

GENERAL ARTICLE

Roles of the State Asthma Program in Implementing Multicomponent, School-Based Asthma Interventions*

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ABSTRACT

BACKGROUND: Asthma is a leading chronic childhood disease in the United States and a major contributor to school absenteeism. Evidence suggests that multicomponent, school-based asthma interventions are a strategic way to address asthma among school-aged children. The Centers for Disease Control and Prevention (CDC) encourages the 36 health departments (34 states, District of Columbia, and Puerto Rico) in the National Asthma Control Program (NACP) to implement multicomponent, school-based asthma interventions on a larger scale.

METHODS: To gain a better understanding of replicable best practices for state-coordinated asthma interventions in schools, an NACP evaluation team conducted evaluability assessments of promising interventions run by state asthma programs in Louisiana, Indiana, and Utah.

RESULTS: The team found that state asthma programs play a critical role in implementing school-based asthma interventions due to their ability to (1) use statewide surveillance data to identify asthma trends and address disparities; (2) facilitate connections between schools, school systems, and school-related community stakeholders; (3) form state-level connections; (4) translate policies into action; (5) provide resources and public health practice information to schools and school systems; (6) monitor and evaluate implementation.

CONCLUSIONS: This article presents evaluability assessment findings and illustrates state roles using examples from the 3 participating state asthma programs.

Keywords: asthma; school-based interventions; evaluability assessment.

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Asthma is a chronic respiratory disorder with increasing prevalence in the United States.¹ US children aged 0-17 years are disproportionately impacted by asthma. From 2008 to 2010, children had an average current asthma prevalence of 9.5% compared to 7.7% among adults. Similarly, during 2007-2009, children had a higher average emergency department visit rate compared with adults (10.7 versus 7.0 per 100 persons with asthma).¹ These numbers suggest that almost 3 children in any given classroom of 30 have asthma.

Asthma is a considerable burden for affected children and their families. Evidence suggests that asthma-related morbidity interferes with a child's ability to attend school, obtain adequate sleep, or fully participate in school-related activities.^{2,3} Among children under age 18 with asthma during the 2006-2010 period, the estimated mean percent reporting 1 or more asthma-related school absence day(s) was 49.6% (1.1),⁴ and the estimated mean percent reporting activity limitation due to asthma was 61.4% (1.1).⁵ The more severe and less controlled a child's asthma,

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the more likely the child is to be absent compared to children without asthma, and in turn, the lower their test scores.⁶ To reduce the impact of asthma on children and their families, feasible, comprehensive, and effective interventions are needed in multiple settings.

MULTICOMPONENT, SCHOOL-BASED ASTHMA INTERVENTION OVERVIEW

Most children aged 5-17 years spend a large percentage of their day exposed to school policies, curricula, and environments.⁷ Therefore, asthma interventions conducted in schools strategically expose a large number of children to asthma self-management education, asthma-friendly environments, and asthma policies.^{8,9} Properly trained school faculty and staff are important resources for addressing asthma among children. They can identify students with asthma, respond appropriately to asthma emergencies, and reduce student exposure to classroom asthma triggers.^{10,11} Additionally, school nurses or school-based clinics can provide medical management or link students to medical care that is inaccessible outside of school.^{8,12,13,14}

Given that students with asthma have diverse triggers, knowledge, and backgrounds, school-based asthma interventions with multiple, varied components are suggested over interventions with only 1 component.^{15,16,17} Components may include improving health services for asthma, creating asthma trigger-free environments, and providing asthma education for faculty, staff, and students.¹⁷ Multicomponent, school-based asthma interventions are shown to positively impact children with asthma by raising academic grades, reducing missed school days, improving daytime asthma symptoms,¹⁸ and increasing asthma self-management knowledge.¹⁹ Despite their great potential, schools may struggle to implement multicomponent asthma interventions due to competing priorities and differences in decision-making power between the local and state level.^{8,14,20} Although many community organizations and school systems have the resources and contextual knowledge to implement these interventions,^{3,14} schools may not have the capacity

to establish and maintain collaborations with these entities. This article explores how state asthma programs fill these gaps by helping develop and implement multicomponent, school-based asthma interventions.

LEARNING FROM MULTICOMPONENT, SCHOOL-BASED ASTHMA INTERVENTIONS IN THE NATIONAL ASTHMA CONTROL PROGRAM

Multicomponent, school-based asthma interventions are a priority of the Centers for Disease Control and Prevention's (CDC) National Asthma Control Program (NACP).²¹ The NACP funds asthma programs in 34 US states, Puerto Rico, and the District of Columbia to advance asthma control and reduce the asthma burden through disease surveillance, partnerships, and interventions. Owing to their population focus, state asthma programs are important players in addressing asthma among school-aged children throughout their state.

Presently, little evidence is available to inform state asthma programs about best practices for developing and facilitating school-based asthma interventions. To fill information gaps and to characterize successful, replicable school-based asthma interventions, the NACP's evaluation team conducted a multisite review using the evaluability assessment method. The evaluability assessment utilizes focused document reviews and site visits to rapidly and systematically ascertain whether a program or intervention has sound programmatic logic and sufficient infrastructure to produce successful outcomes.^{22,23} Given the dearth of evidence on the state's role in fostering school-based asthma interventions, this exploratory approach is useful for rapidly and inexpensively investigating what practices work best.

For the first step of the evaluability assessment, the evaluation team worked with other NACP staff members to identify state asthma programs in the NACP that (1) were currently operating a potentially replicable, multicomponent, school-based asthma intervention deemed successful based on anecdotal evidence or the state's evaluation findings; (2) funded

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*Indicates CHES continuing education hours are available. Also available at http://www.ashaweb.org/continuing_education.html

more than half of the intervention with CDC's NACP funding, indicating that this intervention was affordable for other NACP state asthma programs; (3) had sufficient evaluation capacity to participate; and (4) were willing to collaborate with the NACP evaluation team and other participating states. Based on these inclusion criteria, 3 state asthma programs were invited to participate in the evaluability assessment: the Louisiana Asthma Management and Prevention (LAMP) Program, the Indiana State Chronic Respiratory Disease Section's Asthma Program (ISAP), and the Utah Asthma Program (UAP).

From May to July 2012, the team reviewed program documents and conducted 3-day evaluability assessment site visits in each selected state. Site visit teams consisted of 2 or 3 people. No team members visited a state asthma program for which they had oversight responsibilities, encouraging the programs to openly share successful and unsuccessful activities.

Prior to the site visits, team members created an interview guide that grouped potential questions into 5 subject areas: (1) intervention background and description; (2) intervention successes and challenges; (3) intervention sustainability and future planning; (4) intervention evaluation efforts; and (5) planning for a common evaluation protocol. During each site visit, the general interview guide approach²⁴ was used to conduct semistructured, in-person interviews with individuals or groups engaged in the intervention and/or responsible for its inception. This approach allowed team members to ask respondents questions relevant to their role in the intervention. It also allowed team members to vary the order of the questions, change question wording, and ask unlisted questions that led from the respondent's previous answers. This approach built conversations about specific subject areas and gave evaluation team members the flexibility to ask spontaneous, probing questions that revealed individual viewpoints and experiences.²⁴ To the extent possible, schools participating in the intervention were visited, and environmental changes attributable to the intervention were noted. Table 1 outlines the individuals or groups interviewed and the sites visited.

At the end of each site visit, the evaluation team worked with state asthma program staff to create a draft program logic model of the intervention. After the completion of the site visit, evaluation team members used an analytical framework approach²⁴ to classify all respondents' answers into intervention inputs, activities, outputs, outcomes, and processes on the school and state level. They utilized this information to revise each site's draft logic model. The evaluation team also employed qualitative case study approaches²⁴ to organize respondents' answers into the interview guide's subject areas. This categorization helped the team understand the intervention's history, context, lessons learned, and evaluability. The descriptions

demonstrated that each school-based asthma intervention was unique and had context-specific factors facilitating and challenging its success. Intervention descriptions are provided in Table 2.

Using the categorized data, a report was created for each site which included the intervention description, lessons learned, and revised logic model. Report drafts were shared with state asthma program staff to verify the evaluation team's analysis. These products helped the state asthma programs gain a better understanding of their intervention's gaps and target outcomes, as well as plausible questions for future evaluations. Reports and individual state logic models were also shared with the other participating programs to support discussion about common themes and success factors, as well as how they fit together.

After reviewing the common themes and successful intervention components with the state asthma programs, the evaluation team created a generalized logic model of a potentially effective multicomponent, school-based asthma intervention facilitated on the state level (Figure 1). Through this exercise, the evaluation team identified 6 critical roles state asthma programs can play to help schools and school systems implement multicomponent asthma interventions, including (1) using statewide surveillance data to highlight needs and disparities; (2) facilitating connections between schools, school systems, and school-related community stakeholders; (3) forming state-level connections; (4) translating policies into action; (5) providing resources and public health practice information to schools and school systems; and (6) monitoring and evaluating implementation.

COMMON STATE ASTHMA PROGRAM ROLES IN MULTICOMPONENT, SCHOOL-BASED ASTHMA INTERVENTIONS

Using Statewide Surveillance Data to Highlight Needs and Disparities

State asthma programs are responsible for collecting, analyzing, and distributing statewide asthma surveillance data.²¹ Through surveillance activities, state asthma programs identify statewide asthma trends and populations at the greatest risk of asthma morbidity and mortality. The evaluability assessment indicated that state asthma programs utilized surveillance data to ascertain areas that would benefit most from a multicomponent, school-based asthma intervention. For example, LAMP analyzed their statewide Medicaid claims and asthma hospitalization data sets to detect health regions with the greatest burden of childhood asthma hospitalizations. Following this identification, they contracted with community organizations from these high-burden areas to recruit and train schools or school systems to implement the Louisiana Asthma Friendly Schools intervention.

Table 1. Evaluability Assessment Interview Respondents and Settings Visited

State Asthma Program Name	Intervention Name	Interview Respondents	Settings Visited
Louisiana Asthma Management Program (LAMP)	Louisiana Asthma Friendly Schools	<ul style="list-style-type: none"> • Two elementary school principals • One middle school principal • One school maintenance worker • One Louisiana School Nurse Organization representative • Two asthma regional coordinators • One former Louisiana Department of Education representative • Two state officials from the Louisiana Environmental Epidemiology and Toxicology Section • Two state officials from the Louisiana Chronic Disease Prevention and Control Unit • One director of the Louisiana Bureau of Primary Care and Rural Health • Two state officials from LAMP 	<ul style="list-style-type: none"> • One participating urban elementary school • One participating rural elementary school • One participating rural middle school • Louisiana Department of Health and Hospitals state offices
Indiana State Asthma Program (ISAP)	Fly a Flag for Clean Air	<ul style="list-style-type: none"> • One elementary school principal • Two elementary school nurses • One district school nurse representative • One school district administrator • Two state officials from ISAP 	<ul style="list-style-type: none"> • One participating rural elementary school • One participating suburban elementary school • Illinois Department of Public Health state office
Utah Asthma Program (UAP)	Utah School Asthma Initiative, including "What to Do in Case of an Asthma Attack" training	<ul style="list-style-type: none"> • One "Winning With Asthma" coach participant • One college intern conducting "What to Do in Case of an Asthma Attack" trainings • One local health department environmental health educator • One school district school nurse coordinator • One elementary school nurse • One Utah Department of Environmental Quality state official • Four state officials from UAP 	<ul style="list-style-type: none"> • One participating school district office • One local health department office • Utah Department of Environmental Quality state office • Utah Department of Health state office

State asthma programs also reported surveillance data to help administrators and decision makers in schools and school systems understand the asthma burden in their student populations. Across all 3 state asthma programs, respondents noted that surveillance data were important for educating school boards, and in turn, gaining acceptance of school-based asthma programs.

Facilitating Connections Among Schools, School Systems, and School-Related Community Stakeholders

Asthma is a complex condition, and effective action against the disease in schools requires the joint effort of diverse partners. As members and conveners of the statewide asthma coalition, state asthma programs have the capacity to connect and collaborate with state and regional stakeholders with different backgrounds in medical management, environmental health, and health education. Not only do these relationships

connect states with diverse expertise and support, but they also provide different perspectives for creating accurate, credible, and accessible intervention resources for schools. Additionally, state asthma programs can use their wide-reaching network to support school nurses or asthma champions, such as school administrators or custodial staff, with implementing interventions. The evaluability assessment showed that the 3 state asthma programs relied heavily on the participation of school nurses or asthma champions in their school-based asthma interventions. These individuals reported that they often had too many competing priorities to adequately implement the intervention alone, and they appreciated the state linking them to external stakeholders with the expertise or resources to aid their asthma management responsibilities.

In addition to bringing together expertise from different sectors, state asthma programs play a vital role in linking stakeholders across different

Table 2. Description of the Multicomponent School-based Asthma Interventions in 3 NACP State Asthma Programs Participating in the Evaluability Assessment

State Asthma Program Name	Intervention Name	Year started	No. of Schools*	Key Partners	Staffing	Key Components	Notes
Louisiana Asthma Management Program (LAMP)	Louisiana Asthma Friendly Schools	2010	70	<ul style="list-style-type: none"> Louisiana Asthma Surveillance Collaborative Louisiana School Nurse Organization LDH[†] Section of Environmental Epidemiology and Toxicology LDHH Tobacco Control Program LDHH Adolescent and School Health Program 	4 contractors (part-time) with oversight and support from state health department staff	<ul style="list-style-type: none"> Indoor air quality Outdoor air quality Case identification Asthma action plan and self-administration forms Faculty/staff education Health care provider linkage Coach training 	<ul style="list-style-type: none"> State coalition votes to approve schools for the Asthma Friendly School designation
Indiana State Asthma Program (ISAP)	Fly a Flag for Clean Air	2011	13	<ul style="list-style-type: none"> IN Department of Education ISDH[†] Indoor Air Program AnthemWellPoint Foundation Duke Energy Knozone program[§] Improving Kids' Environment 	1 state health department staff member	<ul style="list-style-type: none"> Indoor air quality Student identification Student asthma education Asthma action plan Faculty/staff education Health care provider linkages Outdoor air quality 	<ul style="list-style-type: none"> Nontraditional partnerships with private health care organizations and emergency management
Utah Asthma Program (UAP)	Utah School Health Initiative, including "What to Do in Case of an Asthma Attack" training	2004	425	<ul style="list-style-type: none"> Utah Department of Environmental Quality Utah School Nurses Association UDoH[†] School Nurse Liaison Utah universities Utah American Lung Association (ALA) 	Interns and support from Utah State Asthma Program staff	<ul style="list-style-type: none"> Faculty/staff education Coaches Outdoor air quality 	<ul style="list-style-type: none"> Operates an internship program that trains college students to recruit schools and provide asthma training Collaborates with the Minnesota Asthma Program to develop online "Winning With Asthma" curriculum Developed recess guidance for participating schools Provides extensive Web-based educational resources

* Currently participating or have participated in the intervention since its inception.

[†] Louisiana Department of Health and Hospitals.

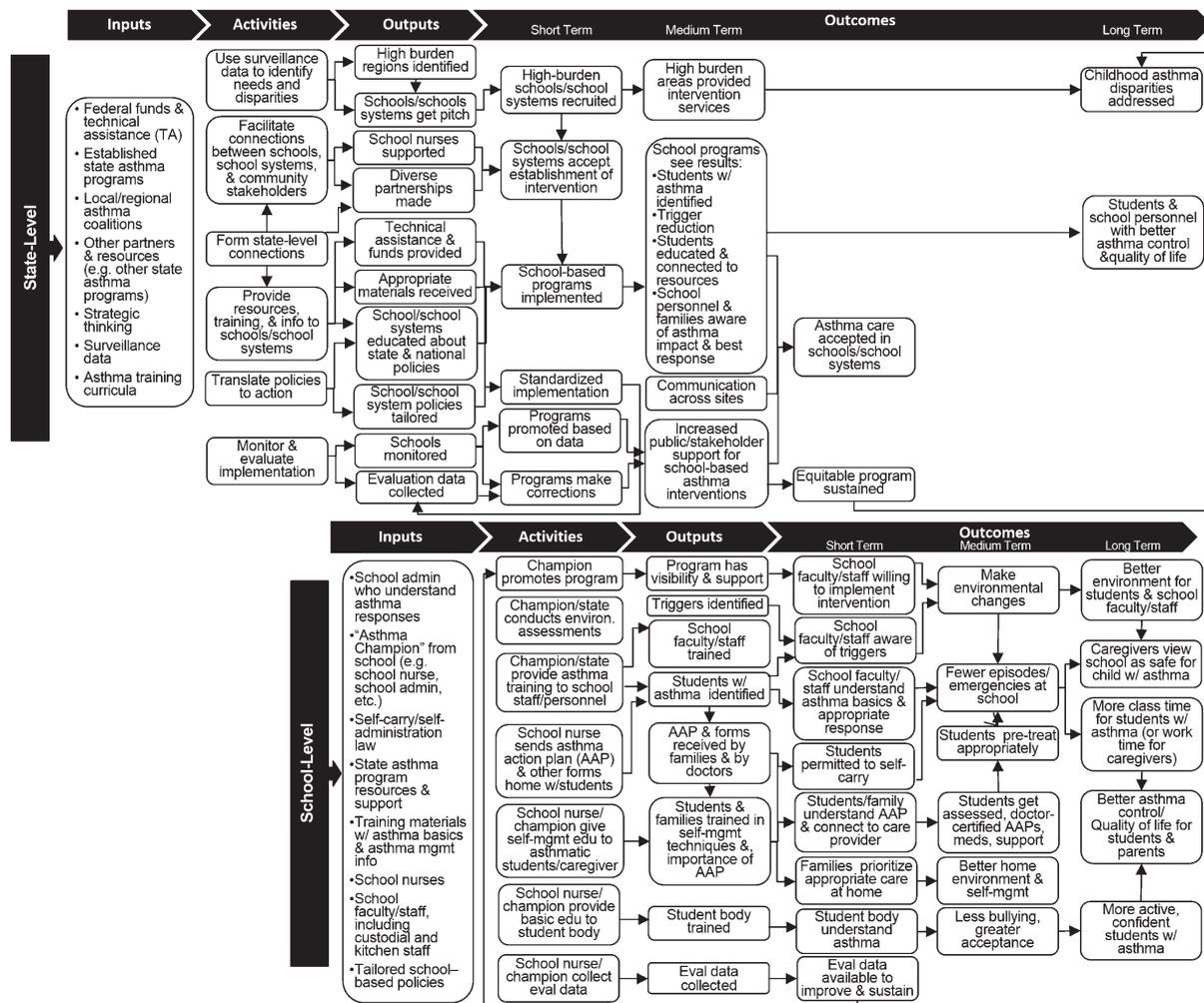
[‡] Indiana Department of Public Health.

[§] Program from the City of Indianapolis's Office of Sustainability.

^{||} Utah Department of Health.

NACP, National Asthma Control Program.

Figure 1. General Logic Model for a Replicable, Multicomponent, School-Based Asthma Intervention Coordinated by a State Asthma Program



administrative levels. School nurse and asthma champion respondents noted that administrative buy-in at multiple levels was important for gaining acceptance and support of the intervention in the school. For example, when recruiting schools for their Louisiana Asthma Friendly Schools intervention, LAMP staff first gained the endorsement of the school system superintendent and the district's nursing supervisor before initiating the intervention. With the school system superintendent's commitment, the principal and school nurses were more empowered to implement the intervention. Administrative support also made teachers and coaches more willing to comply with intervention activities, such as asthma trainings and trigger reduction in the classroom.

Forming State-Level Connections

As a part of the governmental structure, state asthma programs are well positioned to interact with

other state-level organizations internal and external to the state health department. These connections give state asthma programs opportunities unavailable to community stakeholders or individual schools. State asthma programs have immediate access to expertise and resources from other health department units which they can utilize to improve and sustain their intervention. All 3 participating state asthma programs reported collaborating with other internal units whose functions overlapped with school-based asthma interventions. For example, ISAP worked with the Indiana State Department of Health's Indoor Air Program to develop and implement training for school system indoor air quality coordinators. This collaboration ensured that well-trained indoor air quality coordinators were available at schools to reduce asthma triggers, a key component of ISAP's "Fly a Flag for Clean Air" intervention. In another example, UAP worked with the Utah Department

of Health's school nurse liaison. She connected the asthma program with school nurses across the state to improve their understanding of school nurse needs.

In addition to collaborating with groups within the health department, state asthma programs can also use their position to connect with other state government agencies, such as the Department of Education or State Board of Education. All participating asthma programs reported contacting their state's educational organization(s) to understand school regulations and to access school-level data necessary for planning and evaluation purposes, such as school nurse data. ISAP specifically worked with the Indiana Department of Education to implement the asthma portion of their school nurse trainings.

The state environmental agency is another key stakeholder for school-based asthma interventions, especially those interventions with an indoor or outdoor air quality component. In the evaluability assessment, the 3 state asthma programs reported engaging their state environmental agency to obtain air quality data and to access monitoring or training services for school indoor air quality walkthroughs. UAP collaborated with the Utah Department of Environmental Quality to address public concerns about heavy air pollution days caused by a temperature inversion. Together, they established recess guidance for schools based on the outdoor air quality. Using these guidelines, UAP set up a listserv to inform school principals when air quality was harmful to students participating in outdoor activities.

To implement multicomponent, school-based asthma interventions, state asthma programs can also engage state or regional chapters of the American Lung Association, statewide athletic associations, and state school nurse organizations. For example, LAMP partnered with the Louisiana Association for Health, Physical Education, Recreation and Dance to implement coach asthma trainings and to provide coaches with asthma resources, including a "play card" illustrating the appropriate responses to asthma emergencies. While developing a school asthma toolkit, they also collaborated with the Louisiana School Nurse Organization to gain the nurses' perspectives on asthma information necessary for school faculty and staff.

Translating Policies Into Action

State asthma programs play an important role in educating schools and school systems about state and national legislation related to asthma and healthy environments. The 3 participating state asthma programs created easy-to-read materials explaining policies that helped local school staff understand the basic messages and appropriately comply with legislation. Specifically, they each provided resources to schools about their state's law permitting students

to carry and self-administer prescribed asthma medications. During the initial intervention visit, LAMP staff provided brochures to school nurses to inform school staff and faculty about the 2009 state law²⁵ giving public school students the right to carry and self-administer medications in Louisiana. ISAP staff gave information about the state's self-administration law²⁶ to school nurses attending their statewide asthma training. UAP included information about Utah's self-administration law²⁷ in their "Asthma School Resource Manual" and in their "What to Do in Case of an Asthma Attack" school faculty training.

Beyond assisting with translating policies, state asthma programs can aid schools and school systems with developing asthma-related policies for their jurisdictions. In the 3 states visited, many school systems developed school asthma policies based on model policies created or shared by the state asthma program and its partners. For example, in order for a school to be designated as "Asthma Friendly," LAMP encouraged participating school systems to adopt a policy prohibiting school buses and service delivery trucks from idling outside of schools. To help school systems with developing this policy, LAMP shared a sample idling policy they adapted from the Environmental Protection Agency.

Providing Resources and Public Health Practice Information to Schools and School Systems

State asthma programs can support school-based asthma interventions by providing funding, free resources, or technical assistance. A common form of technical assistance provided by the 3 state asthma programs to schools included informational materials, such as national and state asthma-related materials and evidence-based practice information. For instance, both LAMP and ISAP offered free signs and posters, including "No Idling Zone" signs for the bus lanes. UAP distributed a laminated resource to teachers on how to respond to asthma attacks. Respondents from local schools said that these resources made the intervention more feasible and sustainable. Overall, the materials collected and endorsed by the state made school systems and schools feel more confident in their intervention activities.

In addition to equipping local schools, state asthma programs can use practice-based information from pilot programs to create a "model" intervention implementable across diverse settings in the state. By promoting a model, states ensure that participating schools meet set standards. One example includes ISAP's "Fly a Flag for Clean Air" intervention, which the asthma program developed as a package and offered to all interested schools in the state. Although schools implemented the package somewhat differently due to varying resources and contexts,

such as the availability of school nurses, the basic intervention standards allowed local schools to communicate effectively about their progress and learn from each other. It also ensured that implementation was equitable across all sites regardless of the underlying socioeconomic context.

Monitoring and Evaluating Implementation

By implementing standardized school-based asthma interventions, state asthma programs can uniformly collect evaluation data so that common indicators are comparable across diverse sites. For state asthma programs participating in the evaluability assessment, this uniform data collection helped them identify where more state support was needed. The standard evaluation data also assisted with determining the intervention's effectiveness, understanding the circumstances under which interventions were successful, and marketing interventions to other school systems. For example, UAP collected evaluation indicators from tests given to school faculty and staff before and after their "What to Do in Case of an Asthma Attack" training. These indicators summarized the knowledge that faculty and staff gained about responding to asthma emergencies during the training. UAP used test results to determine which schools should receive follow-up trainings and what topics to modify in the training materials.

DISCUSSION

Despite the feasibility and utility of the evaluability assessments, there are some limitations. Owing to resources, the NACP evaluation team was only able to assess 3 programs. Therefore, the findings may not be generalizable to all state asthma programs conducting multicomponent, school-based asthma interventions. Even though the 3 programs vary widely in structure and operation, the common roles that emerged from the evaluability assessment are believed to be possible for most state asthma programs to achieve. Additionally, 2 of the 3 programs have been in operation for only a few school years. These relatively new interventions have not yet been institutionalized, and the processes in their interventions may change. Finally, the generalized logic model represents a combination of inputs, activities, outputs, and outcomes that the 3 state asthma programs expressed were important for their intervention to function optimally. Not all logic model components may be feasible or appropriate for each state asthma program. For example, although all participating state asthma programs agreed that reducing asthma-related school absenteeism was the ultimate goal of their intervention, none of the programs had access to these data. Asthma-related absenteeism data are notoriously difficult to collect

and the participating state asthma programs were unable to overcome challenges created by the locally controlled systems for collecting such data. State asthma programs should adapt the generalized logic model to fit the context of their state.

State asthma programs implementing multicomponent, school-based asthma interventions should use these results to assess whether they are playing the necessary roles to support their intervention. First, they should verify that appropriate state surveillance data are used to target interventions and recruit schools. Asthma programs should also engage diverse stakeholders from multiple fields and administrative levels, including the state's educational and environmental agencies. They should ensure school faculty and staff are fully aware of asthma-related policies and provide resources to fill any knowledge gaps. If the state asthma program decides to broadly promote a model school-based asthma intervention, they should confirm that the intervention is potentially effective, evaluable, and readily implementable in multiple contexts. Finally, state asthma programs should share knowledge gained from school-based interventions and pass on practice-based evidence.

IMPLICATIONS FOR SCHOOL HEALTH

Through their roles as facilitators, overseers, mediators, and suppliers, state asthma programs can help schools and school systems establish effective and sustainable asthma interventions. Ultimately, the actions of state asthma programs in school-based interventions have the potential to decrease the asthma burden among children nationwide.

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