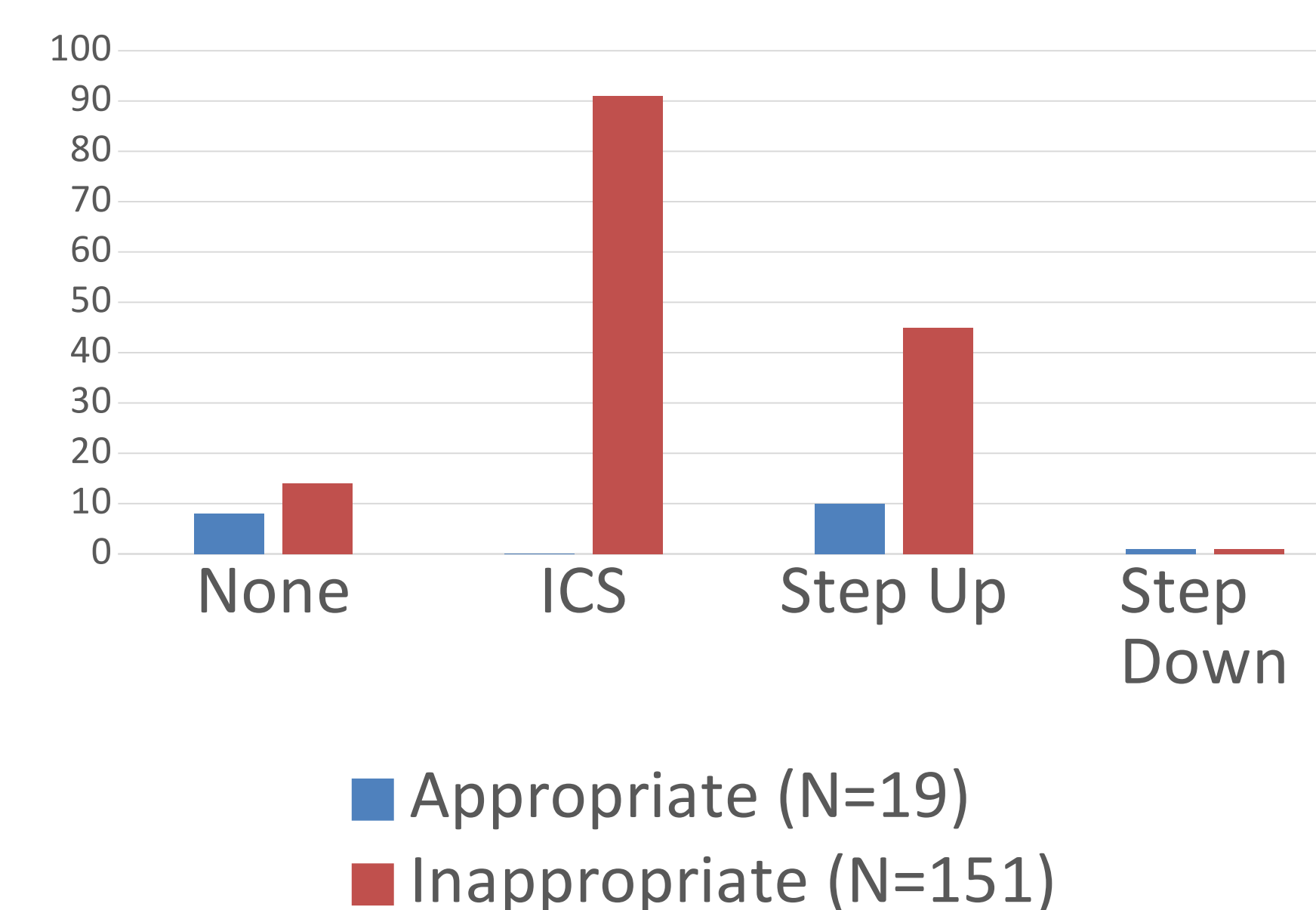


Figure 4: Intervention of pulmonology consult based on referral appropriateness. ( $p < 0.0001$ ).

## Conclusion

The quality of care for children with asthma can be improved through greater concerted efforts of primary care and pulmonology. Primary care providers can effectively treat children with mild to moderate asthma with implementation of ICS, enabling pulmonologists to see high acuity patients, in a more timely manner, and reduce costs for subspecialty evaluation.

## Summary

- The rate of appropriate asthma referrals to a pediatric pulmonology clinic in this retrospective study was only 0.11, with many patients requiring ICS initiation or step up as well as reporting spacer compliance issues.
- Specialty consultations might have been reduced if ICS medications were initiated or stepped up by the primary care provider. However, there are many potential reasons for referral prior to treatment with ICS.
- Further study is needed to identify strategies for improving primary care management of childhood asthma.

## Acknowledgements

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