Health-service utilization and referrals among pediatric ambulatory care cases of asthma in the U.S. from 2006-2014

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Background

- Few studies provide national-level estimates of outcomes and health-service utilization in children with asthma (<18 years), specifically in ambulatory care settings.

Objective

- To evaluate health-service utilization and referrals among pediatric ambulatory cases of asthma in the U.S. from 2006-2014.

Methods

- Historical, cross-sectional study utilized nationally-representative data from the CDC's National Ambulatory Medical Care Survey (NAMCS) from 2006-2014 for asthmatics aged <18 years.
- Outcomes included time spent with physician, number of past clinic visits in last 12 months, emergency department or inpatient (ED/IP) admission, referral to another physician, and whether asthma education was provided.
- Multivariable generalized linear models (GLM) assessed outcomes, controlling for demographics (i.e., age groups of 0-5, 6-11, or 12-17 years, sex, race, ethnicity), payer type, physician attributes, region, year, and other clinical characteristics (i.e., number of chronic conditions, asthma rescue and controller medications, number of non-asthma medications).
- Stata/IC 14 used for data analysis and creation of plots.

Results

- Across the estimated 1.6 billion pediatric ambulatory care visits from 2006-2014,140.8 (8.9%) million involved asthmatics with a mean age of 8.3±5.1 years and 59.5% male.
- The multivariable analyses revealed asthmatics aged 0-5 years had 3.33 times higher odds of ED/IP admission (CI:1.37-8.11; p=0.008), 1.53 times more clinic visits in the last 12 months (CI:1.36-1.72; p<0.001), and 0.91 times shorter time spent with the physician (CI:0.86-0.97; p=0.006).
- Among Medicaid cases, the odds of being referred to another physician was 1.46 times higher (CI:1.03-2.16; p=0.030).
- Visits with individuals of Hispanic/Latino ethnicity had a 0.46 lower odds of referral (CI: 0.28-0.74; p=0.001), and 1.71 higher odds of receiving asthma education (CI:1.10-2.68; p=0.018).
- The odds of receiving asthma education during a visit was 1.24 times higher for males (CI:1.01-1.52; p=0.045).

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Table 1. Descriptive statistics for pediatric ambulatory care visits related to asthma (weighted)

	Pediatric Asthma *(n=140,884,306)*	Pediatrics without Asthma *(n=1,450,097,177)*	Overall *(n=1,590,941,483)*
Patient Demographics			
Age	8.3 ± 5.1	6.6 ± 5.7	6.8 ± 5.7
Sex, Male	59.5%	51.3%	52.0%
Race, White	78.6%	82.1%	81.8%
Black	15.9%	11.4%	11.8%
Other	5.6%	6.6%	6.5%
Ethnicity, Hispanic or Latino	22.6%	19.6%	19.9%
Primary Payer, Private	56.0%	60.6%	60.2%
Medicaid	37.4%	30.8%	31.4%
Other Payer	7.4%	9.2%	9.1%
Clinical Characteristics			
Zero Chronic Conditions	N/A	90.6%	82.7%
One Chronic Condition	90.9%	6.1%	13.6%
Two Chronic Conditions	7.9%	0.4%	1.1%
Total Chronic Conditions	1.1 ± 1.3	0.2 ± 6.1	0.3 ± 5.9
Asthma Rescue Inhaler/Nebulizer	47.7%	3.0%	6.9%
Asthma Controller Medication	35.8%	1.8%	4.8%
Number of Non-Asthma Medications	1.7 ± 1.6	1.3 ± 1.4	1.3 ± 1.5
Acute Asthma Exacerbation Diagnosis	5.3%	N/A	0.5%
Physician Characteristics			
Primary Care Physician (PCP) Seen	73.6%	75.2%	75.1%
Metropolitan Status, No	11.2%	11.2%	11.2%
Geographic Region, Northeast	23.9%	18.7%	19.1%
Midwest	18.2%	20.1%	19.9%
South	38.2%	39.3%	39.2%
West	19.7%	21.9%	21.7%
Outcomes			
Time Spent with Physician, in minutes	19.7 ± 12.1	19.1 ± 11.1	19.2 ± 11.1
Number of Past Visits in Last 12 Months	5.0 ± 4.9	4.3 ± 4.3	4.4 ± 4.4
ED/IP Admission	1.2%	0.4%	0.5%
Patient Referred to Another Physician	6.3%	5.6%	5.6%
Asthma Education Provided	25.8%	0.3%	2.6%

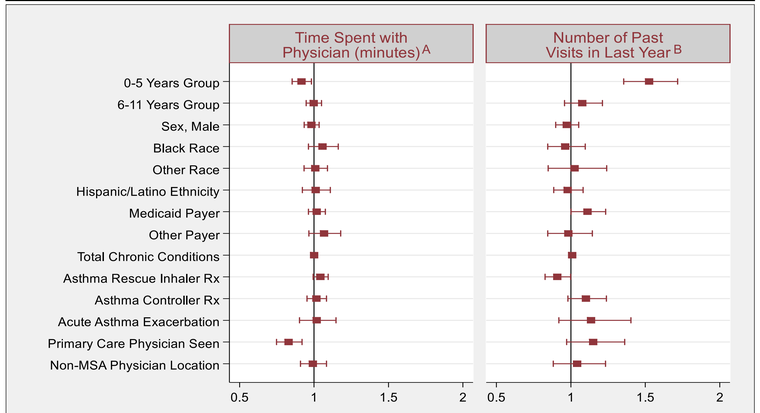
Conclusions

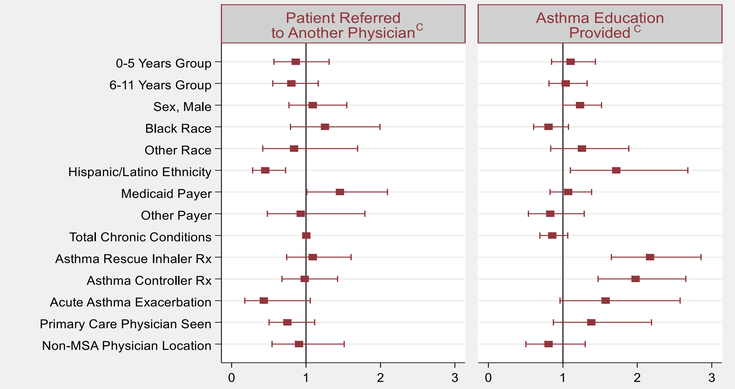
- This investigation of pediatric asthma visits in an ambulatory setting indicated those aged 0-5 years had higher odds of greater health-service utilization.
- Medicaid beneficiaries had increased odds of physician referral, and Hispanic/Latino ethnicity and male sex were associated with higher odds of receiving asthma education.
- Further research is required to determine the effect these differences have on clinical outcomes.

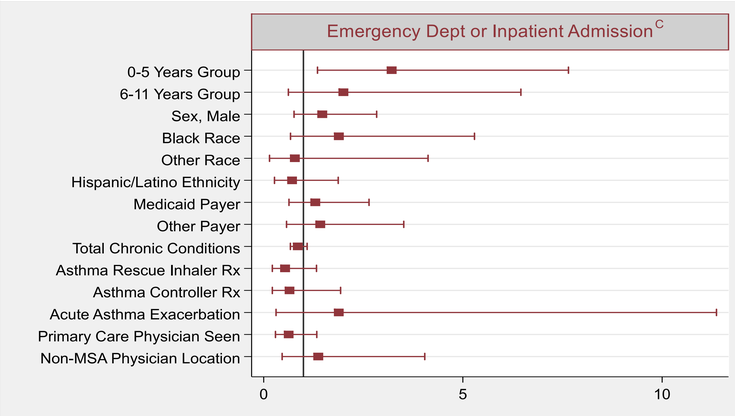
Disclosure Statement

- Drs. Skrepnek and Keast report unrelated grant funding from Purdue Pharma during the course of this work.

Figures 1-3: Coefficient Plots from Multivariable Regressions of Outcomes







For all coefficient plots, x-axis scales and error bars are based on 95% confidence intervals (95% CI).

[A]Zero-truncated negative binomial GLM. Results and markers presented as incidence ratios (IR).
[B]Negative binomial GLM. Results and markers presented as incidence ratios (IR).
[C]Binomial/Logistic GLM. Results and markers presented as odds ratios (OR).

Multivariable regression analyses were performed by controlling for patient demographics (age groups), race, ethnicity, primary payer), clinical characteristics (total chronic conditions, asthma rescue and controller use, number of non-asthma medications, acute asthma exacerbation diagnosis), physician characteristics (PCP seen, physician location), region, and year.