

Managing Asthma in Schools: Lessons Learned and Recommendations

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INTRODUCTION

Five key lessons for school-based asthma programs emerge from the research and case study findings reported in this special issue and from previous literature and the editors' experiences. Following a discussion of these 5 key lessons, we present our vision for the next generation of school-based programs.

LESSON 1: ESTABLISH STRONG LINKS TO ASTHMA CARE CLINICIANS

A key component that is missing in many school-based asthma programs is effectively ensuring appropriate and ongoing medical care. Self-management education has been shown to improve self-management skills and self-efficacy,¹ but it cannot substantially reduce morbidity without appropriate medical care and pharmacotherapy. Although evaluations include a wide range of study designs, the collective experience indicates that programs that either provide asthma care directly or ensure adequate links between the school and the student's asthma care clinician have successfully reduced asthma morbidity.²⁻²⁰ School-based asthma management that is coordinated with the students' medical care includes obtaining asthma action plans and school medication forms and ensuring access to quick-relief bronchodilator medication throughout the school day.

However, ensuring appropriate medical care has been difficult for many school-based asthma programs, particularly in low-income areas. Even when care is available, it is often not used. Difficulties arise due to lack of clinicians, lack of family involvement, lack of family perception that asthma can seriously impact their child's school activities, lack of family perception that their child's asthma can be better controlled, transportation issues, and the cost and availability of medications or health care.²¹⁻²⁴ Furthermore, significant school resources, including school nursing time, may be needed to get appropriate forms and quick-relief medications to the school and to encourage coordination among the school, the family, and the family's health care clinician.

Strategies that accomplish links with medical care include close links between school nurses and community asthma care clinicians^{2,4,6-8,17} or hospitals^{5,9,11,14} or a school-

based asthma specialist,^{9,15} school-based health center,¹⁸ or mobile asthma care clinic.^{3,11,12} Other strategies have also improved the medical care of children with asthma at school. For example, providing stock quick-relief medications and/or standing orders for administration improved students' access to those medications while at school.^{5,8,19} School nurses can also improve medical care by providing case management for students with significant asthma morbidity. This may include meeting with or calling parents and clinicians, providing individual health counseling to students, and ensuring that all proper medications and forms are at the school.^{2,4,6-8,19,25,26}

It is important that the medical care be provided with continual communication between asthma care clinicians, parents, and school staff. School nurses are an integral part of this system; however, they are currently not present in every school, and their absence may limit communication with asthma care clinicians and parents. Many schools have significant information about asthma episodes in school health records, and clinicians can provide more appropriate care when this information is communicated to them. All schools, including those without full-time school nurses, need to develop a system for clear communication about asthma episodes at school that includes the student, parents, school nurse, and asthma care clinician.

LESSON 2: TARGET STUDENTS WHO ARE THE MOST AFFECTED BY ASTHMA AT SCHOOL

Much work has focused on identifying young people with asthma. Many continue to refer to this procedure as "screening" for asthma, but screening refers to identifying people with disease who are in a preclinical (asymptomatic) state. Screening for asthma is not possible since there is no method of diagnosing the condition in people who do not have symptoms.²⁷ The term case detection more appropriately describes most school-based survey programs in that it refers to identifying people who are experiencing symptoms. However, population-based case-detection programs (what some call "school-wide screening") have not been shown to improve health outcomes; efforts to accurately detect students with asthma or probable/undiagnosed asthma are time and resource consuming, yield questionable results, and do not detect many more students with significant morbidity than simple case identification systems.²⁶⁻³⁰ Schools should be more concerned with poorly controlled asthma than underdiagnosis.^{28,30-32} Given that school resources are typically limited, current efforts should seek to identify and intervene with students who are experiencing significant morbidity.³³⁻³⁵ These students can be identified by a school nurse or other school personnel based on the number of health room visits, school absences, 911 calls, times sent home because of asthma, or discussions with teachers. If needed in a community, anonymous survey prevalence counts can be obtained as part of other school or adolescent surveys.^{36,37} These surveys are particularly

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useful if they are part of a larger school district or state health department asthma surveillance program.

LESSON 3: CHOOSE THE RIGHT MIX OF RESOURCES

Program success is strongly linked to having the right people—both to support the program and to staff it. It is important to get administrative buy-in and then build a team of enthusiastic people to support the program.^{6,25,38} Researchers and people from community organizations should involve school administrators and staff in the planning process. Identifying an “asthma champion” within the school is frequently cited as a key to success.^{5,6} In addition, involving school personnel in the planning process is essential for program buy-in and success. Assessing both student and staff perceptions and concerns about asthma at school enables programs to address them.^{20,21,39}

Once school needs are assessed and buy-in is obtained, it is important to note that successful school-based asthma programs use evidence-based materials.⁴⁰ Many asthma program resources already exist (see Resources for Addressing Asthma in Schools); developing new materials is usually unnecessary. However, if it is essential that a new curriculum or other material be developed to meet a specific need, proper evaluation must be performed before widespread implementation.

Appropriate staffing is important for achieving and maintaining a successful school asthma program. School nurses are often critical to program success.^{1-7,19,20,25,26,38,41-44} Full-time school nurses can actively support students with asthma and help them improve their asthma management. They may provide quality care for asthma episodes, obtain and use more asthma action plans, provide asthma education for students with asthma, and improve asthma awareness for all students and staff.^{25,26,41,45} When the ratio of students to school nurses is low and when school nurses receive appropriate training and support, they can provide intensive case management for students whose asthma is poorly controlled.^{2,25} In many areas, however, school nurses are not available. In these situations, it is essential to identify some mechanism for providing the services that school nurses are uniquely qualified to provide.

Parents are an important link between school health staff and the student’s asthma care clinician. Parent support is often a missing element of school asthma programs. Challenges in getting parents involved include the inability to contact parents, poor understanding of good asthma control, lack of parent compliance with school policies, and even parental refusal to pick up their child during an asthma episode.^{20,22,44} Having a nebulizer and medication available at school can be an incentive for parents and school nurses to get a signed order for treatment at school, especially if the school’s policy is to send students having an asthma episode home if a medication order is not available.⁵

Lack of accurate parental assessment of the child’s asthma severity or the impact it is having on the child’s participation at school may be a major, yet often unrecognized, obstacle to family involvement. Parents often report significant levels of symptoms but consider their children’s asthma well controlled or report fewer symptoms than their children report.²²⁻²⁴ School nurse case management and simple asthma education messages sent to parents could mitigate this barrier.

Other important considerations for establishing and maintaining a successful program include time and space for program implementation. School staff and personnel are intimately familiar with the extensive time and space constraints experienced by most schools, but many researchers and outside agencies providing asthma outreach programs are not. While many schools are eager to participate in health education programs, time constraints often limit the school staff’s ability to successfully implement asthma programs. Linking asthma programs to existing programs, such as health and physical education, tobacco programs, or environmental health programs, can be useful.³⁸ Integrating asthma training into the existing school staff development plan is a welcome efficiency,³⁸ and streamlining the written information shared with school staff members and posting bulletins on school or school district Web sites may increase the likelihood that teachers pay attention to asthma messages.⁴⁶

Schools also typically have constraints with classroom space. Rarely is there an “extra” room available for asthma programs. These time and space constraints highlight the need for flexibility in program scheduling. Programs are implemented differently within different districts, and schools often use after-school and lunch periods.

Community collaboration is another key to program maintenance. When several organizations share program goals and objectives, these organizations may be able to provide staffing and funding. Collaborations with hospitals, universities, community organizations, local asthma coalitions, parents, physicians, respiratory therapists, and others are particularly important for schools with limited resources. Community partners support schools in providing asthma education⁴⁷ and appropriate health resources, such as stock albuterol and nebulizers. Schools are often not the lone major player in successful asthma management programs.

Some models for ensuring appropriate staffing include gradually transferring the cost of the program from a research institution or community agency to the school district⁸ and publicizing to stakeholders the cost-benefit of keeping students in school.^{5,25,35,48} Furthermore, innovative uses of technology can enhance program effectiveness and efficiency by improving record keeping and communication with medical care clinician and among school staff^{4,8} and for tailoring asthma management and education for students.²¹ Providing ongoing training and incentives for technology-focused programs is important for success.^{4,49}

LESSON 4: USE A COORDINATED MULTICOMPONENT AND COLLABORATIVE APPROACH

Multicomponent asthma interventions addressing health services, patient education, and staff professional development on asthma basics and emergency response procedures are likely to be more successful than programs addressing only one of these areas.^{50,51} Collaborative interventions require a team effort and involve the whole school community: school administrators, faculty, and staff, as well as students, parents, and local community organizations.⁶ Other components may also be critical for specific schools based on their needs; for example, if there appears to be mold or another environmental problem, an environmental assessment may help examine the nature and extent of the problem.^{52,53}

Asthma-friendly policies described by the National Asthma Education and Prevention Program⁵⁴ and the National Association of State Boards of Education⁵⁵ can strengthen and support long-term maintenance of successful asthma management programs, even if the program champion or other staff positions change.⁵⁶ Self-assessment tools enable schools to conduct a needs assessment and inform key administrators.^{38,48,57}

Several multicomponent programs report promising results; others report minimal or no effect on asthma outcomes or school performance, perhaps because of limitations in linking the student with appropriate medical care. Programs providing asthma care directly at school^{3,9,11-13,15,18} or providing case management^{2,4,6-8,19,25} demonstrate how these gaps can be bridged and underscore the importance of making sure all components are addressed in the school-based program.

LESSON 5: SUPPORT EVALUATION OF SCHOOL-BASED PROGRAMS

Conducting adequate program evaluation is another essential lesson. Stakeholders are more willing to continue funding programs with verifiable improvements in outcomes that matter most to them. Obtaining sufficient levels of participation in the program and using adequate and appropriate outcome measures are particularly important.

Active participation by appropriate students, staff, or families is vital to meaningful evaluation but, as reported by several authors in this issue, is often difficult to obtain. Some researchers have increased parental participation on asthma symptom questionnaires to 98% by providing small incentives for students (pencils and stickers), as well as incentives for the teacher who obtained the questionnaires.⁵⁸ Such incentives can also increase team building by showing appreciation for the work done by individuals.⁵⁸ Choosing appropriate outcome measures is extremely important. Access to school records is often difficult to obtain for research or program evaluation purposes, which makes even simple evaluation designs difficult to implement. Capturing medical data is time consuming and expensive, and obtaining consent is often complicated.⁵⁸ Passive informed consent from parents may be an option for obtaining survey information from middle or high school students.²¹ This allows the researcher access to a larger number of students and fosters autonomous decision making among the students.

Better outcomes for school absences, grades, and health care utilization may be the ultimate goals of asthma education programs; these measures are difficult to achieve and often difficult to measure. School records often do not state the reason for absences, making it difficult to assess the impact of programs on absences due to asthma. Furthermore, school records may not be computerized, making their retrieval costly and time consuming. When student turnover is high, percent attendance is needed (not simple days absent) because students are not always enrolled in a specific school for an entire school year. A good way to limit these confounds is to compare the total percent attendance (or percent absenteeism) for students with and without asthma.²⁵ This methodology can also be applied to the number of health room visits, 911 calls, or times students are sent home early from school.

For most students with asthma, school grades are likely to be influenced by other factors more than asthma control. The quality of teachers, class size, and specific education programs can influence grades. When using grades as an outcome measure, the potential impact of other coexisting interventions must be controlled or considered. Health care utilization can be very expensive and time consuming to track. The 2 most common methods are parental report and medical record review. Parental report requires staff to contact parents regularly for an interview. Medical record review is very complex, particularly in areas with multiple health care facilities that children may access for care.

Despite these difficulties, program evaluation is essential to demonstrate benefit, justify program support, and document strengths and weaknesses for program improvement. Using short-term and intermediate behavioral outcomes and school data can decrease evaluation costs and increase usefulness. These include outcomes such as health room visits, students sent home early, 911 calls, case management encounters, use of school health resources, development and implementation of school asthma-friendly policies, and parent-teacher-student training that are easier to measure and that are meaningful to the program and school administrators. Evaluation can also focus on a smaller, more targeted, group of students—for example, those with poorly controlled asthma—or evaluating the feasibility and success of one or two program changes.

It is important to keep informed about new research findings and evaluate whether the results can be extrapolated to your school setting. More of our colleagues are implementing and evaluating school-based asthma programs every year.

WHERE DO WE GO FROM HERE?

We share the following recommendations for school-based asthma programs based on the lessons we have now learned:

- State and district school health programs should establish asthma-friendly policies and procedures. They should ensure that schools are implementing and enforcing these policies and should provide training and support as needed.
- Schools should assess their needs and resources using appropriate tools. The Centers for Disease Control and Prevention's School Health Index can help schools conduct such an assessment and prioritize their next steps.⁵⁷
- Schools should keep track of school-associated morbidity measures (percent absenteeism, health room visits, 911 calls, times sent home sick from school) for students with asthma. They should use these data for program evaluation and to ensure their program first targets students with poorly controlled asthma.
- School asthma programs should use evidence-based materials and should not squander limited resources by recreating existing materials.
- Communities and schools should work together to meet the needs of students with asthma, including working toward every school having a full-time school nurse. Despite any potential staffing deficiencies,

schools need to help students with asthma receive good medical care through case management, active communication, and collaboration among students, parents, school nurses and other health service staff, and asthma care clinicians.

- Researchers need to develop and evaluate a range of creative strategies that target students with poorly controlled asthma. These strategies must include methods that ensure that quality medical care for the students is linked with the school-based asthma program.
- Promising ideas for programs should be evaluated and the results published, whether or not a strong research design is possible. New and stronger collaborations between schools, community groups, and researchers may support such evaluation and should be encouraged.

We hope that this issue of the *Journal of School Health* will stimulate continued progress in helping our students with asthma participate fully in school activities. ■

References

1. Evans D, Clark NM, Feldman CH, et al. A school health education program for children with asthma aged 8-11 years. *Health Educ Q.* 1987;14(3):267-279.
2. Levy M, Beeman G, Heffner B, Stewart T. The efficacy of asthma case management in an urban school district in reducing school absences and hospitalizations. *J Sch Health.* 2006;76(6):320-324.
3. Liao O, Morphew T, Amaro S, Galant SP. The Breathmobile™: a novel comprehensive school-based mobile asthma care clinic for urban underprivileged children. *J Sch Health.* 2006;76(6):313-319.
4. Barbot O, Platt R, Marchese C. Using preprinted rescue medication order forms and health information technology to monitor and improve the quality of care for students with asthma in New York City Public Schools. *J Sch Health.* 2006;76(6):329-332.
5. Byrne J, Schreiber ME, Nguyen TQ. Community hospital-school partnership to treat asthma episodes at school and improve management. *J Sch Health.* 2006;76(6):336-339.
6. Guglielmo C, Little A. Tragedy in a beachfront community: a proactive school district responds to asthma. *J Sch Health.* 2006;76(6):297-299.
7. Frankowski B, Keating K, Rexroad A, et al. Community collaboration: concurrent physician and school nurse education and cooperation increases use of asthma management plans. *J Sch Health.* 2006;76(6):303-306.
8. Richmond CA, Sterling DA, Huang XH, et al. Asthma 411—addition of a consulting physician to enhance school health. *J Sch Health.* 2006;76(6):333-335.
9. Bartholomew LK, Sockrider MM, Abramson SL, et al. Partners in school asthma management: evaluation of a self-management program for children with asthma. *J Sch Health.* 2006;76(6):283-290.
10. Anderson ME, Freas MR, Wallace AS, et al. Successful school-based intervention for inner-city children with persistent asthma. *J Asthma.* 2004;41(4):445-453.
11. Halterman, JS, Szilagyi PG, Yoos HL, et al. Benefits of a school-based asthma treatment program in the absence of secondhand smoke exposure: results of a randomized clinical trial. *Arch Pediatr Adolesc Med.* 2004;158(5):460-467.
12. Jones CA, Clement LT, Hanley-Lopez J, et al. The Breathmobile™ program: structure, implementation, and evolution of a large-scale, urban, pediatric asthma disease management program. *Dis Manage.* 2005;8(4):205-222.
13. Liao O, Galant S. Demographics and outcomes of a school-based breathmobile program in Orange, Co. CA. *JACI.* 2004;113(2 suppl) S285.
14. Lwebuga-Mukasa J, Dunn-Georgiou E. A school-based asthma intervention program in the Buffalo, NY schools. *J Sch Health.* 2002;72(1):27-32.
15. Millard MW, Johnson PT, McEwen M, et al. A randomized controlled trial using the school for anti-inflammatory therapy in asthma. *J Asthma.* 2003;40(7):769-776.
16. Murphy KR, Hopp RJ, Kittelson EB, Hansen G, Windle ML, Walburn JN. Life threatening asthma and anaphylaxis in schools: a treatment model for school-based programs. *Ann Allergy Asthma Immunol.* 2006;96(3):398-405.
17. Tinkelman D, Schwartz A. School-based asthma disease management. *J Asthma.* 2004;41(4):455-462.
18. Webber MP, Carpiniello KE, Oruwariye T, et al. Burden of asthma in inner-city elementary schoolchildren. Do school-based health centers make a difference? *Arch Pediatr Adolesc Med.* 2003;157(2):125-129.
19. Taras H, Wright S, Brennan J, et al. Impact of school nurse case management on students with asthma. *J Sch Health.* 2004;74(6):213-219.
20. Forbis S, Rammell J, Huffman B, Taylor R. Barriers to care of inner-city children with asthma: school nurse perspective. *J Sch Health.* 2006;76(6):205-207.
21. Ayala GX, Miller D, Zagami E, Riddle C, Willis S, King D. Asthma in middle schools: what students have to say about their asthma. *J Sch Health.* 2006;76(6):208-214.
22. Dozier A, Aigne CA, Schlabach MB. Parents' perception of children's asthma control. *J Sch Health.* 2006;76(6):215-218.
23. Wittich AR, Li Y, Gerald LB. Comparison of parent and student responses to asthma surveys: 2 different experiences with similar results. Students grades 1-4 and their parents, from an urban public school setting. *J Sch Health.* 2006;76(6):236-240.
24. Yawn BP, Wollan P, Kurland M, Bertram S. Comparison of parent and student responses to asthma surveys: 2 different experiences with similar results. Students grades 3-12 and their parents, from a suburban private school setting. *J Sch Health.* 2006;76(6):241-245.
25. Splett PL, Erickson CD, Belseth SB, Jensen C. Evaluation and sustainability of the healthy learners asthma initiative. *J Sch Health.* 2006;76(6):276-282.
26. Wheeler LS, Boyle S. Attempting to use a district-wide asthma case identification system for asthma prevalence. *J Sch Health.* 2006;76(6):219-222.
27. Boss LP, Wheeler LS, Williams PV, Bartholomew LK, Taggart VS, Redd SC. Population-based screening or case detection for asthma: are we ready? *J Asthma.* 2003;40(4):335-342.
28. Yawn BP, Wollan P, Scanlon PD, Kurland M. Outcome results of a school-based screening program for undertreated asthma. *Ann Allergy Asthma Immunol.* 2003;90(5):508-515.
29. Wheeler LS, Boss LP, Williams PV. School-based approaches to identifying students with asthma. *J Sch Health.* 2004;74(9):378-380.
30. Yawn BP. Asthma screening, case identification and treatment in school-based programs. *Curr Opin Pulm Med.* 2006;12(1):23-27.
31. Vargas PA, Magee JS, Bushmiaer M, Jones CA, Feild CR, Jones SM. School-based asthma case finding: the Arkansas experience. *J Sch Health.* 2006;76(6):223-226.
32. Bruzzese JM, Evans D, Wiesemann S, et al. Using school staff to establish a preventive network of care to improve elementary school students' control of asthma. *J Sch Health.* 2006;76(6):307-312.
33. Bonilla S, Kehl S, Kwong KYC, Morphew T, Kachru R, Jones CA. School absenteeism in children with asthma in a Los Angeles inner city school. *J Pediatr.* 2005;147(6):802-806.
34. Moonie SA, Sterling DA, Figgs L, Castro M. Asthma status and severity affects missed school days. *J Sch Health.* 2006;76(1):18-24.
35. Taras H, Potts-Datema W. Childhood asthma and student performance at school. *J Sch Health.* 2005;75(8):296-312.
36. Petronella SA, Bricker SK, Perrotta D, Brown C, Brooks EG. Addressing asthma in Texas: development of a school-based asthma surveillance program for Texas elementary schools. *J Sch Health.* 2006;76(6):227-234.
37. Merkle S, Everett Jones S, Wheeler L, Mannino D. Self-reported asthma prevalence among high school students in the United States—2003. *Morb Mortal Wkly Rep.* 2005;54(31):765-767.
38. Langenfeld NA, Bonaiuto MM, Edmonds EO. Garnering administrative support for school-based asthma education programs. *J Sch Health.* 2006;76(6):250-254.
39. Nelson BW, Valerio MA, Houle CR, Brown RW, Brown C, Clark NM. Working with a Head Start population with asthma: Lessons learned. *J Sch Health.* 2006;76(6):273-275.
40. Centers for Disease Control and Prevention. *Potentially effective interventions for asthma.* Available at: <http://www.cdc.gov/asthma/interventions/default.htm>. Accessed April 28, 2006.
41. McLaughlin T, Maljanian R, Kornblum R, Clark P, Simpson J, McCormack K. Evaluating the availability and use of asthma action plans

- for school-based asthma care: a case study in Hartford, Connecticut. *J Sch Health*. 2006;76(6):325-328.
42. Telljohann SK, Dake JA, Price JH. Effect of full-time versus part-time school nurses on attendance of elementary students with asthma. *J Sch Nurs*. 2004;20(6):331-334.
43. Telljohann SK, Price JH, Dake JA, Durgin J. Access to school health services: differences between full-time and part-time school nurses. *J Sch Nurs*. 2004;20(3):176-181.
44. Anderson EW, Valerio M, Liu M, et al. Schools' capacity to help low-income, minority children to manage asthma. *J Sch Nurs*. 2005;21(4):236-242.
45. Borgmeyer A, Jamerson P, Gyr P, Westhus N, Glynn E. The school nurse role in asthma management: can the action plan help? *J Sch Nurs*. 2005;21(1):23-30.
46. Goei R, Boyson AR, Lyon-Callo SK, Shott C, Wasilevich E, Cannarile S. Developing an asthma tool for schools: the formative evaluation of the Michigan Asthma School Packet. *J Sch Health*. 2006;76(6):259-263.
47. Brasler M, Lewis M. Teens: taking control of asthma. *J Sch Health*. 2006;76(6):269-272.
48. Cicutto L, Conti E, Evans H, et al. Creating asthma-friendly schools: a public health approach. *J Sch Health*. 2006;76(6):255-258.
49. Mangan J, Gerald LB. Asthma agents: monitoring asthma in school. *J Sch Health*. 2006;76(6):300-302.
50. Centers for Disease Control and Prevention. *Strategies for Addressing Asthma Within a Coordinated School Health Program. With Updated Resources*. Atlanta, Ga: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion; 2005. Available at: <http://www.cdc.gov/HealthyYouth/asthma/pdf/strategies.pdf>. Accessed April 28, 2006.
51. Keysser J, Splett PL, Ross S, Fishman E. Statewide asthma training for Minnesota school personnel. *J Sch Health*. 2006;76(6):264-268.
52. Moglia D, Smith A, MacIntosh DL, Somers JL. Prevalence and implementation of IAQ programs in U.S. schools. *Environ Health Perspect*. 2006;114(1):141-146.
53. Abramson SL, Turner-Henson A, Anderson L, et al. Allergens in the school setting: results of environmental assessments in 3 city school systems. *J Sch Health*. 2006;76(6):246-249.
54. National Asthma Education and Prevention Program. National Heart, Lung and Blood Institute. *How asthma-friendly is your school?* Available at: <http://www.nhlbi.nih.gov/health/public/lung/asthma/friendhi.htm>. Accessed April 28, 2006.
55. Wilson TK, Bogden JF. *Fit, Healthy, and Ready to Learn. A School Health Policy Guide. Part III: Policies Related to Asthma, School Health Services, and Healthy Environments*. Part III. Alexandria, Va: National Association of State Boards of Education; 2005.
56. Jones SE, Wheeler L. Asthma inhalers in schools: rights of students with asthma to a free, appropriate education. *Am J Public Health*. 2004;94(7):1102-1108.
57. Centers for Disease Control and Prevention. *School Health Index: a self-assessment and planning guide*. Available at: <http://www.cdc.gov/HealthyYouth/SHI>. Accessed April 28, 2006.
58. Gerald LB, Redden D, Wittich AR, et al. Outcomes for a comprehensive school-based asthma management program. *J Sch Health*. 2006;76(6):291-296.