**The Role of Schools in Strengthening Delivery of New Adolescent Vaccinations**

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**ABSTRACT**

Schools offer an opportunity to deliver new vaccines to adolescents who may not receive them in their medical home. However, school budgets and health priorities are set at the local level; consequently resources devoted to health-related activities vary widely. Partnering with schools requires soliciting buy-in from stakeholders at district and school levels and providing added value to schools. With appropriate resources and partnerships, schools could carry out vaccination-related activities from educating students, parents, and communities to developing policies supporting vaccination, providing vaccines, or serving as the site at which partners administer vaccines. Activities will vary among schools, but every school has the potential to use some strategies that promote adolescent vaccination.

**WITH 3 NEW vaccines for adolescents recommended since 2005, and more on the way, effective mechanisms for delivering adolescent vaccinations are increasingly important. Because school occupies a significant part of most adolescents’ lives, the potential range of roles for schools in adolescent vaccination, from education and promotion to vaccine administration, deserves special attention. Schools must devote significant energy to complying with numerous mandatory accountability measures as they fulfill their primary educational purpose, but every school has the potential to promote adolescent vaccination. Including schools as partners in promoting adolescent vaccination will complement other efforts and offer considerable access to an often hard-to-reach group.**

The information presented in this article rests on 3 assumptions. First, schools are not intended to replace the medical home as the primary location for vaccination of adolescents. Instead, vaccination-related activities in schools can supplement care received in the medical home. Therefore, we have focused this report on information and solutions that can be implemented in the current policy environment rather than the significant changes that would be needed to make schools the primary avenue for delivery of routine adolescent vaccinations. Second, the extent to which any strategy is implemented will vary according to vaccine and school, although every school can undertake vaccination-related activities at some level. Third, variable resources and competing priorities must be taken into account when considering options for addressing vaccination in school health programs. Issues such as pregnancy, sexually transmitted diseases, drug and alcohol abuse, obesity, and violence will often take precedence.\(^1\)

Based on these assumptions, we explore the role of schools in strengthening the delivery of vaccinations to adolescents by reviewing the current scope of school health resources, the history of US experience with school-based vaccination, and potential barriers to vaccination activities in schools. Laws that require vaccination for school attendance, which are known to be highly effective, are covered elsewhere in this supplement.\(^2\) We have drawn on...
lessons learned from past and current programs to offer practical strategies for partnering with schools and propose activities to promote adolescent vaccination. We hope that these suggestions will serve as a resource for health professionals and others who are interested in collaborating with schools to increase adolescent vaccination rates, as well as the delivery of other recommended preventive services.

SCOPE OF CURRENT SCHOOL HEALTH CARE DELIVERY SERVICES

School budgets and health priorities in the United States are set at the local level and vary widely. School health services range from comprehensive and coordinated school health programs, which may include a school-based health center (SBHC) staffed by physicians, nurses, or nurse practitioners, to schools with virtually no health services or education. In the 36 states that do not require school districts to provide nursing services on campus, any services offered are likely to be funded solely by the school.

In the 2000 School Health Policies and Programs Study (SHPPS), a national survey of public and private elementary, junior high, and high schools, 6.5% of the schools surveyed reported having an SBHC. In 2002, there were 1498 SBHCs in 43 US states and Washington, DC (Fig 1). SBHCs vary in their funding and payment sources, hours of operation, populations served, and services provided. Just more than one fourth of SBHCs are located in rural areas; 57% of all SBHCs are concentrated in just 10 states. Because SBHCs provide a variety of preventive services, they may act as a medical home for students who have no regular source of primary care, particularly in rural or inner-city areas. However, only 54% of SBHCs are staffed by primary care providers for >25 hours/week.

 Approximately 56 000 registered nurses are currently employed as public school nurses. The SHPPS 2000 survey revealed that 77% of schools surveyed had a full- or part-time nurse (a registered nurse, licensed practical nurse, or nurse practitioner) who was present at the school for an average of 22.4 hours/week. Approximately 16% of schools employed a full- or part-time school physician, although these physicians were present at the school for only 1 hour/week, on average. Just fewer than half (47.5%) of the schools reported having access to an off-site physician for consultations during the school day. One third (33%) of schools employed part- or full-time health aides; however, a majority (60%) of the aides had to be supervised at all times by a nurse or physician.

Even schools with relatively robust school health services can benefit from external partnerships to help them leverage resources for vaccination-related activities. It is important to note that reported average provider hours spent in schools may obscure wide variations in working hours, and as noted above, nearly one fourth (23%) of the schools in the SHPPS lacked even a part-time school nurse. Furthermore, vaccination is often not a component of health education or school health programs. Fewer than 50% of the schools surveyed by the SHPPS required education about vaccination in their health education curricula, and only 18% provided any vaccinations to students.

EXPERIENCE WITH SCHOOL-BASED VACCINATION IN THE UNITED STATES

School-based vaccination has been used in the United States primarily for 3 purposes: to accelerate introduction of new vaccines, raise coverage, and control school-based outbreaks.
Vaccination in schools was first widely used when the polio vaccine was introduced in 1955, with schools being the primary site of immunizations for children 10 to 19 years old.\(^{10}\) When rubella vaccine became available in 1969, school-based programs were used to reach adolescents who had not received the vaccine as infants in the first attempt to eliminate the disease. Success was inconsistent\(^ {11}\): coverage increased and the incidence of congenital rubella syndrome declined, but rubella was not eliminated in the United States until 2004.\(^ {12}\) Nevertheless, collaboration among schools and health care providers or other partners remains a logical approach to attaining high coverage when new vaccines are introduced.

Most recent experience with delivering vaccines in schools dates from 1992, when public health officials recognized that attempts to reduce transmission of hepatitis B by targeting vaccination to persons at highest risk were not meeting with great success. Universal infant vaccination, therefore, was recommended in 1991, and school-based demonstration projects were subsequently implemented to extend protection against hepatitis B to older children who were not covered by the 1991 recommendation. Successful projects relied on combined efforts by federal, state, and local health departments; school employees; parents; private providers; managed care organizations; and administrative bodies.\(^ {13-15}\) Project costs were subsidized by health departments, the Centers for Disease Control and Prevention, schools, vaccine manufacturers, and other local sources. A review of 9 studies of vaccination programs in schools (8 for hepatitis B vaccination) revealed that vaccination-coverage rates increased a median of 58 percentage points.\(^ {16}\)

Evaluations of these programs have demonstrated that well-organized school-based vaccination with subsidized vaccine can achieve high coverage.\(^ {13}\) However, few pilot programs evolved into statewide voluntary vaccination programs. Programs to provide catch-up hepatitis B vaccinations to adolescents were intended to run only until high routine childhood coverage was attained. Ultimately, school-entry laws were largely responsible for the dramatic sustained increase in hepatitis B coverage among adolescents in several states\(^ {17,18}\) and continue to ensure vaccine administration (see Fig 2 for current school-entry laws for adolescents\(^ {19}\)). Recently, growing interest in reducing community burden of influenza by vaccinating school-aged children has led to pilot tests of school-based mass-vaccination clinics in several states.\(^ {20,21}\) Such efforts have involved collaboration by local health departments or academic medical centers and school districts and use of manufacturer-donated influenza vaccine. Lessons learned from past school vaccination programs could inform not only school-based catch-up efforts for mandatory vaccines but also ongoing annual programs for new vaccines.

Voluntary school-based vaccination has been most successful when conducted in response to outbreaks, usually by public health departments. Coverage increases have been reported after use of school-based vaccination clinics during outbreaks of measles, meningococcal meningitis, and varicella.\(^ {22-24}\) However, the role of new adolescent vaccines in controlling outbreaks may be limited, because many of the diseases they prevent have long incubation periods.

**FIGURE 2**
PARTNERING WITH SCHOOLS
However worthy, vaccination may not be a top priority for the administrators and educators who establish school health priorities. Although once-common outbreaks of vaccine-preventable disease in schools became rare after the widespread use of school-entry laws, some states are experiencing a resurgence in school outbreaks of diseases such as varicella and pertussis.25,26 However, not all of the newest adolescent vaccines target diseases that are likely to have a direct impact on school attendance and performance. Compared with prevention of teen pregnancy, violence, or drug abuse, the benefits of vaccination may be less apparent to administrators and school staff. Therefore, it is important to understand how and by whom school priorities are established.

With some notable exceptions, decisions regarding school activities are usually made at the local, rather than state or federal, level. This long-standing tradition of local control gives superintendents and school boards authority to regulate aspects of day-to-day operations of schools and districts that are not dictated by state or federal education authorities.4 School health programs are no exception; thus, changes to these programs occur most often at the individual district or school level. Establishing health partnerships with schools requires going through the proper channels and soliciting buy-in from the appropriate authorities, usually district superintendents and school principals.4 Partnerships also require buy-in and collaboration by school stakeholders who will be responsible for program implementation, including principals, teachers, school health staff, administrative and support staff, health advisory councils, student organizations, and parent or community organizations.4,27 This ensures a smoothly run program that fits within the context of current school activities and avoids the perception of noneducational activities infringing on the school’s educational mandate.

Schools face an ever-expanding number of obligations with limited resources, and funding, time, and staff dedicated to health are often especially scarce. The best partnerships with schools reduce the school’s burden or, even better, offer the school something in exchange for its cooperation and assistance. For example, end-of-summer vaccination clinics offered on school grounds by public health department staff reduce the effort needed by schools to bring students into compliance with state vaccination requirements for school entry. Even if not mandated by law, new vaccines could also be offered. Finally, framing communications with school leaders is important: suggestions for vaccination programs should be linked to current school goals, programs, and policies and should acknowledge challenges while emphasizing solutions.

BARRIERS TO SCHOOL INVOLVEMENT
In addition to competing priorities for resources, including time, other factors might hinder school involvement in adolescent vaccination. Even routine monitoring for required vaccines can have a negative financial impact on schools, because excluding noncompliant students from school results in loss of per-capita revenue received for student attendance. Anecdotal evidence from some states suggests that enforcement of school-entry laws may be less strict for this reason.24 Correspondingly, costs associated with more vigorous efforts to promote vaccination are more prohibitive.

Schools with students who would most benefit from support for adolescent vaccination (eg, those in rural areas or with a large underserved population) often have access to the fewest resources, both internally and through outside partners such as local health departments. SBHCs may receive funds from a variety of federal agencies and private organizations; however, these funds are typically short term and acquired through a competitive grant-application process.29 Schools without SBHCs may encounter added difficulty seeking funds if they lack assistance with grant writing or billing. Most schools would need to establish billing procedures for both public and private payers to serve privately insured students as well as students who are eligible for public insurance or lack insurance. Billing public payers may necessitate charging fees for vaccination, which might deter students from seeking care.29 Efforts to recoup costs can also be hampered by the need to learn and follow financial management regulations of schools and districts as they relate to billing for services.

The time-limited nature of most grants is a significant barrier to sustaining vaccination-related activities in schools after jump-starting them as part of a demonstration project. Even with stable funding, sustainability of vaccination itself is hindered by prescribed intervals between doses of multidose vaccines, and flexibility in programs and dosing schedules is needed to ensure vaccination-series completion during the school year. Resources may also be quickly expended on complex determinations of eligibility for school-based vaccination (eg, verifying Medicaid eligibility, obtaining consent from parents/guardians, etc.), which limits the feasibility of school-based vaccination.

The need to document vaccinations administered in schools to inform primary care providers of these vaccinations is another barrier to school-based vaccination. Identifying and contacting each child’s primary provider can be time consuming and costly. In states with immunization registries, documentation should not be a barrier to school-based vaccination, because existing school-based programs can use these registries to track vaccinations administered. In 2002, 44 states had immunization registries, of which 37 covered the entire state.30 Documentation is also complicated because the Family Educational Rights and Privacy Act of 1974 (FERPA) protects the privacy of education records, which usually include immunization information, and the privacy of provider-held health records is governed by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) Privacy Rule. Compliance requirements for these laws and confusion about their interpretation can lead to both improper disclosure of student health information and failure to share information appropriately between school health personnel, primary care providers, and immunization registries.31 As discussed...
elsewhere in this supplement,³² the need to obtain and document parental consent for immunization might be a barrier to immunization in schools, depending on local laws related to the ability of minors to consent to medical care and other factors.

In addition to concerns about complete and timely record sharing, primary care providers may fear that school-based vaccination programs compete for services or discourage adolescents from making preventive care visits. Schools should seek to engage pediatricians in planning and implementation to mitigate such perceptions and emphasize the ways in which school programs can complement the medical home.

Other obstacles to vaccine education or administration include cultural or linguistic barriers and the societal context in which each new vaccination is introduced. Those who coordinate school efforts to promote adolescent vaccination should be conscious of key stakeholders’ values, and significant additional effort may be required for certain student populations or vaccines.

THE ROLE OF SCHOOLS
School-based vaccination may be appropriate in schools at which SBHCs serve as the medical home for a significant proportion of students. SBHCs currently provide many primary care services, and studies have suggested that they can achieve vaccination-series completion equal or superior to that of adolescent medicine clinics, particularly by using outreach to leverage their physical proximity to students.³³,³⁴ In schools at which SBHCs are not the medical home for many students, they may still play an important role in assuring equitable access to vaccination for students with limited access to insurance or health care.³ However, the number of SBHCs in the United States is limited, and these facilities are widely variable in resources and populations served. Any school-based vaccination effort would require extensive support and collaboration from stakeholders including school administrators and staff, state and local public health officials, parents, and health care providers. In the next section, we consider a range of vaccination-related activities that can be implemented in schools with or without SBHCs.

Activities to Promote Adolescent Vaccination
Drawing on new partnerships and additional resources, schools could undertake a variety of vaccination-related activities in 5 major areas. For each of these areas (education, providers, linkages, vaccinations, and policies), we propose activities with minimal additional costs, as well as options that could be executed with greater financial resources, which might come from federal or state governments, philanthropic organizations, or even private industry. Additional human resources might come from local government, community organizations, or volunteers.

Educating Students, Teachers, and Staff
- Information about new adolescent vaccinations can be integrated into current education about health, health maintenance, or prevention strategies for youth. Innovative multidisciplinary curricula have been developed to promote vaccine education in schools;³⁵,³⁶ these curricula can be used to meet existing educational goals in several topic areas, thereby reducing competition between health education and other academic priorities.³⁶ Vaccine manufacturers have supplied temporary grants to develop vaccine education for students and staff; good examples include the “Roll up Both Sleeves!” curriculum and the “Give It a Shot” toolkit, both from the American School Health Association (Fig 3).

- Messages regarding the importance and efficacy of adolescent vaccination can be disseminated in newsletters and other media distributed to students. Existing peer-to-peer organizations can educate students about vaccinations relevant to their age group. Additional funds might support creation of peer-to-peer health groups or development of school health fairs that include vaccination booths, at which education can occur in the context of action steps for vaccination.

Educating Families and Communities
- Using existing mechanisms such as school newsletters, Web sites, and letters to parents/guardians can help disseminate information to families. Messages might emphasize the value of vaccination as a means to contain transmission of diseases such as meningococcal meningitis that have an increased incidence among middle and high school students.³⁹ Establishing relationships between schools and local media and educating the media about vaccination could help ensure complete and accurate news coverage of vaccination issues and reduce unnecessary concerns among parents.

- Additional funding could increase the scope and impact of family and community education. Some pharmaceutical companies have developed adaptable information tools that can be used by school administrators to educate parents about the importance of vaccinating schoolchildren. Engaging parent and community organizations could aid in educating families throughout the community, including those who may not be reached directly by schools, thereby improving vaccination outreach to the youth at the highest risk.

Providers
- At schools with on-campus health staff, staff can educate teachers and students about the benefits of vaccination. School health personnel can also guide students to “adolescent-friendly” clinics to seek vaccination when vaccines cannot be offered at school. In addition, they might serve as liaisons between health organizations and school principals or as advocates for community health partnerships. The National Association of School Nurses has endorsed such roles for school nurses.⁴⁰

- At the district or state level, any additional resources could be used for needs assessment and resource mapping to identify areas of greatest need for hiring more
nurses, vaccination nurse managers, clerical staff, or data managers; expanding their hours; and otherwise improving and making the school health infrastructure more uniform. This might help achieve the Healthy People 2010 goal of increasing the proportion of schools with at least a 1:750 nurse/student ratio.41

Linkages

- In areas with adequate community resources, schools can partner with local health departments to obtain nursing assistance with organizational, staffing, and education needs for school-based vaccination clinics.13 Public health nurses might assist schools with irregular or limited access to nurses. Partnership between public health nurses and school nurses was an important factor in the success of New Mexico’s school-based hepatitis B vaccination program.15 Other effective organizations with which to partner will vary but could include community development or after-school programs. Local immunization coalitions can offer schools

FIGURE 3
Cover of the Give it a Shot toolkit.38
a source of ready-made expertise in building community partnerships to promote vaccination.

- With additional funds and a broader mandate, schools could establish partnerships with local health agencies and work to align their goals with public health goals (including adolescent vaccination). Support and direction from public health agencies are important tools for motivating school administrators to action, and collaboration with public health departments significantly influences vaccination-program success. Establishing partnerships with local or regional private payers might also be possible. Community pediatricians may serve as program champions; in 1 survey, three quarters of pediatricians agreed that schools were acceptable alternative sites for children to receive influenza vaccine outside the provider office. Partnerships with organizations such as state athletic associations could offer additional opportunities to monitor and promote adolescent vaccination.

Vaccinations

- In schools at which SBHCs are the primary source of preventive care for a significant proportion of students, vaccination could be implemented with limited additional effort. Full-time SBHCs with appropriately trained staff might be able to acquire free or low-cost vaccine from local health departments, the Vaccines for Children program, or other sources and add vaccination of eligible students to routine vaccination-compliance monitoring.

- With sufficient funding and partnerships, schools with or without SBHCs could acquire supplies, personnel, and record-keeping abilities needed to conduct vaccination clinics during school hours. Such clinics would relieve parents of the burden of taking adolescents whose preventive services are otherwise up-to-date to health care providers for routine vaccinations. Evidence has suggested that school-based vaccination may be more cost-effective than vaccination by private providers, particularly in reducing lost work time for parents. Clinics that leverage the vaccination expertise of public health personnel can streamline vaccination and reduce program burden on school nurses and staff, although the resource commitment from both schools and health departments may be substantial.

Policies

- Schools with policies on monitoring compliance with state vaccination requirements can verify that school providers are familiar with these policies and that responsibility for conforming to school policies is assigned to a designated person or persons.

- At schools that lack school-level policies on compliance with state requirements, additional resources could be used to recruit vaccination outreach workers, attorneys, or other temporary personnel to assist with development and implementation of such policies. School or district policies could also ensure continuity of vaccination-related activities by addressing integration of vaccine education and/or vaccination into school health programs, which is a strategy that has been endorsed by the Society for Adolescent Medicine. Schools may also wish to monitor coverage levels of new adolescent vaccines among their student populations.

CONCLUSIONS

Schools offer an obvious opportunity to reach adolescents who might not otherwise benefit from new vaccines, but they labor under a heavy burden of mandates to achieve their primary educational purpose. Therefore, programs that expand schools’ roles in adolescent vaccination must incorporate judicious use of resources and partnerships and a thorough understanding of the distinct challenges that accompany each new vaccine in each community, including potential resistance to school-based vaccine promotion and administration. Absent significant policy changes, most routine vaccination will continue to occur outside schools. However, schools can play a vital role in promoting vaccination by routinely providing vaccine education to families and communities in partnership with local providers, developing policies that encourage adolescent vaccination, and leveraging relationships with public health departments and other partners for future vaccination efforts.

Initiating any school-based vaccination activity requires buy-in from school and community stakeholders. It is important for health care providers and organizations to understand how to establish mutually advantageous partnerships with schools that continue to educate, fulfill needs, and add value for all partners. Although schools serve diverse student populations and communities and possess variable resources, every school has the potential to promote adolescent vaccination.

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