Controlling Asthma in American Cities: Major Themes, Persistent Challenges, and Next Steps

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The papers in this special supplement provide a sampling of the accomplishments, challenges, and contributions of the Controlling Asthma in American Cities Project (CAACP)—a large, complex project implemented through community-based coalitions at seven inner-city sites. The core purpose of the CAACP was to improve asthma control for children suffering from a high disease burden. The epidemiologic trends and increasing public health burden that drove the initial funding of this project appear in the introductory paper; the conceptual and theoretic framework behind the design of the project are presented in the second. Subsequent papers detail individual site interventions or specific interventions as implemented across sites. This supplement will be of interest to a variety of audiences including community asthma coalitions, community-based organizations that serve children, healthcare provider groups and organizations, insurers (including Medicaid programs), state asthma programs, and academics. This editorial analyzes the major themes reflected in the papers, summarizes the persistent challenges, and suggests next steps for improving asthma control in urban communities.

The CAACP is an important translational initiative and a step in the progression from intervention-focused efficacy research through project-based implementation to scaled-up field implementation by coalitions, healthcare systems, and state asthma programs. As an example of this progression, in-home interventions to provide self-management training and reduce asthma triggers, a component of all the CAACP projects, was first proven effective through a research design in the NIH-funded National Cooperative Inner City Asthma Study¹, then shown to work in additional settings through the Allies Against Asthma community coalitions² and CAACP communities³, and has now been recommended by the Task Force on Community Preventive Services for use in other communities. A similar model of coalition-implemented multi-faceted asthma projects, including in-home interventions, continues currently with the Merck Childhood Asthma Network⁴. Such a translational progression shows that interventions can work with various sources of support and that the interventions can be effectively modified for different contexts. CAACP provided valuable information about the factors which led community partners to sustain interventions without further funding.

As with previous projects and studies, the target population of the CAACP project was children with asthma. The intent was to implement evidence-based interventions appropriate to local cultures and needs and at multiple levels (individual, interpersonal, community, institutional, and policy)⁵. There was room

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for some experimentation with innovative interventions and approaches, and an emphasis on monitoring effectiveness throughout the 5-year implementation phase, as well as measuring impact at the population level.

MAJOR THEMES

Major themes reflected in this collection and in previously published CAACP papers include:

1. The importance of baseline assessments of community needs, resources, capacity, and barriers in planning local projects;
2. The necessity of effective outreach and flexible adaptation to local settings;
3. The limited impact of single interventions and, conversely, the synergistic impact of multiple coordinated interventions;
4. The benefits of the coalition approach to planning, implementation, and adoption of interventions; and
5. Evaluation challenges inherent to projects of this type and scope, and approaches to addressing them.

The paper *Considerations for planning a public health approach to asthma: Scaling interventions for population impact*⁶ describes the importance of conducting community-level needs assessments and briefly describes the Minneapolis/St. Paul project's methods for so doing. There are also examples of more focused, sector-oriented needs assessments. The Minneapolis/St. Paul coalition relied heavily on a baseline assessment of policies to inform the focus of their collaboration with health plans⁷. The St. Louis Asthma Consortium responded to the identified needs of local school districts by designing an asthma-awareness curriculum that could be integrated into standard lesson plans and, at the same time, meet state and federal education standards⁸. The St. Louis site also depended greatly on the baseline assessment of pharmacist needs, capacity, and interest when designing the Asthma Friendly Pharmacy interventions⁹.

The need for and mechanisms to achieve effective outreach through case identification¹⁰, increased accessibility of services^{11,12}, or partnerships³ are recurrent themes. All sites clearly demonstrated that reaching children, particularly those suffering a disparate burden, requires active recruitment, perseverance, and flexibility. Similarly, willingness to identify and adapt interventions to local needs was deemed essential to the success of multiple interventions. Ragazzi et al. emphasized the critical importance of flexibility in engaging physicians and other health care providers in the practice setting: "some practitioners had excellent knowledge and acceptance of the guidelines but needed help with system redesign...others benefited from one-on-one education about guidelines-based management strategies."¹³ Brown et al. described the different accommodations made to implement family and home asthma services, such as asthma self-management, social services, and care coordination, in different communities of need³. Although sites had similar target groups and similar classes of interventions, each site developed unique ways to achieve similar goals in challenging settings.

Among the strengths of this collection of papers is the inclusion of interventions and activities that did not achieve the desired reach or outcomes but, nonetheless, make important contributions to the program-implementation knowledge base. St.

Louis's Breathe Your Best pilot intervention¹⁴ demonstrated the challenges inherent in increasing the availability of asthma action plans within schools when focusing solely on parental behavior. Despite the investment of intensive effort in educating, providing incentives to parents, and following up with them, no significant change occurred in the submission of provider-written asthma action plans. This experience demonstrates the difficulty of relying on individual behavior change without accompanying institutional change (e.g., a school policy requiring action plans) and/or healthcare provider investment in the use of action plans in schools. Similarly, the evaluation of Oakland's bedside intervention for children hospitalized for asthma did not reveal improvement in emergency department utilization. The authors speculated that the negative findings might be attributable to the failure to address other factors affecting emergency department use such as environmental triggers at home and school, primary medical care access, or proper medication¹⁵. In contrast, the paper by Findley et al. demonstrated a "dose response" (evidenced by decreases in daytime symptoms, daycare absences, and emergency department utilization) achieved through exposure to multiple, coordinated layers of interventions: "Daycare center staff made the centers more asthma friendly, ABC (project) staff with center staff educated parents about improved asthma management, and the community's pediatric providers received training to provide appropriate, state-of-the-art care when parents consulted them about their children's asthma."¹⁰

Much of the CAACP projects' work entailed creating communication and linkages to compensate for the fragmented US healthcare system. The CAACP community-based coalitions, designed to address that fragmentation, drew heavily upon the experience and materials of previous coalition-driven asthma projects^{16,17}. The *Added Value of Coalitions* paper in this supplement further advances the literature on coalitions by presenting a methodology for identifying outcomes that would have not occurred without coalitions, or that the participation of coalitions had substantially enhanced¹⁸. A number of additional articles demonstrate the utility and value of assembling a diverse group of stakeholders to improve coordination and reduce redundancy. Berry's paper on Asthma Friendly Pharmacies⁹ presents a series of innovative interventions to improve communication and collaboration among pharmacists and patients that resulted from the inclusion of faculty from the St. Louis College of Pharmacy at all stages of project planning and implementation. Collaboration among local grantees organized through the CAACP coalition, Environmental Improvements for Children's Asthma project in Minneapolis/St. Paul¹⁹, reduced competition and duplication by bringing together funding from three federal agencies.

All sites struggled to evaluate the individual components of their projects, as well as their project's overall impact at the population level. CAACP project terms did not permit research, and population-based surveys were inconsistent with project terms and the level of funding. These limitations led to new partnerships, the creative use of existing data, and innovative data collection methods. Investigators in Chicago²⁰ partnered with a local pharmacy chain to use medication-fill data to follow population-level trends in the use of inhaled corticosteroids. This ecological analysis compared inhaled-corticosteroid prescriptions filled by children 5-17 years of age living in the intervention area with those of children living in other areas of Chicago while controlling for gender, insurance status, race, and indicators of poverty. A significant difference in this proxy measure of adequate medication use was found in one age group (ages 5-9 years), a finding that was consistent with the

project's focus on younger children. Carlson et al. describe the use of a symptom survey of children in the Minneapolis and St. Paul school systems to track trends in asthma symptoms and identify high-risk populations²¹. The Philadelphia site used an annual street corner survey to assess general awareness of asthma and of the CAACP program, as well as knowledge about allergens, symptoms, and signs of asthma among their target population. They obtained information about coalition recognition and program reach from 1,881 people by training student volunteers to administer surveys at street corners, bus stops, subway entrances, and laundromats²².

PERSISTENT CHALLENGES

The CAACP experience, in many ways, mirrors the challenges inherent in addressing chronic diseases at the community level. Clearly, no magic bullet can be applied in a standardized way across diverse communities. The demonstrated importance of considering local needs and capacities, modifying and adapting interventions to accommodate local cultures, strengthening and building local collaboration, and networking with a variety of local agencies and health plans complicates taking interventions of this type to scale. Cost would substantially impede the replication of the CAACP approach on an ongoing basis in every large city. Further, asthma is but one of many chronic diseases with multiple determinants that communities and states must address.

The cities chosen for this project had a set of characteristics that might limit the ability to generalize their experiences. All had a combination of significant asthma burden and an infrastructure to utilize funding to address that burden collaboratively. The sustainability or adoption of some interventions by partner organizations was dependent, in some part, upon a demonstrated impact on the prevalence of hospitalization rates and other indicators of poorly controlled asthma. Communities with a lower prevalence of poorly controlled asthma, although suffering a substantial burden of disease, might not be able to document changes in hospitalization or emergency department rates. Thus, although CAACP provides important information on specific approaches (e.g., in-home case management in urban areas, pharmacy-based education and monitoring), the interventions cannot necessarily be generalized to populations in non-urban areas and might not have the same potential for sustainability through reimbursement in areas experiencing lower geographic density of poorly controlled asthma.

An important contribution of this set of papers is the articulation of the tension between addressing health disparities and demonstrating a population-based impact with a limited set of resources. Although some CAACP outreach efforts were successful, a mobile population with complicated family dynamics and competing socioeconomic demands challenged others. For example, in St Louis, 23% of 193 students targeted through the Breathe Your Best program had an inoperable phone number or had moved from the school district by the end of follow up¹⁴. While many specific asthma control efforts were helpful, many children and their families struggled with broader social determinants of health that precluded having asthma as a priority. The median cost of case management per family was \$1,300 and the median cost per home visit was \$375, with the programs that addressed competing social problems and conducted extensive environmental remediation incurring higher costs³. Although providing service to children and families who are easier to reach and work with might be more efficient, addressing disparities requires more costly

outreach and interventions. However, addressing the root causes of asthma disparities for these families would bring benefits beyond asthma itself. Documenting the cost of not addressing the broader social determinants of health would yield useful information for the readers of this supplement and society at large.

The fact that all the sites have sustained their coalitions to date is an important accomplishment. Individual interventions, service linkages, and the roles of key partners have also been sustained¹⁸. Given the variation in coalition structure, membership, and leadership as well as intervention focus and design, assessing the determinants of coalition functioning and institutionalization or isolating the impact of charismatic leaders and champions is impossible. Additional metrics for understanding coalition impact such as documenting interactions with state programs or state-level quality improvement initiatives and reach to individuals at greatest need would be useful.

This collection of papers documents some innovative work in the evaluation of complex community-based interventions. Much remains to be done, however, to standardize and validate indicators to measure the impact and sustainability of multi-faceted interventions occurring across multiple ecological levels. Understanding the impact of interventions within the context of other public health interventions and social programs in the community is of particular importance.

NEXT STEPS

CAACP has addressed the questions raised in the introduction to this supplement²³ by contributing substantially to the “knowledge base about translating effective clinical and educational interventions into the real world of underserved and overburdened communities”; providing lessons, strategies, and tools that can be applied to similar settings; and contributing to the evaluation of complex, community-based interventions. Next steps need to include additional dissemination of lessons learned, application of these approaches in other settings, the development and use of standardized definitions and metrics for evaluating reach and impact, and further evaluation of long-term effectiveness and cost effectiveness.

In addition to the publication of this supplement, CDC can do much to disseminate these findings to interested, influential audiences. CDC can offer presentations and consultations, perhaps with the help of CAACP-site representatives, to those most likely to implement these interventions, such as CDC-funded state asthma programs at grantee meetings. CDC can recommend to the National Asthma Control Initiative that its demonstration projects and other initiatives implementing asthma guidelines adopt CAACP best practices, emphasizing the importance of multifaceted interventions to create synergistic effects. The publication of additional materials, targeting audiences beyond the public health field, especially potential funders, and the promotion of findings among federal partners, such as the US Environmental Protection Agency, Department of Housing and Urban Development, Centers for Medicare and Medicaid Services, as well as private organizations such as the Business Coalition for Health and philanthropic foundations, could greatly extend the reach of this work.

These interventions have high potential for replication in a variety of other settings, such as small cities and communities with a lower disease burden than the CAACP sites as well as larger-scale populations such as entire cities,

districts, or states. Readers considering replication might ask themselves the following questions:

- How does this intervention address the needs of my community's population? Who would be appropriate community partners? How would participation affect those partners and the community?
- What financial, human, equipment, supply, and information system resources will be needed to implement the intervention?
- What is the likelihood of sustainability? Could partner agencies use savings resulting from the program to sustain funding, and, if so, how? How could the intervention be incorporated into existing workflow without significant alteration?

Although each replicating community is likely to undertake a different mix of interventions based on its own needs, the development of a system for networking with and receiving mentoring from the CAACP sites as well as one another, through a community of practice network or formal mentoring, could offer support for program development and a continually expanding shared base of expertise and data.

As other communities and states implement CAAC interventions, the development uniform methods of recording enrollment and reach, and consistent evaluation indicators and tools, including methods for assigning and tracking costs is critical. The consistent application of standard metrics to the examination of all factors communities consider as they explore, engage, and take implementation to scale is essential to the further development of a solid knowledge base that blends the successes, failures, and diverse experiences of multiple undertakings.

CDC should also consider continuing evaluation of CAACP sites to determine the longer-term impact of its investment and to identify what has continued to work. Areas of investigation might include the impact of these interventions on long-term outcomes such as hospitalizations and factors contributing to these interventions' sustainability (or lack thereof) when the translational funding ends. CDC needs to identify the elements that were key to the interventions' effectiveness and therefore essential to achieving similar results in replicating communities. Better documentation of who incurred project costs and who benefited from the savings could help other communities assess their potential for sustainability. As part of this further evaluation, CDC might examine, more specifically, effective models for implementing in-home case management with environmental remediation, or what CDC, HUD, and EPA can collectively accomplish by funding startup initiatives using the infrastructures they currently fund in many states and cities.

This supplement lays the foundation for the further dissemination, replication, and evaluation of a number of community-based coalition intervention strategies that have been found to be feasible, effective, and sustainable in the CAACP communities. These findings add to the menu of options available to public health professionals and other community workers. Active dissemination of this supplement holds promise for mobilizing other communities to reduce the burden of asthma among children.

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