

# Multilevel Analysis of the Relationship between Maternal Depression and Medication Adherence in Urban, African-American Children with High-Risk Asthma

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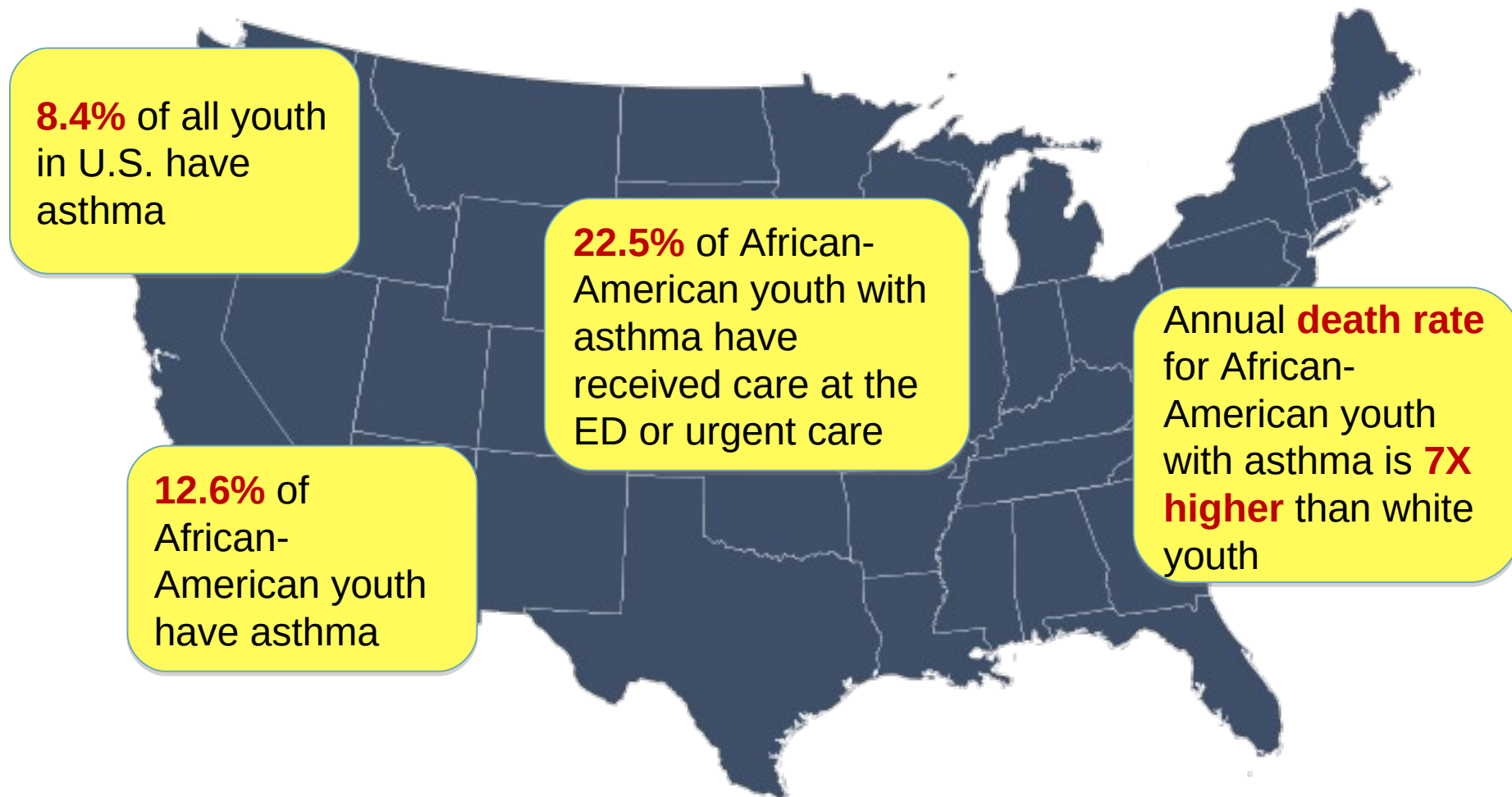
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# Presenter Disclosures

- The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:
  - No relationships to disclose

# Low-Income, Urban, African-American Children with Asthma



# Background

- Medication adherence critical component of asthma self-management process and essential for reducing adverse asthma outcomes
- Medication adherence low among low-income, urban, African-American children with asthma
- Parents generally responsible for disease management in young children with asthma
- Caregiver depression prevalent and may interfere with ability to adhere to child's medication regimen

# Study Purpose

- To evaluate the longitudinal relationship between caregiver depressive symptoms and child asthma medication adherence in a sample of young, urban, African-American children with high-risk asthma.

# Methods

- **Data Source**

- Randomized clinical trial (RCT) evaluating the Asthma Express Environmental Control Educational Intervention
- 222 children (ages 3-12 years) with persistent asthma and frequent emergency department (ED) visits and their caregivers

- **Data Collection**

- Rolling enrollment from August 2013—February 2016
- Participants followed for 12 months
- Data collected at Baseline (T1), 6 months (T2), and 12 months (T3)

- **Sample Selection**

- Analysis restricted to African-American child/caregiver dyads ( $N = 208$ )

# Measures

- **Medication adherence (DV)**
  - Medication Adherence Report Scale (MARS; Horne, 2004)
- **Caregiver depressive symptoms (IV)**
  - Center for Epidemiological Studies-Depression scale (CES-D; Radloff, 1977)
- **Covariates**
  - Group status, event time, baseline child asthma severity, child age and gender, caregiver education level

# Data Analysis

- Multilevel modeling using Stata 15.1
- Random intercept model with depressive symptoms and covariates predicting medication adherence
- Assessed “within-caregiver” and “between-caregiver” effects:
  - cluster mean of CES-D score (i.e., the between-caregiver effect)
  - deviation from cluster mean (i.e., the within-caregiver effect)
- Random intercept model with these new variables



Table 1. Baseline Demographics and Morbidity	Mean (SD)
Child's age	6.3 (2.7)
Child male <sup>+</sup>	136 (65)
Asthma severity <sup>+</sup>	
Mild, persistent	55 (26.4)
Moderate, persistent	95 (45.7)
Severe, persistent	58 (27.9)
Asthma-related school absences in past 3 months <sup>+</sup>	
None	69 (33.3)
1-5 days	104 (50)
6-10 days	24 (11.5)
11-15 days	6 (2.9)
≥ 15 days	4 (1.9)
Symptom days in past 2 weeks	5.9 (4.8)
Symptom nights in past 4 weeks	7.1 (8.8)
Caregiver age	31.5 (7.6)
Caregiver female <sup>+</sup>	202 (97)
Caregiver single <sup>+</sup>	156 (75)
Caregiver HS education or more <sup>+</sup>	168 (80.8)
Annual household income <sup>+</sup>	
< \$10,000	57 (27.4)
\$10,000-\$19,000	38 (18.3)
\$20,000-\$29,000	32 (15.4)
\$30,000-\$39,000	23 (11.1)
≥ \$40,000	30 (14.4)
Missing/refused	28 (13.4)

# Results

# Results

Table 2. Mean MARS and CES-D Scores at Each Timepoint

	Mean (SD)		
Measure	T1	T2	T3
CES-D	12.95 (11.43)	11.41 (10.69)	10.8 (10.76)
MARS	21.88 (3.33)	21.22 (4.36)	20.53 (5.73)

# Results

Table 3. Unstandardized Coefficients for Multilevel Regression Models of Medication Adherence

	Null model	Null + CES-D	Null + CES-D + covariates	Null+ Mean CES-D + Deviation CES-D + covariates
<b>Intercept</b>	21.15**	21.65**	22.36**	21.87**
<b>CES-D</b>		-.040*	-.043*	--
<b>Moderate</b>			.451	.428
<b>Severe</b>			-.198	-.354
<b>Male</b>			.914	.948*
<b>HS grad</b>			-.189	-.061
<b>Intervention</b>			-.276	-.258
<b>Time</b>			-.403**	-.413***
<b>Mean CES-D</b>				-.007
<b>Deviation CES-D</b>				-.079**
<b>Level 1 variance</b>	2.29	2.15	2.09	2.11
<b>Level 2 variance</b>	4.03	3.98	3.93	3.89
<b>ICC</b>	.244	.225	.231	.226

Note. CES-D = Centers for Epidemiological Studies-Depression Scale; Mean CES-D = the cluster mean of CES-D score; Deviation CES-D = the deviation from the cluster Mean of CES-D score; HS grad = High school graduate; Time = event time; ICC = intraclass correlation.

\* p < .05, \*\* p < .01, \*\*\* p < .001

# Implications

- Changes in a caregiver's baseline level of depressive symptoms influence medication adherence more than a caregiver's mean level of depression.
- Adherence decreases over time
- What can clinicians do?
  - Establish relationship with caregiver
  - Develop understanding of child and family's social context
  - Monitor caregiver depressive symptoms and medication adherence at every medical encounter
  - Provide linkages to community resources for ongoing support
- System-level recommendations
  - Depression screening policy
  - Family-centered care
  - Interdisciplinary collaboration

# Limitations

- Medication adherence (and caregiver depression) measured by self-report
- Results not generalizable to broader range of caregivers of children with asthma due to highly specific sample
- Most caregivers single women

# Conclusion

- Change in caregiver depressive symptoms over time appears to have a stronger impact on medication adherence than mean level of depressive symptoms
- Ongoing assessment of caregiver depressive symptoms is a potentially important target for improving medication adherence and reducing asthma morbidity in this vulnerable population

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