

Community Health Worker Interventions to Improve Pediatric Asthma Outcomes



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Background

Asthma is the most common chronic disease of childhood, affecting 9.6% of American children and contributing to:

- ↓ quality of life
- ↑ school absenteeism
- ↑ health resource utilization
- ↑ premature mortality¹

The effectiveness of Community Health Worker (CHW) interventions for asthma has been demonstrated in high-risk populations.^{2,3} However, CHWs have not been widely incorporated into standard practice, and there are currently no widely accepted criteria for referral. In 2016, Dayton Children's Hospital (Dayton Children's) implemented the Comprehensive Asthma Management Program (CAMP), incorporating CHW interventions, to improve child asthma control and reduce urgent health resource utilization.

This study sought to:

1. Assess the impact of CHW interventions on pediatric asthma management in the population served by the CAMP; and
2. Define appropriate criteria for CHW referral.

Methods

This study was a retrospective review of Dayton Children's electronic medical records and CAMP internal records from September 2015 to March 2017, undertaken with approval by the Dayton Children's Institutional Review Board.

Children in grades two to five with parent- or physician-identified asthma received varying levels of intervention, based on self-selection by caregivers:

- **Level 1:** Child asthma education: six 40-minute sessions covering basic asthma information by student nurses
- **Level 2:** Level 1 + caregiver asthma education: one 60-minute session covering medication and trigger information by a respiratory therapist and CHW
- **Level 3:** Level 2 + two or more home assessments by a CHW

Variables (Pre- and Post-intervention):

- Child Asthma Risk Assessment Tool (CARAT)⁴ scores
- Childhood Asthma Control Test (C-ACT)⁵ scores
- Emergency department (ED) visits and hospitalizations
- Asthma triggers and community referrals

Results

All 174 children who were reached by the CAMP received child education; the caregivers of 65 children received caregiver education and 18 children received home visits (Figure 1).



Figure 1. Comprehensive Asthma Management Program (CAMP) participation (n=174).

Results (continued)

Demographics

Study participants were 44.3% (n=77) female and aged 8.9 ± 1.2 years on average. Self-reported racial distribution was 76.4% (n=133) African American, 14.9% (n=26) White and 8.6% (n=15) "Other".

Asthma Indicators

The average pre-intervention CARAT score was 25.2, below the high-risk threshold of 30 (Figure 2).

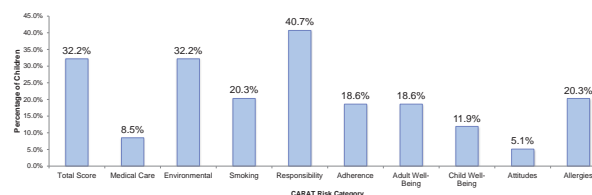


Figure 2. Percentage of children with high-risk CARAT scores (n=59).

The average pre-intervention C-ACT score was 18.5, below the well-controlled threshold of 19, and increased to 20.0 post-intervention (paired t-test, t=-2.5, df=52, p<0.02) (Figure 3).

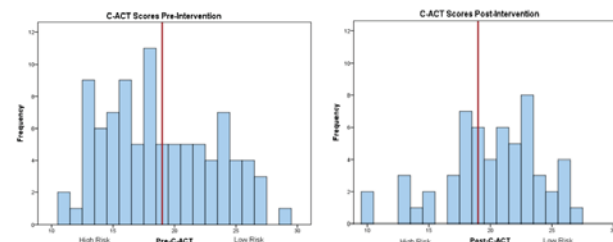


Figure 3. C-ACT scores pre- and post-intervention, with red reference line set to the well-controlled threshold of 19 (n=53).

There were no significant differences in ED visits or hospitalizations 30 days pre- and post-intervention, likely because average utilization was less than one at both measurement times.

The most common asthma triggers identified by the CHW during home visits were dust and odors/irritants, such as cleaning products or incense (Figure 4). Of the 312 trigger recommendations made, 223 (71.5%) were accomplished and verified by the CHW.

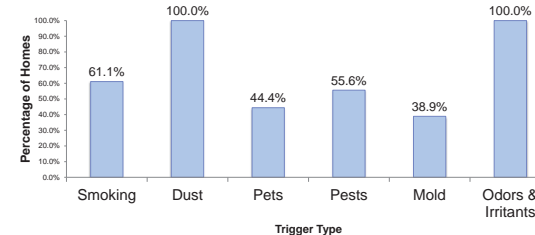


Figure 4. Percentage of homes with triggers identified (n=18).

Discussion and Conclusion

- Participation in the CAMP was associated with a statistically significant improvement in child asthma control and a non-significant reduction in ED visits, mostly due to low ED utilization.
- There were no significant differences in outcomes between intervention levels.

Recommendations

- Children with high health resource utilization should be recruited for the CAMP from the ED or hospital.
- Children with high environmental risks, reflected by high CARAT sub-scores, should be recruited for home visits by CHWs.
- Children with other social or health needs should be referred to pre-existing infrastructure such as the Family Resource Connection at Dayton Children's.
- The following algorithm should be utilized to identify children's needs and inform next steps (Figure 5).

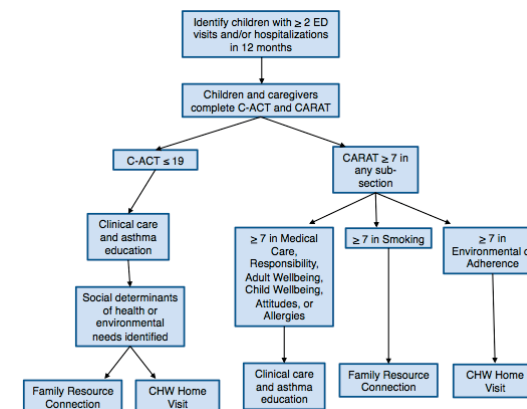


Figure 5. Recruitment and referral algorithm for CHW interventions.

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