

The Healthy Learner Model for Student Chronic Condition Management—Part II: The Asthma Initiative

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ABSTRACT: The Healthy Learner Asthma Initiative (HLAI) was designed as a comprehensive, school-community initiative to improve asthma management and produce healthy learners. National asthma guidelines were translated into components of asthma management in the school setting that defined performance expectations and lead to greater quality and consistency of asthma care. The HLAI incorporated evidence-based practice and introduced the role of the asthma resource nurse. Leadership, capacity building, and strong partnerships among school nurses, students, families, and health care providers were essential to the implementation and sustainability of the HLAI. Professional school nursing and evaluation were defined as key requisites to a successful initiative. Evaluation results indicated positive effects on nursing practice, fewer asthma visits to the health office, and better attendance among students who received asthma care in the school health office. The HLAI provided the basis for development of the Healthy Learner Model for Student Chronic Condition Management.

KEY WORDS: chronic care model, collaboration, evaluation, evidence-based practice, pediatric asthma, school nursing

INTRODUCTION

This article describes a school-community initiative undertaken to improve the management of asthma and to develop a comprehensive model for manage-

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ment of students' chronic health conditions. The Healthy Learner Asthma Initiative was initiated to improve asthma management and reduce the impact of asthma on students' health, school attendance, and academic success. It resulted in an effective asthma management program, verified through extensive evaluation (Splett, Erickson, Belseth, & Jensen, 2006) and the development of the Healthy Learner Model for Student Chronic Condition Management (Erickson, Splett, Mullett, & Heiman, 2006) (this issue, p. 310).

BACKGROUND

Like many urban school districts, Minneapolis Public Schools (MPS) faces significant challenges in promoting the health and safety of students as well as meeting the needs of the increasing numbers of students with chronic conditions that have an impact on their learning. In MPS, 12% of students have asthma.

This compares with 7.9% of children under 18 years of age nationally and 5.8% in Minnesota (U.S. Department of Health and Human Services [USDHHS], 2005). The student body of MPS is diverse, with over 70% students of color and over 22% from families where the primary language is not English (Hmong, Spanish, and Somali are common). In addition, 65% are eligible for free or reduced price meals, and 15% qualify for special education services.

Health services are provided to students in 88 schools by a health team comprised of a school nurse and either a health assistant or a licensed practical nurse (LPN). School nurse allocations vary at school sites from one half-day to five days per week based on enrollment, special education programs, number of students with complex health care problems requiring intensive nursing care, and the school principal's decisions about funding additional health resources. Increases in student health needs and the diversity of the student body occurred at the same time that MPS was facing severe budget reductions. The needs were rapidly becoming greater than the ability to provide adequate services.

The superintendent's question, "Why do we have health services in schools?" was the catalyst for bringing education and health care leaders together around a common vision for children's health in Minneapolis. A Future Search Vision Conference was initiated by MPS that included school staff, families, and representatives from the health care community. The Future Search resulted in identification of several goals to improve both the health and learning for students. It led to the creation of the Healthy Learner Board (HLB), a partnership of public and private health care organizations and the school district, and a series of initiatives that improved asthma management in schools (see timeline in Table 1). HLB partners committed both fiscal and human resources for initiatives to address selected goals and promoted system changes in their organizations and the community to improve students' health and academic success (Perme & Mullett, 2005).

Children with properly managed asthma can lead healthy, active lives, be in school learning, and avoid emergency department visits and hospitalizations for asthma.

Following the successful "No Shots, No School" initiative to improve immunization rates in MPS, the HLB tackled the more complex challenge of developing and testing a comprehensive model to address chronic disease management of children. Asthma was the condition selected based on the high prevalence of asthma in MPS, the increasing asthma-related mor-

Table 1. Healthy Learner Asthma Initiative Timeline

1996	Future Search Visioning Conference Asthma Planning Group created to provide direction to Minneapolis Public Schools (MPS) in collaboration with the American Lung Association of Minnesota
1997	Healthy Learner Board established "No Shots, No School" Initiative
1998	Planning for Healthy Learner Asthma Initiative (HLAI) initiated
1999–2000	Work groups established Development and pre-testing of HLAI procedures and tools in selected K-8 schools
2000–2001	Evaluation in 8 schools with 8 matched control schools Parent Asthma Survey I
2001–2002	Implementation in all K-8 schools Development of asthma curriculum for high school health classes Parent Asthma Survey II Controlling Asthma in American Cities Project Planning Grant (1-year CDC funding)
2002–2003	Continuation in K-8 schools Implementation in high schools Controlling Asthma in American Cities Implementation grant (5-year CDC project)
2003–2004	Continuation in all K-12 schools Inclusion of asthma interventions in early childhood screening and before- and after-school programs Replication and evaluation in St. Paul Public Schools (SPPS) Adapted by Minnesota Department of Health for statewide dissemination
2004–2005	Continuation in MPS and SPPS Minnesota Department of Health statewide asthma management training of school personnel "Steps to a Healthier U.S." grant including asthma and diabetes components (5-year CDC project)
2005–Present	Continuation in MPS and SPPS Components implemented in other Minnesota schools

Note. CDC = Center for Disease Control and Prevention.

bidity and mortality in the community; and recognition that asthma can be well controlled by following national evidence-based guidelines from the National Heart, Lung, and Blood Institute (NHLBI) (National Institutes of Health, 1997). Children with properly managed asthma can lead healthy, active lives, be in school learning, and avoid emergency department visits and hospitalizations for asthma (Lurie, Bauer, & Brady, 2001). From 1999 to the present, MPS and partner organizations have collaborated to develop, implement, evaluate, and now sustain the Healthy Learner Asthma Initiative (HLAI). The HLAI has also been replicated in other school districts.

The experience with the HLAI led to the identification of essential elements of chronic disease management for students and the development of the

Healthy Learner Model for Student Chronic Condition Management described in Part I by Erickson, Splett, Mullett, and Heiman (2006) and published in this issue (p. 310). The Healthy Learner Model has seven elements and two requisites. The elements are: (a) leadership, (b) evidence-based practice, (c) capacity building, (d) chronic disease resource nurse, (e) healthy learner, (f) partnership with families, and (g) partnership with health care providers. The two requisites are professional school nursing and evaluation. The purpose of this article is to describe the HLAI within the elements of the Healthy Learner Model.

HEALTHY LEARNER ASTHMA INITIATIVE

Element 1: Leadership

Motivated by a vision of optimal asthma management of school-age children, the Healthy Learner Board committed resources to the creation of the HLAI. The Health Related Services (HRS) department of MPS was responsible for development and implementation of the initiative. An Asthma Team, consisting of a nursing service manager, an asthma initiative coordinator, four school nurses, and an evaluator, led this effort. An important decision made by the HLB leadership was to require evaluation to determine the effectiveness of the initiative and its potential for expansion to other districts. Continuous input of evaluation data was critical for informing program decisions, refining the HLAI, and securing future funding. HLB members championed the initiative to improve asthma management, identified and implemented needed changes within their respective systems, and facilitated ongoing communication and collaboration between the MPS and community (Johnson, 2003). HRS and HLB leadership was essential for building an effective, systemic, integrated model for childhood asthma management and for sustaining the HLAI over time. Sustainability requires the continued commitment of school district and community leaders to identification and creative allocation of resources that support not just asthma management but maintain all elements of the Healthy Learner Model in a continuously changing environment.

Element 2: Evidence-Based Practice

The HLAI asthma management guidelines for the school setting evolved from review and synthesis of (a) Guidelines for the Diagnosis and Management of Asthma (National Institutes of Health, 1997); (b) the National Asthma Education and Prevention Program (2002); (c) current literature on asthma identification and intervention in schools; and (d) the experience and advice of community, state, and national asthma experts. The guidelines were further refined following the publication of Strategies for Addressing Asthma within a Coordinated School Health Program (Centers

for Disease Control and Prevention [CDC], 2002) and updates of the NHLBI Guidelines (2002).

Asthma management guidelines and recommendations were translated into practice in an asthma procedure guide.

Work groups with representatives from school districts, hospitals and clinics, community organizations, public health organizations, and families reviewed evidence and made recommendations for HLAI strategies, procedures, and tools and for staff development and training. Asthma management guidelines and recommendations were translated into practice in an asthma procedure guide (MPS Health Related Services, 2000). The Procedure Guide included staff performance expectations, asthma screening questions (Bauer, Lurie, Yeh, & Grant, 1999; Wolf, Berry, O'Connor, & Coover, 1999), clinical pathways for asthma emergencies in the school setting, documentation forms, educational resources, community resources, skill validation tools, and tools to communicate with families and providers in clinics and hospitals.

Element 3: Capacity Building

In order for evidence-based practices to be adopted in MPS, changes were needed in asthma knowledge and skills of staff, availability of tools, equipment and supplies, and systems to support best practices. Staff development and training was planned and implemented as an ongoing, incremental process. It included group education and individual coaching and mentoring.

The "Components of Asthma Management in the School Health Office" and "Core Tasks" contained asthma management guidelines and defined performance expectations specific to job classification, including delegated nursing care procedures (MPS Health Related Services, 2004). School nurses focused on assessment of asthma severity, care for students with complex needs, student self-management, and care coordination. LPNs and health assistants were responsible for routine asthma care and delegated nursing care based on license, training, and job descriptions.

At the beginning of the HLAI, all school health staff received intensive asthma education that included asthma physiology, disease manifestations, types of asthma medications, and national guidelines for asthma management and care expectations. The content of training for skill development was directly linked to performance expectations. It included routine and emergency care, proper inhaler technique, assessment of symptoms and severity level, communication with families and health care providers, and health office

asthma equipment. A carefully designed student asthma record served as a reminder of care components and streamlined the documentation of asthma care, student counseling and teaching, and care coordination. All health offices were supplied with peak flow meters, spacers, nebulization equipment, and metered dose inhaler trainers.

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Maintenance of staff capacity was assured through ongoing education, training, and reinforcement. Asthma training was incorporated into orientation of new health staff. Reinforcement and updates were integrated into all staff meetings, annual skills day training, and weekly communiques from HRS.

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Element 4: Chronic Disease Resource Nurse

HRS created the position of the Asthma Resource Nurse (ARN) to assist with the development, implementation, and evaluation of the HLAI and to support the expanded role of school nurses in managing asthma. As the position evolved, the ARN became an expert in asthma management, an advocate for evidence-based practice, and a champion for change.

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At the beginning of the initiative, four experienced school nurses with an interest in becoming asthma experts were designated as ARNs (2 FTE total). ARN time was reduced (to the current level of one ARN at .6 FTE) as the level of staff asthma expertise improved and asthma guidelines became embedded into daily health office practice.

ARNs functioned at the school, district, and community level. They worked in the schools as asthma educators, role models, coaches, and consultants to nurses and other health staff. They assisted the staff with case-finding activities, provided guidance for student asthma care and education, supported care coordination efforts, and assisted with problem solving for students with complex needs. ARNs provided individualized support to build staff asthma knowledge and skills through assessment of competencies and learning needs using direct observation and skill validation tools.

At the district level, ARNs worked in partnership with other departments (i.e., curriculum, athletics, environmental health, and transportation) to ensure the systematic implementation of the HLAI. They were available to work with families, school principals and staff, and health care providers to resolve challenges such as continuity of care for homeless and highly mobile students. They established a computerized system for tracking students with moderate to severe asthma as they transitioned to new school sites. ARNs supported care coordination by gathering and providing information about district and community resources, contact persons, and program eligibility (e.g., insurance, transportation for medical appointments, medication sources for the uninsured, or community resources for home modifications to reduce environmental triggers). They also assisted with asthma data collection, interpretation, and program adjustments based on findings.

At the community level, the ARNs served as the liaison between MPS and health care providers and community agencies and participated in local and state asthma committees.

HRS management committed district nursing resources to maintain the ARN position. To assure clinical expertise, HRS provided the ARN with opportunities for continuing education, credentialing, and community partnering. The current ARN has become a nationally certified asthma educator. Recently, the ARN role was expanded to chronic disease resource nurse to improve management of other chronic con-

ditions using the Healthy Learner Model, including diabetes and life-threatening allergies.

Element 5: Healthy Learner

Students are the central focus of the HLAI, and the goal is to assure that students' asthma is well managed and students are in school actively participating in the educational process. Students are encouraged to be increasingly involved in their asthma care as appropriate to their age and developmental levels. As students progress toward self-management and asthma control, they become healthy learners who can function at their full potential physically, socially, emotionally, and academically.

Students with asthma are identified using annual health information forms, emergency contact cards, physical exam reports, and medication authorizations. School nurses take a proactive approach by assessing students and prioritizing them by asthma severity, level of control, and school limitations (Bateman, Boushey, Bousquet, Busse, Clark, Pauwels, & Pedersen, 2004). To achieve the greatest impact, the decision was made to initially focus HLAI efforts on students with poorly controlled or moderate to severe persistent asthma. This decision reflects the reality of balancing the targeted asthma interventions with other health demands of the school population and with health staffing levels.

To meet students' needs, pre-exercise medications were administered more consistently and controller medications were given at school to students with low adherence at home.

Asthma interventions are individualized to best meet the learner's needs. For example, to obtain information on students' asthma status and treatment plans, nurses requested current asthma action plans (AAP) and had parents or older students complete asthma questionnaires. To meet students' needs, pre-exercise medications were administered more consistently and controller medications were given at school to students with low adherence at home.

Age-appropriate asthma education for K-8 students was defined, and educational resources were identified and available in each school (Betz, 2000; Meng & McConnell, 2003). Nurses assessed students' asthma knowledge and self-management skills and provided needed counseling and education. They instructed students on correct techniques for measuring peak flow and using inhalers with spacers, symptom recognition, and trigger identification and avoidance.

Because few high school students with asthma were seen in the health office, an asthma curriculum was

developed to be incorporated into health classes. "Active with Asthma" was designed as two, 50-minute sessions co-taught by school nurses and health teachers (Minneapolis Public Schools, HRS, 2005). An advantage of this strategy was that all high school students with asthma as well as their peers learned about asthma.

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Episodic care included assessment and monitoring of respiratory symptoms, medication administration, teaching, and family notification using a standard form. When necessary, nurses initiated care coordination activities to address barriers to good asthma control and to support the students' physical, psychosocial, and emotional well-being.

Element 6: Partnership With Families

The HLAI recognized the necessity of partnership between families and school nurses for effective management of students' asthma. Focus groups were conducted to determine family expectations regarding school involvement in providing asthma care to their child. Parents said that they expected to be notified on the same day any time their child experienced asthma problems at school. They viewed the school setting and school health personnel as trusted sources to learn information about asthma. In addition, they respected school nurses and perceived them as caring.

A survey of MPS parents of students with asthma provided evidence that many students' asthma was not well controlled. Many parents falsely viewed daytime and nighttime symptoms as "normal for children with asthma," and 85% incorrectly believed their child's asthma was in good control. Survey findings confirmed that many parents did not understand good asthma control, reinforcing that asthma education for families was imperative and ongoing school nurse-family partnerships were important.

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Mechanisms to exchange information with families were established, including an Asthma/Breathing Problem Visit Notification (Figure 1). The notification

nurses used it to determine asthma severity level and control and to develop an individualized plan of care.

School nurses facilitated communication between families and health care providers, empowering parents to advocate for the best care for their child. Facilitation goals include ongoing health care at a “medical home,” appropriate asthma medication at home and school, and a current AAP. School nurses provided parents with information and documentation of their child’s asthma status that could be given to and discussed with their child’s health care provider. In addition, school nurses identified and provided referrals to community resources to support parent efforts in caring for their child’s asthma.

Asthma education was provided consistently to parents by school nurses in person or on the phone, by written materials, and through interpreters in a family’s native language. A series of asthma education handouts for students and families was developed that addressed topics such as asthma control, home environment, and the importance of yearly flu shots. Materials were written at a 6th grade reading level, piloted and revised with parent input, and translated into several languages. Families were notified of culturally-specific asthma education opportunities in the community. An empowering approach to asthma education was used to build parents’ understanding, skill, and confidence in managing their child’s asthma. This approach strengthened parents’ ability to ask informed questions of providers, make appropriate decisions, and increased their awareness of community resources.

Element 7: Partnership With Health Care Providers

Two areas of focus for the partnership between health care providers and schools were a commitment to NHLBI guidelines for asthma care (National Institutes of Health, 1997; National Asthma Education and Prevention Program, 2002), as well as more effective communication and care coordination. A Clinical Advisory Work Group was established to provide direction on the application of NHLBI guidelines to asthma management in schools and clinics and the development of improved systems and mechanisms for communication among health providers, parents, and school health staff.

To facilitate changes in clinics, a local managed care organization collaborated with the HLB and MPS to assist with clinical performance improvement projects in seven clinics. Clinics that provided medical care to large numbers of MPS students with asthma were targeted. Objectives were to improve the quality of asthma care, increase the use of AAPs, and streamline mechanisms to transmit AAPs to schools. A revised AAP was developed that reduced paperwork for clinics, parents, and schools. The AAP was not only the med-

ical treatment plan, but, when signed by health care provider and parent, it also served as the medication order, parent and provider authorization to administer medication at school, and parent consent to exchange health information. At HRS, a designated number was established for clinics to fax AAPs. As a result, the number of AAPs received by schools increased from 25 to over 524 during the first year of the initiative. Having an AAP available was highly valued by school health staff (also see Borgmeyer, Jamerson, Gyr, Westhus, & Glynn, 2005).

Another tool was jointly developed that improved communication and care coordination. The Asthma Medical Request/Referral (Figure 2) was used by school nurses to communicate concerns about a student’s asthma status; to alert the health care provider of the need for medical evaluation; to request a public health nurse or other referral; or to request an adjustment in asthma medication or an updated AAP. As evidence of the benefits of health care provider and school partnerships, reports from school health staff indicated, “health care providers now think of the school as a partner in the student’s asthma management” and “students and families benefit when clinics and schools are on the same page.”

Requisite 1: Professional School Nursing

A fundamental requisite of the Healthy Learner Model and the effectiveness of the HLAI was the role of the professional school nurse. The professional school nurse is a baccalaureate-prepared nurse who possesses knowledge, skills, and expertise in the education, counseling, case management, and care coordination across school, health care, and community systems for children with chronic health conditions. HLAI supported current nursing standards that emphasized evidence-based practice (National Association of School Nurses and American Nurses Association, 2005; Praeger, 2005).

School nurses’ expertise and advocacy for student health was integral to all elements of the model in addition to their key roles in working with students and partnering with families and health care providers. Through the HLAI, school nurses not only enhanced their own practice but they were instrumental in driving improved asthma practice in clinics. Improved practice came by sharing documentation of students’ asthma symptoms and medication use or misuse, requesting AAPs and community and medical referrals, and identifying needs for medication, supplies, and asthma education for parents and students.

Requisite 2: Evaluation

Evaluation was an integral part of all phases of the development, implementation and ongoing management of the HLAI. Asking questions, using carefully



Subjective/Objective	Student _____ Student ID# _____ DOB _____ School _____ Parent/Guardian _____				
	<p>Dear Health Care Provider _____ (name if known), this student was seen in the school health office for problems with his/her asthma. The following is a brief summary of school observations:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Presenting symptoms: <input type="checkbox"/> Cough <input type="checkbox"/> Wheeze <input type="checkbox"/> Tight chest <input type="checkbox"/> SOB <input type="checkbox"/> Respiratory rate _____ <input type="checkbox"/> Acute respiratory distress <input type="checkbox"/> Other _____ </td> <td style="width: 50%; padding: 5px;"> Precipitating Factors: <input type="checkbox"/> Cold symptoms <input type="checkbox"/> Exercise <input type="checkbox"/> Cold air <input type="checkbox"/> Other trigger/irritant/allergen exposure (specify) _____ <input type="checkbox"/> Reports not taking daily long term control medicine regularly <input type="checkbox"/> Other _____ </td> </tr> <tr> <td colspan="2" style="padding: 5px;"> Medication in the health office: <input type="checkbox"/> Quick-relief medicine _____ _____ via MDI with spacer _____ via nebulizer _____ via breath-actuated MDI <input type="checkbox"/> Long term Control medicine <input type="checkbox"/> Other _____ <input type="checkbox"/> No medicine is in the health office </td> </tr> </table>	Presenting symptoms: <input type="checkbox"/> Cough <input type="checkbox"/> Wheeze <input type="checkbox"/> Tight chest <input type="checkbox"/> SOB <input type="checkbox"/> Respiratory rate _____ <input type="checkbox"/> Acute respiratory distress <input type="checkbox"/> Other _____	Precipitating Factors: <input type="checkbox"/> Cold symptoms <input type="checkbox"/> Exercise <input type="checkbox"/> Cold air <input type="checkbox"/> Other trigger/irritant/allergen exposure (specify) _____ <input type="checkbox"/> Reports not taking daily long term control medicine regularly <input type="checkbox"/> Other _____	Medication in the health office: <input type="checkbox"/> Quick-relief medicine _____ _____ via MDI with spacer _____ via nebulizer _____ via breath-actuated MDI <input type="checkbox"/> Long term Control medicine <input type="checkbox"/> Other _____ <input type="checkbox"/> No medicine is in the health office	
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Medication in the health office: <input type="checkbox"/> Quick-relief medicine _____ _____ via MDI with spacer _____ via nebulizer _____ via breath-actuated MDI <input type="checkbox"/> Long term Control medicine <input type="checkbox"/> Other _____ <input type="checkbox"/> No medicine is in the health office					
School absences this academic year: # _____ Comments: _____ _____					
Other data/comments: _____ _____ _____ _____					
Assessment	<p>To support this student's asthma management at school, please send/order/arrange:</p> <input type="checkbox"/> Medical evaluation of this child <input type="checkbox"/> Current Asthma Action Plan signed by the health care provider (may serve as medication consent form) <input type="checkbox"/> Medication / spacer /PF meter for school (circle item) <input type="checkbox"/> Assess need for / adjustment of controller medication/s for this child <input type="checkbox"/> Home care referral (for asthma education, environmental assessment and follow-up in home) <input type="checkbox"/> Asthma Case Management (for care coordination, arranging education, transportation, follow-up) <input type="checkbox"/> Other _____ <input type="checkbox"/> Please respond: <input type="checkbox"/> by _____ (date) <input type="checkbox"/> after this child is seen in clinic				
	School Nurse _____ Phone/pager# _____ Date _____				
Plan	<p>Health Care Provider Response:</p> <input type="checkbox"/> Clinic will contact student / family to schedule an asthma check-up / evaluation <input type="checkbox"/> See attached new or revised Asthma Action Plan <input type="checkbox"/> Continue with current Asthma Action Plan <input type="checkbox"/> Medication / spacer / PF meter refill called to student's pharmacy <input type="checkbox"/> Medication/s approved for use at school (list) _____ <input type="checkbox"/> Refer to PHN / Home Care / Case Management (specify agency or program, if preference) _____ <input type="checkbox"/> Above request/s by school nurse is/are approved <input type="checkbox"/> Other _____				
	Health Care Provider name/signature _____ Clinic staff name/signature _____ Date returned _____ FAX or SEND TO fax # _____ -or- address _____				

Figure 2. Asthma Medical Request or Referral

chosen methods to gather relevant data, assessing and interpreting the data, and applying findings in planning and decision-making is consistent with the principles of evidence-based practice, quality manage-

ment, and evaluation. The payoff of this was a well-functioning program, embedded in system changes that foster consistent practice with a broad base of support and evidence to sustain the HLAI.

EVALUATION OF THE HEALTHY LEARNER ASTHMA INITIATIVE

Three types of evaluation were used in the HLAI (Centers for Disease Control and Prevention, 1999). **Formative evaluation** was used in the beginning of the initiative to get input and pre-test program procedures and tools as they were being developed. **Process evaluation** tracked the implementation of the HLAI to assure that practices followed guidelines. Qualitative and quantitative data illuminated successes and barriers and identified where adjustments were necessary. **Outcome evaluation**, including a formal effectiveness study, was conducted using a randomized community trial in eight elementary and middle schools with eight matched schools as controls. A range of evaluation methods was used to gather data from various perspectives and produce useful information to strengthen the elements and guide the initiative. Regular consideration of evaluation findings by those leading the initiative assured an evidence-based initiative that set high expectations for performance but included capacity building and support to achieve expectations (Splett, Erickson, Belseth, & Jensen, 2006).

Evidence-based practice included review of research and expert recommendations for application to schools and clinics, and pre-testing of procedures and tools by potential users (health office staff, families, health care providers) to assess content, clarity, relevance, and usability. This early input assured forms and procedures were user-friendly and fostered acceptance and adoption by school and clinic personnel.

Capacity building was evaluated using observations by the Asthma Team, skill validation checklists, and a survey of health staff to assess asthma knowledge, skill and confidence doing asthma management activities, and quality of training. Skill validation checklists completed by the ARN and school nurses were used to determine the competence of health staff and identify needs for additional training and support. Identified needs were addressed individually or in group training for all staff. Evaluation findings showed that, as anticipated from dissemination and adoption theory (Rogers, 1995), adoption of the HLAI by nurses and health assistants followed a gradual and predictable pattern. Each month, more HLAI practices were incorporated into their routine work. By the end of the year, staff could be categorized into thirds as fully implementing all aspects of the initiative, implementing some, or just getting started. A year later, two-thirds were consistently implementing most aspects of the HLAI.

Health office staff reported increased job satisfaction with their improved skills and expanded role. School nurses were able to practice at a higher level and see a positive impact of their work on the health of students.

The value of the asthma resource nurse was assessed

through staff surveys. Health staff reported that the support of the ARN was the most valuable part of their training for asthma management.

Healthy learner evaluation focused on outcomes. HLAI outcomes related to the healthy learner were measured through nurses' reports of asthma activities, record review, and analysis of school attendance data. The comparison of eight schools implementing the HLAI to eight matched control schools following usual care found significant differences in care. Asthma initiative schools had greater use of peak flow measurements, symptom assessment, asthma education, and controller medications, and greater availability of asthma medications in the health office. For students who received asthma care in the health office, there was a shift from episodic visits for problems to more preventive care visits. This resulted in an overall reduction in the number of visits to the health office. Specifically, the comparison study found 119 health office visits (including 23 episodic visits) per month per 100 students with asthma in control schools versus 91 visits (including 13 episodic visits) per month per 100 students with asthma in the asthma initiative schools. In addition, receiving asthma management care through the school health office appeared to have a positive impact on school attendance (Splett, Erickson, Belseth, & Jensen, 2006).

Partnership with families included focus groups and surveys of parents early in the HLAI and ongoing tracking of communication with parents following episodic visits. Culture and language-specific focus groups held with parents of students from grades K-12 identified parents' desires and expectations of the school's involvement in asthma care for their children. Parent surveys were used to gather information about students' asthma symptoms and care. In February 2001, parents reported in the previous four weeks, a majority of their children had experienced problems that had a negative impact on quality of life, including nighttime symptoms (57%), interference with normal activities during the day (50%), and school absences (47%) due to asthma. Almost 7% of children were using quick relief medications more than four times a day. Further, 43% of parents missed one or more days of work in the past month due to their child's asthma.

Documentation of parent communications indicated that parent contact increased from infrequent to over 60% of episodic visits. Health office staff experienced frustration when parents could not be reached or engaged in their child's asthma management. To address this, an in-service education program about strategies for working with at-risk families was provided, and ARNs offered greater support in this area.

Health care provider evaluation methods included input in procedure and form development, reports of clinical improvement efforts, and counts of medical requests sent to clinics and AAPs sent from clinics to

schools. Nurses initiated over 300 medical requests throughout the school year. About half resulted in direct responses from health care providers, such as scheduled clinic visits, new medication orders, or AAPs. Availability of AAPs greatly increased; clinics sent new AAPs for over 20% of students with asthma each year.

Sustainability of the HLAI was evaluated through quarterly reports of asthma management activities by nurses, AAP counts, and ARN observations. Monitoring of asthma activities in the health office over the past five years showed that changes have been sustained in asthma care for students even though resources allocated to project have declined and general budget cuts have been made across the district. In addition, the number of AAPs received exceeds 600 each year, and health office staff report more frequent communication with families and health care providers (Splett et al., 2006).

Evaluation was crucial throughout development, implementation, and long-term sustainability of the HLAI. Evaluation data aided decisions about program plans and adjustments; it also informed leaders about the progress of the HLAI and its impact on important process and outcome criteria. Evaluation assured judicious use of limited school health resources, an issue critical in a school district facing extensive budget constraints. In addition, evaluation findings from the HLAI helped secure other funds to extend and replicate the work of the HLAI (Keysser, Splett, Ross, & Fishman, 2006).

IMPLICATIONS FOR SCHOOL NURSING PRACTICE

The availability of national evidence-based asthma guidelines was an impetus for action and provided a common base for cooperation and collaboration between the school system and the health care system. It also facilitated a consensus about appropriate asthma care and expected outcomes across the community. This supported continuity of care, and families benefited from getting consistent information and having that information reinforced by caregivers in clinics and at school.

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A wide range of intervention strategies was used to reach, teach, and bring about changes in students, parents, school health staff, teachers, coaches and other school staff, and health care providers. These strat-

egies reached the greatest number of stakeholders and were effective when they were planned, sequential, interactive, targeted, and customized for the specific student or adult audience. For example, interventions for elementary students used direct asthma care and monitoring, whereas the asthma curriculum was an effective way to reach high school students and partner with health teachers. A quarterly asthma newsletter was developed for health teachers, while coaches received a wallet-sized asthma first aid card with their training.

A challenge reported by school staff was working with students from families with complex social, emotional, and physiological issues. Well-designed asthma tools, communication mechanisms, ARN coaching, and community partnerships enabled the school nurse to support family efforts in caring for their child and be more effective with students and their families while recognizing cultural diversity.

Plans for the HLAI included a staged approach to program development and implementation. The first focus was students with moderate to persistent and poorly controlled asthma, where the greatest impact was likely. The initiative built on each success and incrementally addressed other needs. Examples of additional asthma efforts were the inclusion of asthma case finding, referral, education in early childhood screening, and the development of a district process procedure for determining if a student's asthma status required special district transportation.

The systematic development, phased implementation, and evaluation of all aspects of the comprehensive HLAI resulted in a well-defined asthma management program that could be shared with colleagues and replicated in other districts (Managing Asthma in Minnesota Schools, 2004). This work has also led to the articulation of the Healthy Learner Model for Student Chronic Condition Management (Healthy Learner Model) that has been applied to asthma, diabetes, and anaphylaxis. This model appears to have application to other chronic conditions that are common in school-age children. Criteria to consider when determining Healthy Learner Model application or replication include: (a) prevalence of chronic conditions; (b) intensity of school nursing time and expertise required; (c) impact on students' school attendance, participation, and safety; and (d) requirements for accommodations during school-related activities.

Another significant outcome of the HLAI was its effect on staff. Clear expectations and training got everyone on the same page at the same time, enhanced collegial relationships, and led to high-quality, consistent care with positive outcomes for students. School nurses experience professional growth and personal satisfaction by participating in a well-designed initiative that clearly demonstrated health benefits for students.

CONCLUSION

The HLAI is a comprehensive, integrated approach to evidence-based asthma management for school children. It requires time and resources to implement, but the benefits are great. The HLAI enhances school nursing practice for students with asthma by enabling school nurses to function using their expertise, skills, and time for planning, care coordination, and activities that ensure student health, safety, and positive education outcomes. School nursing practice, guided by evidence-based principles and informed by ongoing evaluation, results in high-quality care for children and promotes educational success, including improved attendance and active participation in learning. Systematic development and rigorous evaluation over seven years has produced an effective program for asthma management and the Healthy Learner Model for Student Chronic Condition Management.

School nursing practice, guided by evidence-based principles and informed by ongoing evaluation, results in high-quality care for children and promotes educational success, including improved attendance and active participation in learning.

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