Improvements in Health Care Use Associated With Community Coalitions: Long-Term Results of the Allies Against Asthma Initiative

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Objectives. We assessed changes in asthma-related health care use by low-income children in communities across the country where 6 Allies Against Asthma coalitions (Hampton Roads, VA; Washington, DC; Milwaukee, WI; King County/Seattle, WA; Long Beach, CA; and Philadelphia, PA) mobilized stakeholders to bring about policy changes conducive to asthma control.

Methods. Allies intervention zip codes were matched with comparison communities by median household income, asthma prevalence, total population size, and race/ethnicity. Five years of data provided by the Center for Medicare and Medicaid Services on hospitalizations, emergency department (ED) use, and physician urgent care visits for children were analyzed. Intervention and comparison sites were compared with a stratified recurrent event analysis using a Cox proportional hazard model.

Results. In most of the assessment years, children in Allies communities were significantly less likely ($P < .04$) to have an asthma-related hospitalization, ED visit, or urgent care visit than children in comparison communities. During the entire period, children in Allies communities were significantly less likely ($P < .02$) to have such health care use.

Conclusions. Mobilizing a diverse group of stakeholders, and focusing on policy and system changes generated significant reductions in health care use for asthma in vulnerable communities. (*Am J Public Health.* 2013;103:1124–1127. doi:10.2105/AJPH.2012.300983)

In a previous issue of the *Journal*,[1] we reported the sustainable asthma-care policy and system improvements for low-income children achieved by 7 community coalitions participating in the Allies Against Asthma initiative. Allies coalitions worked in areas of high-level asthma burden to lead community- and system-wide efforts to improve the quality of care and health status of children with the condition. Engagement of stakeholders and activities constituting the coalitions' collaborative work, beginning in 2002, were described in detail elsewhere.[2] Collectively, the coalitions succeeded in implementing 93 institutional, organizational, and public policy changes addressing clinical practice, care coordination, environmental conditions, and asthma management by families. We also reported that their work resulted in significant decreases in asthma symptoms among children and increases in parents' sense of control over the disease in families participating in Allies sponsored interventions versus a comparison group.[1]

This article presents data assessing changes in health care use for asthma by children residing in neighborhoods with extensive Allies activities compared with those without this exposure. This health care utilization study acknowledged that emergency department (ED) use and hospitalizations create significant burden on families in low-income neighborhoods, especially in African American and Hispanic populations.[3,4] Furthermore, the costs of urgent care for childhood asthma are exceedingly high[5] and constitute a serious burden not only for families but for the health care system. An important marker of success of the initiative would be the decreased need of Allies children for urgent health services subsequent to the activities of the Allies coalitions compared with children living in non-Allies communities.

The premise of the study presented was that the policy and system changes achieved by Allies coalitions would reach beyond the cohort of children followed to ascertain differences in symptoms and quality of life to affect much larger numbers of children with asthma residing in Allies neighborhoods. Furthermore, the assumption was that the impact of sustained policy and system changes engendered by Allies coalitions for these larger numbers of low-income children would be observable. Over time, there would be a community-wide decrease in the need for urgent asthma care services in the children with asthma.

After a planning period, implementation of Allies activities began by 2002, and coalitions were fully operational through 2004. This effectiveness study examined health care use in low-income children with asthma in Allies communities measured against comparison neighborhoods from 2002 to 2006, including 2 follow-up years (2005 and 2006) to assess sustained coalition effects. Outcomes assessed were differences in ED visits, urgent care visits, and hospitalizations for asthma.

METHODS

To conduct this study, the Center for Managing Chronic Disease (CMCD) of the University of Michigan entered into a collaboration with the Centers for Medicare and Medicaid Services (CMS) of the federal government. CMS provided data to CMCD based on zip codes and provided consultation to CMCD regarding data analysis and variables

related to children with asthma covered by Medicaid insurance provisions from 2000 to 2006.

The Sample

The initiative took place in low-income communities in the following 6 cities (Allies sites) across the United States: Hampton Roads, Virginia; Washington, DC; Milwaukee, Wisconsin; King County/Seattle, Washington; Long Beach, California; and Philadelphia, Pennsylvania. Allies coalitions provided the zip codes for neighborhoods that constituted their focus, that is, the areas of greatest coalition activity. Expert consultants to the CMCD then used a set of criteria to identify matched zip codes in areas where Allies coalitions were not active. For each Allies zip code, 1 or 2 demographically similar zip codes (according to Census 2000) were identified to serve as comparison communities. Characteristics for selecting comparisons were percentages of racial/ethnic groups and median income, because these variables consistently are associated with asthma prevalence. Secondary variables used in selection were total population size, percentage of family households and percentage of population younger than 18 years. Geographic considerations were also made (e.g., rural vs urban settings). These non-Allies comparison zip codes were located in Roanoke City, Virginia; Jacksonville, Florida; Everett, Lacey, Olympia, and Tacoma, Washington; National City and San Bernardino, California; Baltimore, Maryland; Lorain, Ohio; Muskegon, Detroit, and Flint, Michigan; and Fort Wayne and Indianapolis, Indiana.[2]

The files from CMS for children in intervention and comparison sites included all of the Medicaid Fee-for-Service claims and encounter claims from managed care patients submitted in the study years. A person-specific cohort data file was constructed for analysis based on the following inclusion criteria: (1) aged 2 to 18 years on January 1, 2002; (2) nondisabled; and (3) in the baseline year, 2002, had at least 1 health care visit with a principal or secondary diagnosis of asthma (*International Classification of Diseases-Ninth Edition*[6] codes 493.XX) to include a hospitalization, a visit to an ED, an urgent care facility, or to a physician's office; or a filled prescription for at least 1 of the following asthma medications from Healthcare Effectiveness Data and Information Set guidelines[7]: inhaled corticosteroids, inhaled corticosteroid and long-acting β-agonist combination, leukotriene modifier, long-acting inhaled β-2 agonist, mast cell stabilizer, methylxanthine, or short-acting inhaled β-2 agonist. This produced data on 26 836 children for analysis.

Data Sources

Four types of CMS files for each year were utilized: inpatient (hospitalizations), other services (physician's visit, ED visits, and urgent care facility), prescription drug files, and person summary (demographic information). Data fields included beginning and ending date of service, diagnosis (asthma principal or secondary), type of service, where service was provided (hospital, ED, urgent care facility), and eligibility and payment.

The hospitalizations, emergency or urgent visits, and prescription claims were categorized to describe the pattern of utilization by year using frequency tables. Because a hospitalization, emergency, or urgent visit for asthma are relatively rare events (Table 1; 2.5% of the cohort were hospitalized and 10.3% had at least 1 ED or urgent care facility visit in the baseline year), these events were combined and measured as a "significant asthma event." Logistic regression was used with cross-sectional data to determine differences between intervention and comparison groups related to the odds of having a significant asthma event (hospitalization, ED, or urgent care visit) within a given year. A stratified recurrent event analysis approach using the Cox proportional hazards model[8] was used to analyze the time to event from previous events. This analysis allowed comparison of the hazard of an event to be conditional on previous events and also controlled for demographic and other potentially confounding factors. Location (site) was a control variable in analyses. SAS/STAT software version 9.2 was used for analysis.[9]

TABLE 1—Percentage of Hospitalizations and Emergency or Urgent Visits by Year: Long-Term Results of the Allies Against Asthma Initiative, 2002–2006

	Hospitalizations			Emergency or Urgent Visits			
Year[a]/Study Groups	0, %	1, %	≥2, %	0, %	1, %	2-3, %	≥4, %
2002							
Intervention (n = 12 361)	98.4	1.5	0.2	89.9	8.5	1.1	0.5
Comparison (n = 14 475)	96.7	3.0	0.3	89.6	8.5	1.5	0.5
2003							
Intervention (n = 11 975)	98.8	1.1	0.1	93.0	5.6	1.0	0.3
Comparison (n = 13 968)	98.1	1.6	0.3	95.0	3.9	0.8	0.3
2004							
Intervention (n = 10 304)	99.1	0.8	0.04	93.5	5.0	1.0	0.5
Comparison (n = 10 839)	98.3	1.5	0.2	95.8	3.2	0.7	0.2
2005							
Intervention (n = 8947)	99.1	0.9	0.03	93.4	5.3	0.9	0.4
Comparison (n = 9201)	98.3	1.4	0.4	92.0	5.8	1.4	0.9
2006							
Intervention (n = 7741)	99.1	0.8	0.1	94.2	4.5	1.0	0.4
Comparison (n = 7833)	98.5	1.2	0.3	92.3	5.5	1.4	0.8
Total (2002–2006)							
Intervention (n = 12 361)	95.9	3.3	0.8	78.1	14.1	5.8	2.0
Comparison (n = 14 475)	93.2	5.1	1.7	79.5	12.5	5.9	2.0

Note. Allies Against Asthma initiatives took place in Hampton Roads, VA; Washington, DC; Milwaukee, WI; King County/Seattle, WA; Long Beach, CA; and Philadelphia, PA. Comparison cities were Roanoke City, VA; Jacksonville, FL; Everett, Lacey, Olympia, and Tacoma, WA; National City and San Bernardino, CA; Baltimore, MD; Lorain, OH; Muskegon, Detroit, and Flint, MI; and Fort Wayne and Indianapolis, IN.

[a]Lower numbers in years 2003–2006 compared with baseline (2002) because of loss to follow-up.

RESULTS

Overall, children in the intervention communities were predominately African American (63%). Seventeen percent were Hispanic, and 11% were White. The mean age at baseline was 8.4 years; 26% were aged 2 to 4 years, 26% were aged 5 to 8 years, 20% were aged 9 to 11 years, and 28% were aged 12 to 17 years. Fifty-four percent of the population was male. There were some demographic differences between the Allies and comparison communities by race/ethnicity, with the comparison sites having a slightly larger proportion of African Americans and Whites than the Allies sites (64% vs 62% and 15% vs 7%, respectively). All demographic factors were controlled for in analysis.

Significant Asthma Events

Table 2 presents the results of models of combined events (hospitalization, ED, or urgent care visit) in the cohort of children studied. It illustrates that cross sectionally, in almost all years, children in the comparison zip codes had higher odds of having an asthma-related hospitalization, ED, or urgent care visit than children in the Allies zip codes. The analysis adjusted for age, race/ethnicity, gender, site, and indicator of baseline event. Table 2 also shows that differences between Allies neighborhoods and comparisons were greater in the last 2 years of the assessment (2005–2006), that is, when results of the coalitions' work had more time to take hold and reach increasing numbers of children.

Repeated Asthma Events

Two models were created to account for the fact that some children moved in and out of Medicaid coverage. One examined those children who remained on Medicaid continuously for at least the first 2 years (no gap). The other kept all children in the sample and treated data as if no event occurred during the time the child was missing from Medicaid (gap). The hazard ratio for having an asthma health care use event (hospitalization, ED, or urgent care visit) between 2002 and 2006 was 1.066 (95% CI = 1.013, 1.122; $P = .014$) for those with no enrollment gap and 1.065 (95% CI = 1.012, 1.121; $P = .015$) for those with a gap in enrollment.

The findings illustrated that in both analyses, the hazard of having a hospitalization, ED, or urgent care visit at any time during the 5-year time period was 6% to 7% ($P < .01$ and $P < .02$) greater for children in the comparison group than those in the Allies communities. The models were adjusted for age, gender, race/ethnicity, and site. In addition, a residual analysis was conducted to confirm the proportionality model assumption in the Cox regression.

DISCUSSION

Study findings supported the premise that the policy and system changes that the coalitions achieved would reduce the need for urgent care services in Allies neighborhoods. Furthermore, they supported the idea that there would be a broad effect on urgent health care use for asthma by children living in the targeted low-income neighborhoods. We hypothesized that the effects would be stronger over several years, because children would be exposed to clinical and community services that had time to make changes initiated through the coalition work a routine and stable part of their operation. Findings indicated that the better health care use profile for children in Allies sites was evident most years and also cumulatively over the 5 years of the study, with strong effects observed in the 2-year period after the Allies coalition funding ended. The nonsignificant findings in the middle years were most likely associated with the fact that it could take up to 24 months for the effect of an intervention to be apparent in health care utilization data.

These health care use data described population-wide improvements in communities where Allies Against Asthma coalitions changed health care policies and systems. The changes included more coordination and standardization of health care, clinical quality enhancements, improved home environmental conditions, and greater opportunity for families to learn how to manage asthma. The combination of changes varied by site, as coalitions responded to the specific features of their communities. It was not possible, given the study design, to determine which type of policy or which specific change was most associated with health care use outcomes. It was likely, however, that a combination of improvements in the sites contributed to reductions in need for urgent health care. It was also likely, as was suggested in an earlier assessment,[1] that the Allies approach of engaging stakeholders from across the community led to policy and systems changes that were most salient and relevant to improving the access to and quality of health services in their community. There were few studies of outcomes of the work of community coalitions and fewer still observing outcomes at the population level.[2] The findings of this study contributed to the existing literature suggesting cross-community collaboration of stakeholders could have wide reaching effects on health care use by children in vulnerable communities.

There were limitations to this study. Children moved in and out of Medicaid, and the Medicaid claims results from both the intervention and comparison sites might not have

TABLE 2—Comparison of Odds of Having a Significant Asthma Event in a Given Year: Long-Term Results of the Allies Against Asthma Initiative, 2002–2006

	Hospitalization, ED Visit, or Urgent Care Visit (vs Intervention)	
Year	Adjusted OR[a] (95% CI)	*P*
2002	1.185 (1.073, 1.308)	< .001
2003	1.014 (0.892, 1.153)	.83
2004	0.842 (0.721, 0.985)	.031
2005	1.345 (1.154, 1.567)	< .001
2006	1.405 (1.075, 1.836)	.013

Note. CI = confidence interval; ED = emergency department; OR = odds ratio. Allies Against Asthma initiatives took place in Hampton Roads, VA; Washington, DC; Milwaukee, WI; King County/Seattle, WA; Long Beach, CA; and Philadelphia, PA. Comparison cities were Roanoke City, VA; Jacksonville, FL; Everett, Lacey, Olympia, and Tacoma, WA; National City and San Bernardino, CA; Baltimore, MD; Lorain, OH; Muskegon, Detroit, and Flint, MI; and Fort Wayne and Indianapolis, IN.
[a]Models adjusted for age group, gender, race/ethnicity, site, and for 2003–2006, baseline value.

included all enrolled children during the study years because not all encounter claims from managed care patients were submitted to CMS. Findings were based on administrative claims data for a continuously enrolled pediatric Medicaid population between 2002 and 2006. Although these data represented claims data exclusively, and we did not have access to patient records, other studies showed high sensitivity and specificity for diagnoses obtained from administrative claims data with high-risk conditions, including asthma.[10,11] The problems associated with this phenomenon were reduced by the analyses we conducted to look at children who were continuously enrolled as well as all children. These 2 scenarios led to very comparable statistical significance, which suggested that the assumption of no occurrences of events in the gap time seemed reasonable. Another limitation was that we did not know the level of exposure of any given child to the various components of service improved by the Allies' policy and systems changes. We did know, however, that over time, children living in the areas where these services were introduced needed less urgent care, an indication that whatever the level of exposure, the outcome was positive.

There were important implications for practice in the results of the Allies' evaluation. First was that the approach to assure ongoing consumer voices in coalition processes and decisions likely increased the quality of the policy and system changes introduced,[1] that is, ensured that they reflected the actual needs of the families attempting to manage asthma. Another was that reaching beyond the clinical setting to affect change could enhance asthma outcomes.[2] Allies targeted policy and systems change in locations where families could learn how to manage asthma better (homes, schools) and sought changes in environmental conditions related to both indoor and outdoor air quality. Both these factors, education and environment, were shown to be highly relevant to improvements in asthma management.[12] In addition, these coalitions sought to institute procedures and practices that would connect clinical settings, homes, schools, and other community services. They created links between the places where children spent their time and received their care. Finally, Allies mobilized a diverse group of stakeholders representing clinical practice, insurers, government, schools, families with asthma, etc., to determine and support the policy and systems change efforts. The right people with the needed knowledge, contacts, and influence were assembled, in the context of coalition infrastructure and support, to affect changes and positive outcomes in childhood asthma as measured by the decreased need for urgent health care.

The findings from this study indicated that mobilizing a diverse group of stakeholders, engaging consumers, and focusing on policy and system changes could generate significant reductions in health care use for those experiencing the greatest burden of asthma. ■

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Contributors

All of the authors participated in the Allies Against Asthma program as either project directors of the individual sites or as the research team at the National Program Office, for which N. M. Clark (corresponding author) was director. N. M. Clark and L. Lachance conceptualized and oversaw all aspects of the study; B. Benedict provided conceptual guidance and consultation regarding analyses and interpretation of findings. D. F. Awad managed large-scale claims data and created the analytic data sets. P. Song and M. Wilkin conducted the analyses and contributed to the interpretation of results. L. J. Doctor provided conceptual guidance. L. Gilmore, C. Kelly, J. Krieger, M. Lara, and J. Meurer oversaw the interventions in the Allies communities, A. F. Milanovich, and S. Stoll contributed to the interpretation of findings. All authors contributed to the editing of the article and approved the submitted version of the article.

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Human Participant Protection

The University of Michigan Health Sciences institutional review board approved this study.

References

1. Clark NM, Lachance L, Doctor LJ, et al. Policy and system change and community coalitions: outcomes from Allies Against Asthma. *Am J Public Health.* 2010;100(5):904–912.

2. Lachance LL, Houle CR, Cassidy EF, et al. Collaborative design and implementation of a multisite community coalition evaluation. *Health Promot Pract.* 2006;7(2 suppl):44S–55S.

3. Jones R, Lin S, Munsie JP, Radigan M, Hwang S. Racial/ethnic differences in asthma-related emergency department visits and hospitalizations among children with wheeze in Buffalo, New York. *J Asthma.* 2008;45(10):916–922.

4. Kim H, Kieckhefer GM, Greek AA, Joesch JM, Baydar N. Health care utilization by children with asthma (abstr). *Prev Chronic Dis.* 2009;6(1):A12.

5. Kamble S, Bharmal M. Incremental direct expenditure of treating asthma in the United States. *J Asthma.* 2009;46(1):73–80.

6. *International Classification of Diseases, Ninth Revision.* Geneva, Switzerland: World Health Organization; 1980.

7. *Use of Appropriate Medicines for People with Asthma: Volume 2: Technical Specifications.* Washington, DC: National Committee on Quality Assurance (NCQA); 2009.

8. Prentice RL, Williams BJ, Peterson AV. On the regression analysis of multivariate failure time data. *Biometrika.* 1981;68(2):373–379.

9. SAS/STAT Software. Version 9.2 of the SAS System for Windows. Cary, NC: SAS Institute Inc.; 2008.

10. Daley MF, Barrow J, Pearson K, et al. Identification and recall of children with chronic medical conditions for influenza vaccination. *Pediatrics.* 2004;113(1):e26–e33.

11. Dombkowski KJ, Wasilevich EA, Lyon-Callo SK. Pediatric asthma surveillance using Medicaid claims. *Public Health Rep.* 2005;120(5):515–524.

12. Lara M, Rosenbaum S, Rachelefsky G, et al. Improving childhood asthma outcomes in the United States: a blueprint for policy action. *Pediatrics.* 2002;109(5):919–930.