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Understanding the Bigger Picture of Rural Asthma Inequities

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Introduction

- Asthma accounts for up to 60% of children's emergency department visits in the United States.[1]
- Emergency visits for asthma are also correlated with an increased risk of future exacerbations, leading to higher morbidity.[1]
- Although urban environments are typically associated with asthma, similar inequities persist in rural areas at comparable rates when controlling for socioeconomic factors.[2]
- The etiologies of rural asthma differ from those of urban asthma due to factors such as housing quality, insurance access, physician availability, medication shortages, cigarette exposure, and agricultural environments.[3]
- During my clinical interactions at Eaton Rapids Sparrow Primary Care, I encountered a family in which the mother expressed difficulty in obtaining asthma medications for her daughter, as they lived on a farm far from the clinic.
- Understanding the inequities and barriers to asthma management enables the development of targeted interventions tailored to rural communities.
- Focus Question:
  - How can we address health inequities that affect rural patients in terms of asthma severity and medication adherence?
- **Figure 1:** CDC pediatric incidence rates of asthma in Michigan based on urban-rural classifications.[4]

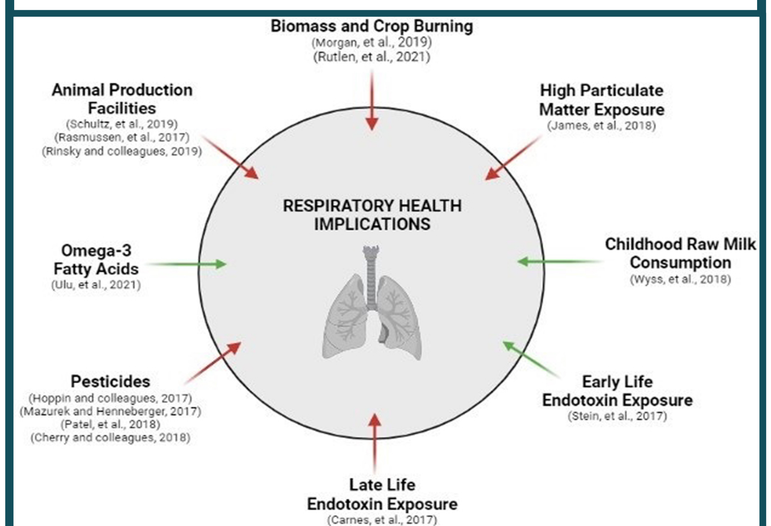
Age Group	Urban-Rural Classification	Counties	Prevalence, % (SE)
Child	Medium Metropolitan	Cass, Clinton, Eaton, Genesee, Ingham, Kalamazoo, Van Buren, Washtenaw	10.1% (1.35)
Child	Noncore	Alcona, Alger, Antrim, Arenac, Baraga, Charlevoix, Cheboygan, Clare, Crawford, Emmet, Gladwin, Gogebic, Huron, Iosco, Iron, Lake, Luce, Mackinac, Manistee, Montmorency, Newaygo, Oceana, Ogemaw, Ontonagon, Osceola, Oscoda, Otsego, Presque Isle, Roscommon, Sanilac, Schoolcraft, Tuscola	3.7% (0.95)
Child	Large Fringe Metropolitan	Barry, Lapeer, Livingston, Macomb, Montcalm, Oakland, Ottawa, St. Clair	6.4% (0.78)
Child	Small Metropolitan	Bay, Berrien, Calhoun, Jackson, Midland, Monroe, Muskegon, Saginaw	6.9% (1.14)
Child	Micropolitan	Allegan, Alpena, Benzie, Branch, Chippewa, Delta, Dickinson, Grand Traverse, Gratiot, Hillsdale, Houghton, Ionia, Isabella, Kalkaska, Keweenaw, Leelanau, Lenawee, Marquette, Mason, Mecosta, Menominee, Missaukee, St. Joseph, Shiawassee, Wexford	8.3% (1.75)
Child	Large Central Metropolitan	Kent, Wayne	8.8% (1.06)

Methods

Data were obtained using search engines such as Google Scholar and PubMed, along with the MSU database for past studies. The terms utilized for this literature review included: Rural Asthma, Rural Asthma Inequities, Rural Asthma Adherence, and Rural Asthma Education. A total of 10 articles were selected to address the focus question. Inclusion criteria focused on rural asthma barriers to care, health outcomes, costs associated with management, and patient education.

Results

- According to a U.S. Department of Agriculture survey, the most commonly cited barriers to accessing healthcare in the U.S. were transportation (60%) and cost (33%).[5]
- Rural asthma is associated with higher mortality due to a lack of infrastructure resulting from hospital closures, long travel distances to emergency care, healthcare workforce shortages, and low insurance rates.[6]
- Patient education programs that targeted rural children through telemedicine did not significantly improve asthma symptoms but did lead to better self-monitoring through peak flow meter use.[7]
- Provider education programs, such as the Asthma Toolkit Bootcamp implemented in rural Colorado pediatric practices, led to:
  - Increased use of spirometry testing (22% → 86%)[8]
  - Improved severity assessment (47% → 88%)[8]
  - Higher rates of action plan implementation (40% → 86%)[8]
  - 10% decrease in emergency department visits[8]
  - 35% decrease in hospital admissions[8]
  - 29% decrease in oral corticosteroid prescriptions[8]
- A retrospective cohort study in Saskatchewan, Canada found that rural pediatric asthma patients had:
  - Lower rates of physician and specialist visits [9]
  - Reduced prescriptions for daily corticosteroid use [9]
  - A much higher prescription rate (4× greater) for emergency asthma controllers, such as SABA inhalers (albuterol).[9]
- **Figure 2:** Factors contributing to rural asthma (green indicates improvement, red indicates worsening).[10]



Conclusions

- The major barriers of transportation and access severely impact asthma morbidity and mortality.
  - Lack of healthcare infrastructure, hospital closures, health workforce shortages, spatial inequities, and low insurance rates all contribute to barriers to access and transportation.
- These obstacles to care lead to fewer clinical visits, lower utilization of daily asthma medications, and higher reliance on emergency medications.
- Patient education programs aim to reduce asthma severity, but they only address a narrow scope of contributing factors.
- Provider education programs significantly improve asthma severity outcomes by raising awareness among patients about the dangers of uncontrolled asthma and increasing utilization of asthma interventions.
- To reduce health inequities affecting rural asthma patients, targeted education programs should be implemented for healthcare providers to improve patient education, enhance screening, and develop targeted interventions.
- The root causes of rural inequities, such as limited access and long travel distances, must be addressed to improve asthma outcomes. While education can enhance patient management, its effectiveness is limited if access to healthcare providers remains a barrier.
- Future studies should investigate the underlying causes of rural healthcare workforce shortages, particularly spatial mismatches and access limitations, which directly impact medication adherence and disease management.

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