

Implementation and Evaluation of a Stock Albuterol Program for Students with Asthma

To the Editor:

Approximately 10% of children in the United States have asthma (1). Nearly 60% experience an asthma exacerbation annually, leading to 750,000 emergency department visits and 200,000 hospitalizations. Asthma poses a substantial burden to school-age children, as evidenced by 10 million school absences annually (2). On average, students with asthma experience two more absences per year than students without asthma, and some students miss much more (3, 4). Low-income and minority students residing in urban areas bear an even greater burden (5–7).

Recommendations to optimize asthma care in schools emphasize having asthma action plans and quick-relief medication readily available for all students with asthma (8–11). The National Asthma Education and Prevention Program guidelines also recommend that schools ensure reliable access to asthma medications (9). Despite these recommendations, limited access to albuterol remains an important safety issue for schools and for the children with asthma they serve. We previously documented that fewer than 20% of students with asthma had access to albuterol in a large urban school district. A survey in the United Kingdom found that 86% of children with asthma have at some time been without an inhaler at school (12, 13). Barriers include difficulty obtaining asthma action plans from physicians or medication from parents (12, 14–16), lack of a source of care (7), forgetting/losing the inhaler (13), or having the inhaler run out (13). Therefore, current school policies focused on personal inhalers are insufficient to ensure access to albuterol.

To improve medication access, pediatricians can consult with schools to create policies that allow sharing of a single albuterol inhaler among multiple students (stock inhaler). The stock inhaler approach uses reusable holding chambers, eliminating the need for each student to have his or her own inhaler. Such a program can supplement individualized asthma care by providing a “failsafe” mechanism when students’ personal inhalers are not available. We recently worked with the Sunnyside Unified School District (SUSD) to implement such a policy. SUSD enrollment includes 17,500 students who attend one of 22 schools. Eighty-two percent of students are Hispanic. Of children younger than 12 years, 58% live in a household with an income below 200% of the federal poverty level. SUSD has a nurse in each school, and the SUSD nurse-to-student ratio is 1:795, which is consistent with the National Association of School Nurses recommendation of 1:750 for healthy populations.

Although SUSD nurses strive to obtain personal inhalers for every student with asthma, they are unable to do so in most cases because parents have difficulty obtaining a second inhaler for school. Students who self-carry may forget their inhaler and lack access when an attack occurs. During the intervention year, a stock inhaler was used to manage 222 discrete events in 55 children (Table 1). Ninety percent used the stock inhaler one or two times; only 10% used it more than twice.

Albuterol was purchased in part by a grant from the Sundt Foundation, and disposable holding chambers were donated by Thayer Medical Corporation.

Despite modest stock inhaler use during the implementation year (222 events across 22 schools), there were 20% fewer 911 calls ($P = 0.38$) and 40% fewer emergency medical services (EMS) transports ($P = 0.20$) than during the preimplementation year. Although neither reached statistical significance, this was not unexpected, given the combination of small sample size and rare event occurrence. These differences, approximately five EMS transports per 1,000 children with asthma, if substantiated, would equal 25,000 fewer EMS transports per year among the 5 million children with asthma in U.S. public schools.

Our experience indicates that a stock inhaler program can be successfully implemented. Program acceptability was high among school nurses, parents, and students. Qualitative interviews with all 22 school nurses indicated they felt greater peace of mind and lower job stress for themselves and better asthma outcomes for their students. Telephone interviews with parents and focus groups with students indicated they felt the program created a safer school environment.

All participants reported that stock inhalers provided an important stopgap when personal inhalers were not available, as was the case for 70% of students. Nurses felt comfortable using a stock inhaler, but were concerned that administering it in emergency situations in the absence of a documented physician diagnosis could expose them to liability. After similar concerns were raised with Missouri’s stock inhaler law, Missouri amended it to indemnify “good faith” use in all students and school personnel (17), as has been done in several states with regard to epinephrine use.

Nurses reported that they did not try as hard to get individual inhalers at school when there was a stock inhaler available, and our results indicated that a lower percentage of children with asthma had a personal inhaler (26% vs. 29%) after the stock inhaler protocol was implemented. Future study is needed to ensure that stock inhaler policies do not weaken students’ responsibility to maintain personal inhalers, and therefore reduce access in other settings.

Nurses also reported several unanticipated uses of the stock inhaler, such as use in students before exercise, when the student had forgotten his personal inhaler, or use in staff members. Such situations should be considered by districts when implementing stock albuterol policies.

Others have reported success with implementation of stock albuterol inhaler programs in the United States. Murphy and colleagues report implementation of a stock inhaler program in Omaha, Nebraska, involving 78 schools and 45,000 students (18). During a 5-year period between 1998 and 2003, a stock inhaler was used in 94 instances. Two-thirds of students treated via the protocol lacked either an asthma action plan or a personal inhaler. Rood and colleagues report outcomes of House Bill 1188 that enabled use of stock albuterol in Missouri schools (17). Within a year of passage, 48% of students had access to a stock inhaler, and 56% of school nurses reporting using it at least once. Nurses reported high satisfaction with the program, citing greater piece of mind and fewer 911 calls; however, they also reported liability concerns related to its use and that caregivers might be less likely to provide personal inhalers. Other countries, such as the United Kingdom, have passed legislation that allows schools to buy spacers and inhalers from a pharmacy without a prescription for emergency use in children with asthma when their personal inhaler is not available (13).

Table 1. Pre- and postintervention data on asthma prevalence and stock albuterol use among children with asthma

	Preintervention, 2012–2013	Postintervention, 2013–2014	P Value
Enrollment (September 1)	17,313	16,784	
Students with asthma	1483 (8.6%)	1487 (8.9%)	
Students with personal asthma inhaler	436 (29%)	390 (26%)	
Number of stock albuterol administrations	0	222	
Number of 911 calls (per 100 students with asthma)	36 (2.43 per 100)	29 (1.95 per 100)	0.38
Number of emergency medical services transports (per 100 students with asthma)	18 (1.21 per 100)	11 (0.74 per 100)	0.20

On the basis of our experiences and those reported by others, we conclude that stock inhaler programs are feasible, inexpensive, and well-accepted by schools and families. Physicians can work with schools to write standing orders for albuterol and a prescription for its use. Resources to assist clinicians are now available from the American Lung Association, which has created a model policy on stock bronchodilators (<http://www.lung.org/lung-disease/asthma/creating-asthma-friendly-environments/asthma-in-schools/asthma-medication-in-schools.html>).

The major barrier to widespread dissemination of stock albuterol policies is ensuring that state laws enable stock albuterol use and indemnify good faith use. At this time, there are only five states that have such specific legislation. Enabling legislation is not required to implement a stock inhaler program; however, these laws provide specific guidance to school districts, ensure personnel are indemnified for their good faith use, and reassure the public that safe and effective care is being delivered. Therefore, asthma and school health advocates can help accelerate the availability of stock albuterol medication at school by engaging with advocacy organizations, such as the American Lung Association, to enact such laws.

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