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

Laura L. Hester, ScM [Environmental Health Scientist]

ORISE/CDC Research Program, Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Hwy, Mailstop F60, Atlanta, GA 30341, T:770- 488-0789, F: 770-488-1540, gjt8@cdc.gov

Maureen A. Wilce, MS* **[Lead Evaluator]**

Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Hwy, Mailstop F60, Atlanta, GA 30341, T: 770-488-3721, F: 770-488-1540, muw9@cdc.gov

Sarah A. Gill, BA [Evaluation Technical Advisor]

Cazador, Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Hwy, Mailstop F60, Atlanta, GA 30341, T: 770-488-0782, F: 770-488-1540, iqv2@cdc.gov

Sheri L. Disler, BA [Evaluation Technical Advisor]

Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Hwy, Mailstop F60, Atlanta, GA 30341, T: 770-488-3713, F: 770-488-1540, sjd9@cdc.gov

Pamela Collins, MPA [Public Health Advisor]

Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Hwy, Mailstop F60, Atlanta, GA 30341, T: 770-488-0792, F: 770-488-1540, ing4@cdc.gov

Gregory Crawford, PhD MSPH [Deputy Branch Chief]

Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Hwy, Atlanta, GA 3034, T: 770-488-3728, F: 770-488-1540, glc8@cdc.gov

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 thirty-six health departments (34 states, DC, and Puerto Rico) in the National Asthma Control Program (NACP) to implement multicomponent, school-based asthma interventions on a larger scale.

***Address correspondence to**: Maureen Wilce, Lead Evaluator, Air Pollution and Respiratory Health Branch, National Center for Environmental Health, Centers for Disease Control and Prevention, 4770 Buford Hwy, Mailstop F60, Atlanta, GA 30341, T: 770-488-3721, F: 770-488-1540, muw9@cdc.gov.

METHODS—To better understand best practices and replicability of state-coordinated interventions in schools, an NACP evaluation team conducted an evaluability assessment 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 to action; 5) provide resources and public health practice information to schools and school systems; 6) monitor and evaluate implementation.

CONCLUSIONS—This article provides an overview of the evaluability assessment findings and illustrates these roles using examples from the three participating states.

BACKGROUND

Asthma Burden among US Children

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, from 2007–2009, children had a higher average emergency department visit rate compared with adults (10.7 vs. 7.0 per 100 persons with asthma).[1] These numbers suggest that almost three 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 aged less than 18 with current asthma during the 2006–2010 period, the estimated mean percent reporting one 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, the more likely the child has higher absenteeism rates 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, interventions are needed that are feasible, comprehensive, and effective.

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, environmental asthma trigger reduction, and asthma policies.[8, 9] Properly trained school faculty and staff are also important resources for addressing asthma among schoolchildren. 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.[8,12–14]

Given that students with asthma have diverse triggers, knowledge, and backgrounds, school-based asthma interventions with multiple components that address diverse aspects of asthma are suggested over interventions with only one component.[15–17] Multicomponent, school-based asthma interventions are shown to positively impact children with asthma by raising academic grades, reducing missed school days, improving day-time asthma symptoms,[18] and increasing asthma self-management knowledge.[19] Despite their great potential, schools often struggle to implement multicomponent asthma interventions. They may face competing priorities, resource constraints, and complications due to differences in decision-making and regulation 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] establishing and maintaining such collaborations often requires resources and expertise beyond the school's capacity. This paper explores how state asthma programs fill these gaps by helping develop and effectively 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. Due 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 evaluation team conducted a multi-site 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 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 this inclusion criteria, three 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 three-day evaluability assessment site visits. Site visit teams consisted of two or three people. No team members visited a state for which they had oversight responsibilities, encouraging the state asthma programs to openly share successful and unsuccessful activities.

Prior to the site visits, team members created an interview guide that grouped potential questions into five 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 approach[24] was used to conduct semi-structured, in-person interviews with individuals or groups engaged in the intervention and/or responsible for its inception. This approach allowed team members to only ask respondents questions relevant to their role in the intervention. They also were able 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 on specific subject areas while giving team members the flexibility to ask spontaneous, probing questions that revealed individual viewpoints and experiences.[24] To the extent possible, at least one setting was observed during each site visit in which the intervention was implemented, and any environmental changes attributable to the intervention were noted. Table 1 outlines the individuals or groups interviewed and the sites visited during each visit.

At the end of each site visit, the evaluation team worked with state asthma program staff to create a draft program logic model. After the completion of the site visit, evaluation team members used an analytical framework approach[24] to classify all respondents' answers into intervention inputs, activities, outputs, outcomes, and processes on the school- and state-level and utilized this information to revise a logic model for each site. The evaluation team also employed qualitative case study approaches[24] to organize respondents' answers into the interview guide's subject areas. Using these data, a report was created that included a program description, lessons learned, and the revised logic model for each site. Descriptions of each intervention are provided in Table 2.

Initial draft reports were shared with state asthma program staff to verify the evaluation team's analysis. These products helped each state better understand their intervention's target outcomes, recognize current gaps in the intervention structure, and identify 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 create a community of practice.

The descriptions from the evaluability assessment demonstrated that each school-based asthma intervention was unique and had context-specific factors facilitating and challenging its success. The evaluation team created a generalized logic model displaying the inputs, activities, outputs, and outcomes of a potentially successful multicomponent, school-based asthma intervention facilitated on the state level (Figure 1). Through this exercise, our

evaluation team identified six essential roles state asthma programs can play when conducting multicomponent, school-based asthma interventions: (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 datasets to detect health regions with the greatest burden of childhood asthma hospitalizations. Following this identification, they contracted community organizations from high-burden areas to recruit and train schools or school systems to implement the Louisiana Asthma Friendly Schools intervention. State asthma programs also reported using surveillance data to help administrators and decision makers in schools and school systems understand the asthma burden in their student populations. Across all three state programs, respondents noted that these data were important for educating school boards, and in turn, gaining acceptance of school-based asthma programs.

Facilitating Connections between 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 that have different backgrounds in medical management, environmental health, and health education. Not only do these relationships connect states with diverse expertise and support, they also provide different perspectives for creating accurate, credible, and accessible intervention resources for schools. State asthma programs can also 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 three 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 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 three 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” school-based asthma 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 also use their position to connect with other state government organizations, 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. The three state asthma programs reported engaging their state environmental agency to obtain air quality data or to access environmental monitoring and 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 provide coaches with asthma resources, including a "play card" illustrating the appropriate response to asthma emergencies. They also collaborated with the Louisiana School Nurses Organization while developing a school asthma toolkit 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 three 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 law[25] giving public school students the right to carry and self-administer medications in Louisiana. ISAP staff gave information about the state's self-administration law[26] to school nurses attending their statewide asthma training. UAP included information about Utah's self-administration law[27] 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 laws and policies, state asthma programs can aid schools and school systems with developing asthma-related policies for their jurisdictions. The evaluability assessment showed that many local school asthma policies were based on model policies created by the state asthma coalition and other state-level 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 three state asthma programs to schools included informational materials, such as national and state asthma-related materials and evidence-based practice information. Both LAMP and ISAP offered free "No Idling Zone" signs for the bus lanes. Respondents from local schools said that these resources made the interventions more feasible and sustainable.

Overall, the materials collected and endorsed by the state made them 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. For example, ISAP developed the "Fly a Flag for Clean Air" intervention as a package 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 program allowed local schools to communicate effectively 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 participating state asthma programs, 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 ensured that common evaluation indicators were collected from faculty and staff through tests given before and after they received the "What to Do in Case of an Asthma Attack," a faculty training component of UAP's school-based asthma activities. These indicators summarized the knowledge 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 these exploratory assessments, there are some limitations. Due to limited resources, the NACP evaluation team was only able to assess three programs. Therefore, the findings may not be generalizable to all state asthma programs conducting multicomponent, school-based asthma interventions. Even though the three 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, two of the three programs have only been in operation for 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 three state asthma programs expressed were important for their intervention to function optimally. Not all logic model components may be feasible or appropriate for a 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 the data to

demonstrate these reductions. 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, knowledge gained from evaluating interventions should be shared with other state asthma programs to ensure public health work is tailored based on practice-based evidence.

IMPLICATIONS FOR SCHOOL HEALTH

This assessment demonstrates that state asthma programs capitalize on their roles as facilitators, overseers, mediators, and suppliers to enable schools and school systems in creating and maintaining multicomponent, school-based asthma interventions. By adopting these roles to fit the context of their states, state asthma programs can foster effective, efficient, and sustainable asthma interventions in schools. Ultimately, these interventions have the potential to decrease the asthma burden among schoolchildren nationwide.

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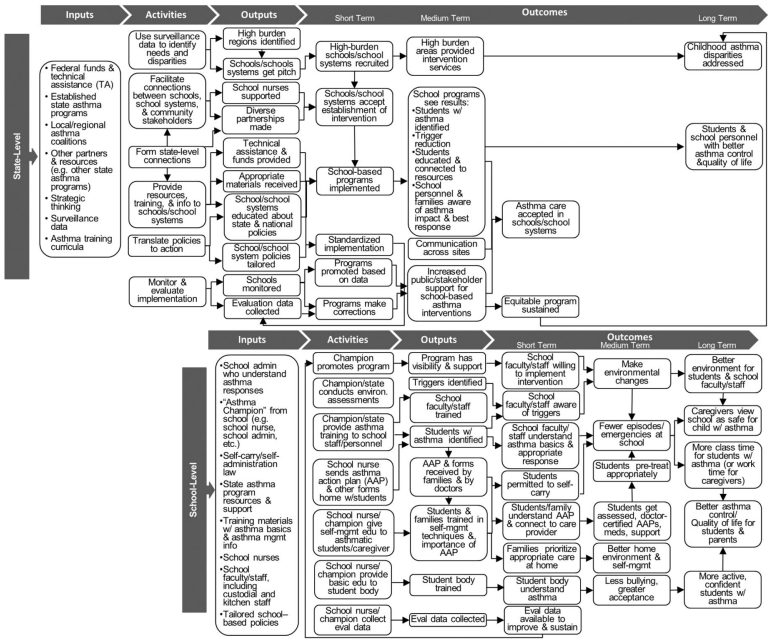

Figure 1.

General logic model for a replicable, multicomponent, school-based asthma intervention coordinated by a state asthma program.

Table 1

Evaluability assessment interview respondents and locations visited

State Asthma Program Name	Intervention Name	Interview Respondents	Locations Visited
Louisiana Asthma Management Program (LAMP)	Louisiana Asthma Friendly Schools	• Two elementary school principals	• One participating urban elementary school
		• One middle school principal	• One participating rural elementary school
		• One school maintenance worker	• One participating rural middle school
		• One LA School Nurse Organization representative	• Louisiana Department of Health and Hospitals state offices
		• Two asthma regional coordinators	
		• One former LA Department of Education representative	
		• Two state officials from the LA Environmental Epidemiology and Toxicology Section	
		• Two state officials from the Louisiana Chronic Disease Prevention and Control Unit	
		• One director of the LA Bureau of Primary Care and Rural Health	
		• Two state officials from LAMP	
Indiana State Asthma Program (ISAP)	Fly a Flag for Clean Air	• One elementary school principal	• One participating rural elementary school
		• Two elementary school nurses	• One participating suburban elementary school
		• One district school nurse representative	
		• One school district administrator	• Illinois Department of Public Health state office
		• Two state officials from ISAP	
Utah Asthma Program (UAP)	Utah School Health Initiative, including “What to do in Case of an Asthma Attack” training	• One “Winning With Asthma” coach participant	• One participating school district office
		• One college intern “What to do in Case of an Asthma Attack” trainer	• One local health department office
		• One local health department environmental health educator	• Utah Department of Environmental Quality state office
		• One school district school nurse coordinator	• Utah Department of Health state office
		• One elementary school nurse	
		• One Utah Department of Environmental Quality state official	
		• Four state officials from UAP	

Table 2

Description of the multicomponent school-based asthma interventions in three NACP state asthma programs participating in the evaluability assessment

State Asthma Program Name	Intervention Name	Year started	# of schools[1]	Key partners	Staffing	Key components	Notes
Louisiana Asthma Management Program (LAMP)	Louisiana Asthma Friendly Schools	2010	70	• Louisiana Asthma Surveillance Collaborative • Louisiana School Nurse Organization • LDHH[2] 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	• Indoor air quality • Outdoor air quality • Case detection • Asthma action plan and self-administration forms • Faculty/staff education • Healthcare provider linkage • Coach training	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	• IN Department of Education • ISDH[3] Indoor Air Program • Anthem/WellPoint Foundation • Duke Energy • Knozone program[4] • Improving Kids' Environment	1 state health department staff member	• Indoor Air Quality • Student identification Student asthma education • Asthma Action Plan • Faculty/staff education • Healthcare provider linkages • Outdoor Air Quality	Nontraditional partnerships with private healthcare 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	• Utah Department of Environmental Quality • Utah School Nurses Association • UDoH[5] School Nurse Liaison • Utah and Arizona Universities Utah American Lung Association (ALA)	Interns and support from Utah State Asthma Program staff	• Faculty/staff education • Coaches • Outdoor Air Quality	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 Extensive web-based educational resources

[1] Currently participating or have participated in the intervention since its inception.

[2] Louisiana Department of Health and Hospitals

[3]Indiana Department of Public Health

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

[5]Utah Department of Health