

School-based interventions: Where do we go from here?



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Asthma is the most common chronic pediatric lung disease, affecting nearly 6 million children in the United States. Disparities in asthma prevalence and morbidity exist, with children from minority groups living in low socioeconomic urban areas having the highest rates of asthma morbidity. Multiple modifiable factors contribute to morbidity, including access to care, environment, and adherence to guideline-based care. Despite advances in the pharmacologic treatment of asthma, suboptimal control of daily symptoms and exacerbations requiring emergency department visits and hospitalizations remains a public health problem. Even with adequate health insurance, such as Medicaid, access to good and convenient asthma care remains an issue. School-based programs are an attractive health care delivery option for children with asthma. They have the potential to identify children at risk for or with high morbidity; to provide asthma education to youths, parents, and school personnel; and to improve adherence to medication regimens. Interventions to reduce environmental exposures in schools have been developed.

A review of school-based programs and the challenges faced in implementing them has been the subject of recent publications.^{1,2} In this month's issue of the *Journal*, 2 reports attempt to build on past interventions and implement them on a wider scale. Szeffler et al³ developed Building Bridges by integrating 2 existing asthma programs, Easy Breathing and the Colorado Step Up Asthma Program, into the Hartford, Connecticut, and Denver, Colorado, public school systems. Gerald et al⁴ adapted Supervised Asthma Medicine in Schools (SAMS), an efficacious school-supervised asthma therapy program that the authors had developed in Birmingham, Alabama,⁵ for implementation in the Tucson Unified School District.

The first step in both programs was to identify children with asthma. To do this, both interventions used existing school health forms as the initial screen. Although Gerald et al⁴ included all students with asthma in their intervention, Szeffler et al³ targeted those at risk for adverse asthma outcomes. However, review of school records potentially misses students whose parents do not inform schools of their children's asthma. Alternatively, screening students using brief validated tools has the potential

to identify additional undertreated children. Although school-wide screening has been found not to be cost-effective, screening only for those with a prior diagnosis and poorly controlled asthma, as done in the Building Bridges program, has been found to be optimal.⁶

Once children with asthma have been identified, it is essential to provide interventions in which families are willing to enroll. After identification of the target population, the Building Bridges program enrolled participants and provided case management and care coordination. This was a labor-intensive intervention with face-to-face visits and coordination with primary care providers (PCPs). The SAMS program was less complex; it administered asthma medications once daily at school and delivered asthma education.

Many school-based trials, including those featured in this month's issue of the *Journal*, are limited by low enrollment. For example, the Building Bridges program enrolled only 59% of those with asthma. This figure might be an overestimate because 64% of identified asthmatic patients returned the asthma intake form, raising the possibility that some of those were eligible for enrollment. In the SAMS study 39% of eligible children with asthma enrolled in the study.

Both groups of investigators are to be commended for engaging schools in their research effort. The Tucson study demonstrates the feasibility of conducting randomized clinical trials in the school setting. The Denver/Hartford group was able to establish a collaboration among schools, community groups, and health care providers. Both studies had limitations that raise questions about the negative findings of one (SAMS) and positive findings of the other (Building Bridges). School absence for asthma as a primary outcome in Building Bridges is problematic because it can be confounded by recall, as well as by familial and psychosocial factors. Their pre-post intervention analysis for secondary clinical outcomes makes conclusions difficult. Asthma studies in inner-city children with moderate-to-severe asthma using control groups consistently show significant improvements in clinical symptoms.^{7,8} The lack of effect in giving medications at school in the SAMS study might be explained by the inclusion of children with mild asthma. Nevertheless, the negative findings raise a note of caution for implementation of school-based interventions. The SAMS study included a predominantly Mexican American population, whereas the previously successful study in Birmingham on which it was based was conducted in a predominantly African American population. The lack of effect in the Tucson school district raises the possibility that genetic, social, and environmental factors can influence the outcome of an intervention.

Multiple factors contribute to asthma morbidity in youth. The ideal school-based model that potentially addresses multiple factors needed to achieve asthma control is a network of care in which schools coordinate relationships between families, health care providers, and schools. When considering school-based programs, it is essential to consider the setting. Schools have a spectrum of resources ranging from having fully staffed school-based health centers (SBHCs) to having a full-time nurse to

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having no health personnel on site. As such, programs need to be designed for and studied in the various settings.

Given competing priorities within schools, it is essential for school-based asthma programs to be cost-effective. School-based programs have targeted predominantly children in low socioeconomic urban areas. The cost-effectiveness of such programs has been found to improve when delivered to those with more severe asthma.⁹ This provides justification for school-based programs to target children in low-socioeconomic-status urban areas, where morbidity is highest.

Going forward, school-based asthma interventions must be designed to overcome the drawbacks of current interventions. To improve the reach of interventions, we recommend that stakeholders be engaged to learn how to best enroll families in interventions and ensure commitment of required school personnel. The outcomes of the 2 studies in the *Journal* favor limiting school interventions to target those most at risk for uncontrolled asthma.

We must also acknowledge that not all schools have the same resources. Therefore, to optimally design asthma interventions, we must leverage available resources, which will result in interventions being tailored to a setting. For example, SBHCs provide an effective intervention setting to improve asthma control, particularly among disadvantaged students.¹⁰ Because SBHCs often have multidisciplinary teams of medical, mental health, and health education-trained providers, they offer a unique opportunity to reach underserved youth and an ideal setting to deliver a multifaceted program that incorporates treatment, education, and case management, including referrals for specialty care. SBHCs can use evidence-based programs and adapt them for delivery in the SBHC to improve their effect.

Schools that have full- or part-time nurses are constrained in what they can offer youth with asthma given the nurses' competing responsibilities. A realistic role is to identify students with uncontrolled asthma, deliver a dose of daily controller medication to those with persistent asthma, and/or collaborate with the students' PCPs to ensure that optimal care is delivered in schools. Communicating with PCPs, although ideal to bridge the gap in care at schools, is often limited. A feasible option is for the nurses to send a brief letter to the students' PCPs, providing them feedback regarding the youth's asthma while at school and requesting an asthma action plan for school; such approaches have been used successfully as part of more comprehensive interventions.⁸

Schools that lack a school nurse, be it part-time or full-time, are limited in what they can do to help their students with asthma. Requiring students to complete health forms that include specific questions about asthma would help identify those at high risk. The school could recommend or arrange referrals in their community for primary care, specialty care, or both. For examples, letters can be sent home to parents with a list of resources in the local area that the school has identified. Additionally, such schools might be able to form partnerships with local organizations, such as lung

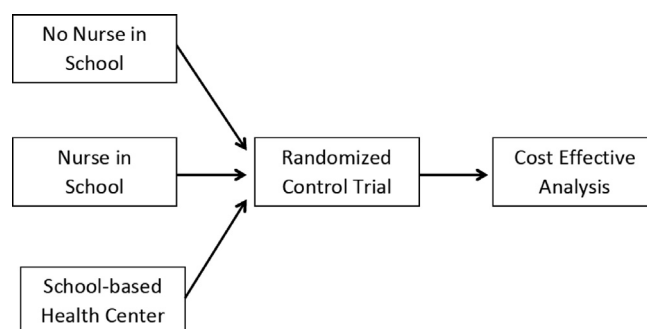


FIG 1. Proposed study designs for school-based intervention trials.

associations and visiting nurses' services, to provide asthma education to the students and parents.

A prospective randomized trial is the optimal study design for future school intervention studies. Despite barriers to conducting these studies in schools, other studies, including the study by Gerald et al.,⁴ demonstrate the feasibility. Additionally, given that health care resources are limited, the cost-effectiveness of school-based asthma programs are needed to shed light on whether the programs have sufficient value to be scalable and generalizable.

In summary, the next step is to develop school-based asthma programs tailored to real-world settings. Future studies are needed to test the effect of the interventions by using rigorous methodologies and include cost-effectiveness analyses (Fig 1).

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