Medical, Social, and Relational Health Risks and Childhood Asthma Severity, National Survey of Children's Health, 2020-2024

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Introduction

- Asthma is one of the most common chronic health conditions in children and is the number one cause of ED visits in the US.[1]
- A few studies have examined medical, social, and relational determinants of childhood asthma.
- However, these factors are often examined in isolation despite evidence suggesting that they work in concert.

Objective

- To examine the cumulative and combined influence of medical, social, and relational health risks on childhood asthma severity.

Methods

Study Population

- Data from the 2020-2024 National Survey of Children's Health (NSCH; N=254,309) was analyzed.

Exposure

- Medical, social, and relational health risks were measured using the Whole Child Risk Index – a composite, multidomain measure capturing cumulative risk exposures across medical, social, and relational domains.

Outcome

- Asthma severity was classified into three categories: 1) no asthma, 2) mild asthma, and 3) moderate-to-severe asthma.

Statistical Analysis

- Multinomial logistic regression was used to examine the association.

Results

Table 1. Association between medical, social, and relational health risks and childhood asthma severity, National Survey of Children's Health, 2020-2024

Whole Child Risk Index	Asthma Severity	
	Mild Adjusted OR (95% CI)[a]	Moderate-to-Severe Adjusted OR (95% CI)[a]
No risk domain	Ref.	Ref.
One health risk domain	1.16 (1.05–1.28)*	1.69 (1.45–1.98)**
Two health risk domains	1.52 (1.36–1.70)**	2.89 (2.43–3.43)**
Three health risk domains	2.16 (1.86–2.50)**	4.84 (4.04–5.80)**

"No asthma" is the reference category for asthma severity

[a]Adjusted for age, sex, race/ethnicity, household income, insurance, family construct, and parent/guardian education

** p< 0.0001, * p< 0.01

Table 2. Association between medical, social, and relational health risks and childhood asthma severity, National Survey of Children's Health, 2020-2024

Whole Child Risk Index	Asthma Severity	
	Mild Adjusted OR (95% CI)[a]	Moderate-to-Severe Adjusted OR (95% CI)[a]
MHR domain only	1.75 (1.52-2.01)***	3.66 (2.95-4.52)***
SHR domain only	1.17 (1.02-1.35)*	1.39 (1.11-1.73)**
RHR domain only	0.91 (0.79-1.03)	1.08 (0.86-1.34)
MHR and SHR domains	1.86 (1.55-2.25)***	4.52 (3.77-5.42)***
MHR and RHR domains	1.73 (1.48-2.01)***	3.57 (2.80-4.56)***
SHR and RHR domains	1.22 (1.04-1.43)*	1.65 (1.31-2.08)***
MHR, SHR, and RHR domains	2.10 (1.81-2.43)***	4.98 (3.81-6.51)***
No risk domain	Ref	Ref

"No asthma" is the reference category for asthma severity

[a]Adjusted for age, sex, race/ethnicity, household income, insurance, family construct, and parent/guardian education

*** p< 0.0001, ** p< 0.01, * p< 0.05

Discussion

- Demonstrates that childhood asthma severity is shaped by the cumulative and combined influences of medical, social, and relational health risks rather than isolated health risks.
- Children exposed to multiple health risk domains experienced substantially higher asthma severity, highlighting the need for comprehensive, integrated approaches to pediatric asthma care.

Strengths and Limitations

- Data is based on a large, nationally-representative sample of children.
- The NSCH is based on parent or caregiver report and may be susceptible to reporting bias.
- Asthma severity classifications were based on parent-reported measures rather than spirometry.



References

1. Centers for Disease Control and Prevention. Most Recent National Asthma Data.; 2023. Accessed May 31, 2025. Retrieved from https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm.