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SCHOOL NURSING

The Official Journal of the National Association of School Nurses

CHAMPIONING SCHOOL-LOCATED INFLUENZA IMMUNIZATION:
THE SCHOOL NURSE'S ROLE

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Championing School-Located Influenza Immunization: The School Nurse's Role

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LEARNING OBJECTIVES

1. Explain the importance of influenza vaccination in children and adults
2. Discuss recent Centers for Disease Control and Prevention data regarding rates of influenza vaccination coverage among children and adults, with particular emphasis on the low rates among health-care workers
3. Apply their knowledge as the health care expert within the school to educate students, families, staff and the school community about influenza immunization
4. Outline the school nurse role in planning and implementing a mass influenza immunization program in the school setting as one strategy to increase immunization rates

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Introduction

The purpose of this supplement is to raise awareness about the 2008 Advisory Committee on Immunization Practices' (ACIP) expanded influenza vaccine recommendations and the resulting implications for school nursing practice. First, the foundational knowledge about seasonal influenza and school-located immunization clinics will be provided. Then examples of school-community partnerships will highlight challenges, successes, and strategies when using schools and school nurses as an access point for annual influenza immunization.



to as *school-placed*) immunization clinic, by definition, requires collaboration between the school and community—health department, local hospital, or other outside entity—to make the clinic actually happen. *School-located* clinics would include the school nurse in planning and implementation.

Given the enormous burden of seasonal influenza and the important role that school-age children play in the cycle of disease, school nurses need to be knowledgeable about the clinical course, options for preventing and treating the disease, and steps that can be taken to

Seasonal influenza is a serious and potentially deadly disease that spreads very easily. Anyone can get influenza. Influenza vaccine is safe and effective and is the best way to avoid contracting and spreading the virus. In 2008, influenza vaccination recommendations from the ACIP to the Centers for Disease Control and Prevention (CDC) were expanded to include all children aged 6 months through 18 years.

Strategies suggested to meet this goal often include using the school setting as an important point of access to this vaccine. The school setting offers many benefits: lost work time for parents and lost school time for students is minimized, children and families can be easily reached, and the school nurse is well positioned to link the school with community vaccine partners.

It should be noted there is a difference between a *school-located* and a *school-based* immunization clinic. Limited resources are a reality for most schools, making it impossible to shoulder the burden of fully implementing a *school-based* immunization clinic (ie, salaries for personnel, securing the vaccine, storing the vaccine, coordinating reimbursement). A *school-located* (also referred

to improve influenza immunization rates. School nurses and school staff must model the health-protecting behavior by receiving annual influenza vaccine. School nurses are well positioned to champion the importance of annual influenza vaccination for all school-age children. School nurses are also critical to the collaborative efforts needed to plan for and implement a school-located influenza vaccination clinic.

School nurses are a credible source of information for students, families, and the community. The information in this supplement will provide school nurses with knowledge and strategies for combating influenza. Vaccinating children protects both children and the broader community by interrupting influenza transmission to others. Vaccines prevent disease—leaving children healthy and ready to learn.

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Feature Article

Seasonal Influenza: An Overview

Christina Li, MPH, and Marian Freedman, MA

Seasonal influenza is a major cause of morbidity and mortality in the United States. It also has major social and economic consequences in the form of high rates of absenteeism from school and work as well as significant treatment and hospitalization costs. In fact, annual influenza epidemics and the resulting deaths and lost days of productivity are estimated to cost US\$10.4 billion in direct medical expenses and US\$16.4 billion in lost potential earnings. Given the enormous burden of seasonal influenza and the important role that school-age children play in the cycle of disease, school nurses need to be knowledgeable about all aspects of this condition, including its clinical course and how it is transmitted; the range of options for preventing and treating the disease; and steps that can be taken to improve the rates of immunization against influenza. School nurses also can help by making sure that they themselves are vaccinated in a timely manner.

Keywords: influenza-related complications; annual vaccination; trivalent; inactivated influenza vaccine; live, attenuated influenza vaccine; chemoprophylaxis

Each year on average, seasonal influenza causes approximately 36,000 deaths and 226,000 hospitalizations in the United States (Centers for Disease Control and Prevention [CDC], 2008c; Molinari et al., 2007). Notably, influenza and pneumonia combined are the eighth leading cause of death (Heron, 2007). Complications and fatalities due to influenza are most common among adults aged 65 years and older, children younger than 2 years, and individuals with medical conditions that pose a high risk for influenza-related complications. Yet annual influenza attack rates among school-age children, who play a key role in transmitting the infection to others, are as high as 42% (American Academy of Pediatrics [AAP], 2008a).

Influenza also has major social and economic consequences in the form of high rates of absenteeism from school and from work as well as significant treatment and hospitalization costs. In a study of 313 elementary schoolchildren in Seattle, for example, 87 more illness events occurred during the influenza season (that is, from January 8,

2001 through March 2, 2001) than would have been expected during the rest of the year (Neuzil, Hohlbein, & Zhu, 2002). For every 100 children, an additional 63 school days were missed—a remarkable statistic, given the fact that the entire influenza season included a total of just 37 school days. Parents missed almost an entire day of work for every 3 days of their children's influenza-related school absence. All told, annual influenza epidemics in the United States—and the resulting deaths and lost days of productivity—are estimated to cost U.S. \$10.4 billion in direct medical

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expenses and U.S. \$16.4 billion in lost potential earnings (Molinari et al., 2007).

Given the enormous burden of seasonal influenza and the important role that school-age children play in the cycle of disease, school nurses need to be knowledgeable about all aspects of this condition, including its clinical course and how it is transmitted; the range of options for preventing and treating the disease; and steps that can be taken to improve the rates of immunization against influenza.

INFLUENZA BASICS

Uncomplicated influenza is marked by abrupt onset of constitutional and respiratory signs and symptoms, such as fever, myalgia, headache, malaise, nonproductive cough, sore throat, and rhinitis (CDC, 2008c). Fever usually ranges from 101°F to 102°F and often is accompanied by prostration (CDC, 2008a). Some patients experience runny nose, substernal chest burning, eye pain, or sensitivity to light (CDC, 2008a). Young children are least likely to experience typical influenza symptoms; in that age group, otitis media, nausea, and vomiting are common (CDC, 2008c). Uncomplicated disease generally resolves after 3 to 7 days, although patients may continue to cough and experience malaise for more than 2 weeks.

Secondary bacterial pneumonia is the most common complication of influenza (CDC, 2008a). Primary influenza viral pneumonia occurs less frequently; however, it does have a high fatality rate (CDC, 2008a). Other influenza-related complications include sinusitis or otitis media. In addition, infection with influenza virus can contribute to coinfections with other viral or bacterial pathogens. Sometimes influenza infection is confused with other illnesses. In young children, for example, it may mimic bacterial sepsis, or respiratory symptoms may be erroneously attributed to illnesses caused by other respiratory pathogens (CDC, 2008c).

Incubation Period and Viral Shedding

The average incubation period for influenza is 2 days, typically ranging from 1 to 4 days. Both

adults and children begin shedding influenza virus prior to symptom onset. In adults, viral shedding continues for 5 to 10 days after illness onset (CDC, 2008c). Young children, on the other hand, can be infectious for 10 or more days after symptoms appear. This long period of viral shedding, and hence infectiousness, accounts for children's pivotal role in the transmission of influenza to others in their families and communities.

Mode of Transmission

Influenza viruses generally are passed from one person to another when large virus-laden droplets in the cough or sneeze of an infected person settle on the mucosal surfaces of the upper respiratory tract of a susceptible individual (CDC, 2008c). A virus also can be transmitted when uninfected persons touch surfaces contaminated with influenza virus, then touch their eyes, nose, or mouth (CDC, 2008a).

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NEWEST RECOMMENDATIONS FOR VACCINATION AGAINST INFLUENZA

The Advisory Committee on Immunization Practices (ACIP) of the CDC recently expanded its recommendations for annual vaccination against influenza to include all children and adolescents aged 6 months through 18 years (CDC, 2008c). It is hoped that the expansion will enable health care providers to improve the historically low rates of coverage among segments of the pediatric population for whom annual vaccination was recommended previously (See Appendix A). Clinicians are asked to begin implementing the expanded recommendations during the 2008–2009 influenza season if feasible, but no later than the 2009–2010 influenza season (CDC, 2008c). Vaccination efforts should continue to focus on children aged 6 to 59 months and on older children and adolescents who have medical conditions

TABLE 1. Who Is at High Risk for Influenza-Related Complications?

Individuals in Certain Age-Groups

- Children aged 6 to 59 months
- Adults aged 50 years and older

Individuals With Certain Underlying Medical Conditions

- Children, adolescents, and adults who have chronic disorders: pulmonary (including asthma), cardiovascular (except hypertension), renal, hepatic, hematologic, or metabolic (including diabetes mellitus)
- Children, adolescents, and adults who are immunosuppressed, including those whose immunosuppression is caused by medications or by human immunodeficiency virus
- Children, adolescents, and adults who have any condition that can compromise respiratory function or the handling of respiratory secretions or that can increase the risk for aspiration. Such conditions include cognitive dysfunction, spinal cord injuries, seizure disorders, or other neuromuscular disorders.
- Children and adolescents who are receiving long-term aspirin therapy and who therefore might be at risk for experiencing Reye syndrome after influenza virus infection

Household Contacts and Caregivers of the Following Individuals

- Children younger than 5 years, with continued emphasis on contacts of children younger than 6 months
- Adults aged 50 years and older
- Persons with medical conditions that put them at high risk for severe complications of influenza

Other individuals at high risk for influenza-related complications

- Adolescent girls and adult women who will be pregnant during influenza season
- Residents of nursing homes and other chronic-care facilities
- Health care personnel

Source: CDC, 2008c

(e.g., asthma, diabetes, heart disease, or compromising respiratory conditions) that place them at high risk for influenza-related complications (Table 1). Children aged 6 months to 8 years should receive two doses of vaccine given at least 4 weeks apart if they have not been vaccinated against influenza previously. Children in that age group who received only one dose of vaccine during their first year of influenza immunization also should be given two doses of vaccine the following year. Notably, children older than 9 years need only one dose in their first season of immunization (AAP, 2008b).

Annual vaccination is now recommended for any adult who wishes to reduce the risk of becoming ill with influenza or transmitting the illness to others should he or she become infected. However, the ACIP continues to emphasize the importance of annual influenza vaccination for all persons aged 50 years and older; other adults who are at high risk for influenza complications or who are more likely to require medical care as a result of influenza; and anyone who lives with or cares for young children, individuals older than 50, and/or persons with medical conditions that put them at high risk for severe complications from influenza (Table 1). It is of paramount importance that all health care personnel—regardless of age—

receive an annual influenza vaccination, as an infected clinician who has yet to show symptoms can easily transmit the virus to patients. Notably, just 41.8% of all health care workers were immunized during the 2005–2006 influenza season (CDC, 2008c).

OPTIONS FOR PREVENTING INFLUENZA AND ITS COMPLICATIONS

Annual vaccination is the best way to prevent influenza and its complications (CDC, 2008c). Considerable research indicates that vaccination is correlated with a decrease in transmission of influenza within households, health care facilities, and communities (CDC, 2008c). A cost-benefit analysis of a strategy to vaccinate healthy working adults against influenza showed that vaccination saved a mean of US\$13.66 per person, with vaccination generating net savings 95% of the time (Nichol, 2001). The cost-effectiveness of annually vaccinating children against influenza is less clear. A 2006 study found that cost-effectiveness increased along with the child's risk status. Cost-effectiveness tended to decrease with increasing age (Prosser et al., 2006). The impact of herd immunity

on the cost-effectiveness of the expanded influenza vaccine recommendations has yet to be assessed.

Two types of influenza virus, A and B, cause epidemic disease in humans. Type A influenza has several subtypes that are determined by the surface antigens hemagglutinin (H1, H2, and H3) and neuraminidase (N1 and N2). Hemagglutinin plays a role in virus attachment to cells, whereas neuraminidase plays a role in virus penetration into cells. Influenza A affects all age groups and causes moderate-to-severe illness. Influenza B, which generally causes milder disease than type A, primarily affects children (CDC, 2008a).

Because influenza viruses change constantly, the US Food and Drug Administration (FDA) gathers information each year about which strains are most responsible for infecting humans. The FDA then recommends two influenza A strains and one influenza B strain for inclusion in the following season's vaccines (CDC, 2008d). The name of each influenza virus strain denotes virus type (A or B), geographic origin, strain number, and year of isolation. For influenza type A viruses, the type of hemagglutinin and neuraminidase also is indicated. Vaccines for the 2008–2009 influenza season contain A/Brisbane/59/2007 (H1N1)-like virus, A/Brisbane/10/2007 (H3N2)-like virus, and B/Florida/4/2006-like virus (CDC, 2008c). All three of these strains are different from those that comprised the 2007–2008 vaccines (AAP, 2008b).

Two types of vaccines are available: trivalent inactivated influenza vaccine (TIV), which is an intramuscular injection, and live, attenuated influenza vaccine (LAIV), which is an intranasal spray. Because vaccine viruses are grown in eggs, neither TIV nor LAIV should be given to anyone who has had a severe allergic reaction (hives, angioedema, allergic asthma, or systemic anaphylaxis) to chicken or egg proteins (AAP, 2008b).

TIV

For the 2008–2009 season, four manufacturers have provided TIV for use in the United States: CSL Biotherapies (Afluria[®]), GlaxoSmithKline (Fluarix[®] and FluLaval[®]), Novartis Vaccine (Fluvirin[®]), and sanofi pasteur (Fluzone[®]). Two TIVs are approved for use in children: Fluzone for children aged 6 months and older and Fluvirin for children aged 4 years and older. Afluria, Fluarix,

and FluLaval are all indicated for use only in individuals aged 18 years and older (CDC, 2008c).

Adverse events after receipt of TIV generally are mild and include soreness at the injection site and fever. Mild systemic symptoms, such as nausea, lethargy, headache, muscle aches, and chills, also are possible (AAP, 2008b).

When the strains included in the vaccine closely match those that are circulating within the community, the efficacy of TIV is as high as 90% among healthy recipients who are younger than 65 years (CDC, 2008a). Among individuals aged 65 years and older, TIV is only 30% to 40% effective in preventing illness but is 50% to 60% effective in preventing hospitalization and 80% effective in preventing death (CDC, 2008a).

Keep in mind that individuals undergoing immunotherapy may have a diminished immune response to TIV. In addition, persons with a history of Guillain-Barré syndrome (GBS) are at substantially higher risk for a subsequent recurrence of GBS, compared with those persons who do not have such a history. Although it is unknown whether influenza vaccination specifically increases the risk for GBS recurrence, it may be prudent to avoid vaccinating persons who are not at high risk for severe influenza complications and who are known to have experienced GBS within 6 weeks after a previous influenza vaccination (CDC, 2008c).

LAIV

Also known as FluMist[®], LAIV is manufactured by MedImmune, LLC. Administered intranasally with a sprayer, LAIV is licensed for use in healthy nonpregnant persons aged 2 to 49 years. Children aged 6 to 23 months and adults aged 50 years and older should not receive LAIV. In addition, LAIV should not be administered to children with asthma and those younger than 5 years who have recurrent wheezing or have experienced an episode of wheezing during the preceding year (AAP, 2008b). The vaccine also is contraindicated in individuals who have any of the underlying medical conditions that increase one's risk for complications of influenza infection (Table 1; CDC, 2008c). These individuals should receive TIV instead. There have been no reports of GBS among LAIV recipients; however, data are limited. A careful consideration of the potential risks and benefits is warranted when

deciding whether to administer LAIV to an individual who previously experienced GBS within 6 weeks of having been immunized against influenza (MedImmune, LLC, 2008).

Adverse events after receipt of LAIV generally are mild; in children, they include runny nose, nasal congestion, headache, fever, vomiting, abdominal pain, and myalgias—all of which are associated more often with the first dose (CDC, 2008c). Adults who receive LAIV may experience cough, a runny nose, nasal congestion, sore throat, and chills. No serious adverse reactions to LAIV have been identified (CDC, 2008a).

The use of LAIV among healthy adults reduces the incidence of severe febrile illness by 20% and the incidence of febrile upper respiratory illness by 24%. In addition, LAIV is 87% effective against culture-confirmed influenza in children aged 5 to 7 years and has been shown to reduce the incidence of febrile otitis media by 27% (CDC, 2008a).

Efficacy—TIV Versus LAIV

Both TIV and LAIV have shown effectiveness in children and adults, but head-to-head data that directly compare the efficacy of the two vaccines are limited (CDC, 2008b). In a randomized double-blind study that included more than 4,000 children aged 24 to 59 months, there were 55% fewer cases of influenza in the group that received LAIV than in the group given TIV (Belshe et al., 2007). LAIV offered significantly more protection against both well-matched and mismatched influenza A viruses.

A community-based trial was conducted during the 2003–2004 influenza season, when circulating strains were poorly matched with H3N2 strains in the vaccine. Results showed that LAIV, unlike TIV, was effective against the antigenically distinct H3N2 strains in circulation (Piedra et al., 2007). Specifically, 37% of children aged 5 to 18 years who received LAIV were protected from influenza-positive medically attended acute respiratory illness; 50% were protected from medically attended pneumonia and influenza events.

When and Where to Vaccinate

Immunization against influenza should begin as soon as that season's vaccines become available,

preferably by October. Annual vaccination of all children aged 6 months through 18 years should begin in the 2008–2009 season and no later than the 2009–2010 influenza season (CDC, 2008c). Providers should offer vaccinations routinely whenever the opportunity arises throughout the influenza season, even after influenza has appeared in the community—which may be as late as February—and continue to immunize through the month of May (Poland & Johnson, 2008). Keep in mind that immunity generally develops within 2 weeks of having received influenza vaccine.

Vaccination at schools and other alternative, nontraditional sites has been recommended to improve coverage rates (CDC, 2008c; Stinchfield, 2008). The development of such sites will enhance community preparedness for possible mass vaccinations in the event of an influenza pandemic (Stinchfield, 2008). For more information, see “Championing School-Located Influenza Immunization: The School Nurse’s Role,” on page 18S.

Overcoming Vaccination Myths and Misconceptions

Providing handouts that address frequently asked questions can increase patients’ knowledge and help overcome common myths and misconceptions about influenza vaccination (see Appendix B). Many people mistakenly believe that immunization can cause influenza; others simply do not think that influenza is a severe enough disease to warrant vaccination (Stinchfield, 2008). Also common is the erroneous belief that influenza vaccine is in short supply, that the vaccine should be reserved for those patients who need it most, and that healthy individuals do not need to be immunized (Johnson, Nichol, & Lipczynski, 2008).

Other Preventive Measures

Four antiviral medications are licensed in the United States for treatment of or chemoprophylaxis against influenza: the adamantanes amantadine and rimantadine, and the neuraminidase inhibitors zanamivir and oseltamivir. However, because of ongoing resistance of influenza A virus strains, neither amantadine nor rimantadine should be used at this time according to the CDC (2008c). Oseltamivir is

approved for treatment or chemoprophylaxis in individuals aged 1 year and older; zanamivir is approved for treatment of persons aged 7 years and older and for chemoprophylaxis against influenza in patients aged 5 years and older (CDC, 2008c). Clinicians should remain alert for changing recommendations as additional data regarding antiviral resistance become available. For updates, visit <http://www.cdc.gov/flu/professionals/antivirals/index.htm>

Treatment of influenza with oseltamivir or zanamivir is most likely to be effective if begun within the first 48 hours of symptom onset. Whether such treatment reduces the duration of viral shedding remains unclear. However, timely administration of either antiviral agent has been shown to reduce the duration of uncomplicated illness by approximately 1 day (CDC, 2008c).

During periods of increased influenza activity in the community, the following groups of persons should be considered high priority for the use of oseltamivir or zanamivir as antiviral chemoprophylaxis:

Persons at high risk during the 2 weeks after influenza vaccination (after the second dose, in the case of children younger than 9 years who have not been vaccinated previously).

Persons at high risk for whom influenza vaccine is contraindicated.

Family members or health care providers who are unvaccinated and are likely to have ongoing, close exposure to persons at high risk, unvaccinated persons, and infants younger than 6 months.

Persons at high risk and their family members and close contacts, and health care workers, when the influenza strains in that season's vaccine do not match the strains circulating within the community.

Persons with immune deficiencies or those who might not respond to vaccination.

Unvaccinated staff and persons during response to an outbreak in a closed institutional setting with residents at high risk.

Decisions concerning the timing and duration of chemoprophylaxis will likely depend on factors such as cost, adherence, and the potential for adverse events (CDC, 2008c).

CONCLUSION

It is hoped that higher levels of vaccination against seasonal influenza will go a long way

toward decreasing our nation's disease burden and enhancing our population's preparedness in the event of an influenza pandemic. School nurses can help improve the rates of immunization against influenza by staying up to date with the latest ACIP recommendations and making the most of every opportunity to talk with students, caregivers, and staff members about the importance of annual vaccination. School nurses and their colleagues in the health professions also can help by making sure that they themselves are immunized each year in a timely manner.

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Appendix A

Influenza Vaccine Coverage: A Long Way to Go

Recently the Centers for Disease Control and Prevention (CDC) reported data regarding the rates of pediatric immunization against influenza during the 2007–2008 influenza season, which was four seasons after the Advisory Committee on Immunization Practices (ACIP) began recommending annual vaccination of children aged 6 to 23 months and two seasons after the ACIP expanded its recommendation to include children aged 24 to 59 months (CDC, 2008b). On average, 40.8% of children aged 6 to 23 months received one or more influenza vaccine doses; however, just 22.1% were fully vaccinated. Among children aged 24 to 59 months, the proportion of children in that age group who received one or more doses was 22.2%; only 16.5% were fully vaccinated.

Adult vaccination rates for the 2006–2007 influenza season were as follows: 35.1% for individuals aged 18 to 49 years with high-risk conditions; 42.0% for individuals aged 50 to 64 years; and 72.1% for persons aged 65 years and older (CDC, 2008e). Although these figures represent a significant improvement over the 2005–2006 season, they still fall far below the *Healthy People 2010* targets—annual vaccination of 90% of all noninstitutionalized adults aged 65 years and older, and 60% of noninstitutionalized adults aged 18 to 64 years who have one or more high-risk conditions (US Department of Health and Human Services, 2000). Unfortunately, coverage rates among pregnant women remain abysmally low, having risen only slightly from 12.3% during the 2005–2006 influenza season to 13.4% in 2006–2007. And, only 41.8% of health care workers were immunized in 2005–2006, despite repeated and emphatic calls for annual vaccination of all individuals in that category (CDC, 2008c)

Appendix B

Frequently Asked Questions

Q. Is the flu a serious illness?

A. Yes, it can be. Influenza and its complications claim about 36,000 lives in the United States each year and result in more than 200,000 hospitalizations.

Q. Are healthy children and adults at risk for flu complications?

A. Yes, especially children younger than 2 years and adults aged 50 years and older.

Q. Isn't it dangerous for patients with chronic conditions to be vaccinated?

A. On the contrary, influenza vaccination is recommended especially for people with chronic conditions because these individuals are at high risk of influenza-related complications. For example, it is particularly important that people with asthma, diabetes, or any condition that can compromise respiratory function be vaccinated.

Q. Can any of the flu vaccines give you the flu?

A. You cannot get the flu from any of the flu vaccines. The nasal spray vaccine includes live (but weakened) influenza viruses; therefore, it can cause mild symptoms of influenza, such as nasal congestion, runny nose, fever, or sore throat. The flu "shot" has inactivated ("killed") viruses and does not cause these symptoms.

Q. How effective is the flu vaccine? Why do some people get the flu even though they've been vaccinated?

A. The flu vaccine is between 70% and 90% effective in preventing influenza in healthy young people and somewhat less effective in patients older than 50 years. Because the vaccine is not 100% effective, it's possible to get influenza even after being vaccinated. However, annual vaccination still is the best protection against influenza, whatever your age.

Q. Are there side effects associated with either type of flu vaccine?

A. Side effects with either vaccine usually are mild and last only a short time. With the injected vaccine, side effects are most likely mild pain or redness at the injection site. With the nasal spray vaccine, runny nose, nasal congestion, headache, or sore throat are all possible side effects.

Q. Is it possible for an individual who has received the live, attenuated influenza vaccine to transmit the live viruses to someone else?

A. No. Although such transmission is a theoretical risk, it has not been seen in clinical practice.

Q. I received a flu shot last year. Why do I need to get another one this year?

A. Because the flu virus is continually changing, the content of each year's vaccines is changed as well to include the strains of the virus most likely to be circulating during that particular influenza season.

Q. I've been told that my child, who is 8 years old and will receive flu vaccine for the first time this season, will require two doses of vaccine. Why?

A. In children younger than 9 years who are being vaccinated for the first time, two doses of vaccine, at least 4 weeks apart, are required for full protection.

Feature Article

School-Located Influenza Vaccination Clinics: Local Health Department Perspectives

James Ransom, MPH

Universal childhood influenza vaccination presents challenges and opportunities for health care and public health systems to vaccinate the children who fall under the new recommendation. Advisory Committee on Immunization Practices (ACIP) recommendations and guidelines are helpful, but they do not provide strategies on how to deliver immunization services to the groups affected by their recommendations. Community stakeholders need to develop and sustain new partnerships to achieve the goals of universal childhood immunization recommendations, including expanding the points of access to influenza vaccination. Schools are a key community venue for annual delivery of influenza vaccination. Over the past 2 years, the National Association of County and City Health Officials has examined local health department–school system relationships in regard to delivery of influenza vaccination to identify and document common elements of success, challenges, and key lessons learned.

Keywords: influenza; local health departments; schools; school nurses; vaccination; partnerships

INTRODUCTION

Local health departments (LHDs) have entered a new age era of challenges—multiple new vaccines, new Advisory Committee on Immunization Practices (ACIP) immunization recommendations (Fiore et al., 2008), and stagnant or shrinking budgets to implement these new recommendations (Honore, Clarke, Mead, & Menditto, 2007). Characterizing the experiences of LHD immunization programs and their work with schools to deliver influenza vaccinations can be a useful tool to help inform future policies and practices at all levels of governmental public health as well as within multiple public institutions, including school systems. Because resources to schools and health departments often do not match the demands on these agencies, LHDs need to involve all community stakeholders and be bold and innovative in finding models of immunization service delivery that work in their communities.

The operational challenges faced by LHDs when delivering immunization services in schools are numerous just as they are with any government

public health program. Expanded influenza vaccination in children will likely decrease the number of influenza cases across all population groups, decrease the impact of influenza on the health care system, protect more susceptible contacts, decrease the economic impact of influenza disease, and increase community capacity to deliver vaccine to the general population (Esposito et al., 2006).

Although considered at high-risk, children historically have been overlooked during influenza season because the senior population becomes the main focus due to their increased morbidity and mortality (Bhat et al., 2005). Among children, the rate of hospitalizations from influenza ranges from 19 to 104 hospitalizations per 10,000 children per year. Furthermore, the influenza attack rates are 10% to 40% among preschool children, putting

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older persons and persons with chronic medical conditions at high risk of infection through family transmission of the disease (Jordan et al., 2006).

Even before the ACIP voted to expand influenza vaccination recommendations, many LHDs had taken steps to reach school-age children via venue-based delivery methods (Hull, Frauen-dienst, Gundersen, Monsen, & Fishbein, 2008). Most of these LHDs focused on elementary schools as the appropriate venue, but some also held influenza vaccination clinics in middle and high schools settings (National Association of County & City Health Officials [NACCHO], 2007a). Their challenges, successes, and lessons learned are summarized in this article.

CHALLENGES

More than two decades ago, LHDs provided many back-to-school vaccinations. The push in the early-to-mid 1990s was to get children integrated into a medical home for more coordinated care, including immunizations. As immunization services delivered to this age group shifted from the back-to-school model to the medical-home model, the resources to vaccinate those who fell into health care coverage and access “gaps” diminished in kind. LHD service regarding immunizations delivered in school settings lingered, but with the recent ACIP influenza and other adolescent-focused vaccination recommendations, the need for that service has returned.

LHDs are supportive of school-located immunization efforts, but they are occasionally wary of asserting themselves on schools’ turf. LHDs need a clearer roadmap to determine how to deliver influenza vaccines in school settings efficiently without disrupting the school’s primary functions of teaching and child care. LHDs need local political leadership to help open lines of dialogue with schools. Health departments need those same political leaders to help secure local funding support to provide the resources needed to implement school-located immunization clinics. These types of support help build and sustain a platform for continuing and strengthening the collaboration between LHDs and community schools.

When working with schools, LHDs have to set immunization clinic dates at least a year in advance because rescheduling is difficult when the

immunization clinic is competing with other school activities (e.g., picture days and field trips) for space on the school’s calendar. Therefore, getting the influenza vaccine doses when promised is critically important. If health departments’ influenza vaccine orders arrive early or right on time, scheduled school clinics can proceed as planned. However, if the ordered influenza vaccine doses arrive late, the scheduled school clinics can be jeopardized. In schools, LHDs are confronted with a spectrum of ages of children and some children who cannot receive certain formulations of influenza vaccine due to medical contraindications (Centers for Disease Control and Prevention [CDC], 2008). Therefore, LHD staff need to have all types of influenza doses on hand to move forward with the scheduled clinics.

Planning immunization clinics demand that LHDs coordinate schedules with schools and work with school staff to identify volunteers (preferably those already working with the schools so additional background checks do not become necessary), rely on the schools to distribute and collect consent forms from students, and assure that all documents and forms are translated into the appropriate languages for the school populations. Many schools do not have the infrastructure to handle these logistics as there are tremendous resource inequities across school districts and systems, even within the same county. Some districts are well funded and employ full-time school nurses, while others have limited budgets and have a small staff of school nurses with responsibilities across multiple school districts. Some school districts have no school nurses at all. The lack of school nurses is a national challenge that has been characterized elsewhere (Goodin, 2003).

To address the logistical and workforce challenges of school-located immunization clinics, many LHDs have explored collaborating with mass vaccinators to provide immunization services in school settings. However, LHDs have found that often they cannot work with mass vaccinators because the mass vaccinators do not have a reimbursement incentive to conduct these clinics. LHDs are not able to provide the incentive (Centers for Medicare and Medicaid Services, 2007). This reimbursement incentive must come from the state or federal levels of government. The low reimbursement rate for Vaccines for Children (VFC) doses acts as a disincentive to LHD collaboration with mass vaccinators.

This is a challenge because county governments often do not have funds to purchase influenza vaccine doses for non-VFC-eligible children. Some local districts have overcome this particular challenge by working effectively with their political leadership, with foundations, and with private providers in their community to help secure doses of influenza vaccine to fill these gaps (NACCHO, 2007b). The availability of these additional locally financed doses eliminate the need to screen schoolchildren for VFC eligibility. LHDs also have relied on proxy measures of VFC eligibility, such as ratio of children eligible for free school meals (Roosa, Deng, Nair, & Burrell, 2005).

Because of LHD staffing shortages, they have to recruit many volunteers, with a preference for those volunteers already screened and used by the school (NACCHO, 2007d). They also have to develop clear work plans to map out activities that can be done by the school staff, such as distributing and collecting consent forms or locating space within the school to host the clinic. The LHDs have to do the bulk of the remaining clinic-related activities due to the shortage of school nurses. Even in those jurisdictions with enough school nurses, many of those school nurses reported that they were being “leaned on” again to do additional activities that they did not have the time, resources, or funding to do (NACCHO, 2007c). School nurses in these jurisdictions looked to the LHD to actively partner with them on all activities related to the immunization clinic.

Evaluating the processes and outcomes of these school-located clinics is a challenge. The lack of evaluation of school-located clinics is a function of the lack of time and resources on the part of LHDs and partners conducting these immunization clinics. Much of the time spent by those conducting the clinics is spent on the labor- and resource-intensive tasks associated with planning, preparing, and coordinating the schedules of the health department and the school, managing and transporting the vaccine doses, and operating the clinics efficiently to minimize disruption of the school day for students and staff. There are few resources remaining to conduct an extensive evaluation. A strategy that some LHDs have used to overcome this challenge has been to work with local academic centers to help develop evaluation tools and instruments that are not an administrative

burden to the LHD staff tasked with collecting evaluation data (NACCHO, 2007c).

SUCCESSSES

LHDs pride themselves on collaborating with community partners to identify and address emerging public health concerns. Their established relationships with private providers, local medical societies, community clinics, child-care centers, and other community-based organizations help open doors to collaborations with schools. School-located influenza efforts have assisted many communities to address racial and ethnic disparities by locating the influenza clinics where underserved children live and attend school and by offering vaccinations free of charge to the school community. Many LHDs have concentrated their efforts on schools in communities that are medically underserved (NACCHO, 2007b) because that will have the greatest impact on those having the greatest need and often eliminates the need for VFC-eligibility screening.

LHDs have developed flyers, posters, model consent forms, brochures, and incentives with an educational message to increase awareness of the importance of annual influenza vaccination for children. These health education materials have been disseminated not just within the schools but throughout the community. Collaboration with local primary care providers (PCPs) has proved an effective way to educate parents and target populations, conduct disease awareness efforts, and educate providers as well as the spectrum of staff in provider offices, such as medical assistants, front office staff, and file clerks.

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Many LHDs have connected their school-located influenza vaccination efforts to pandemic influenza

preparedness. They have worked with their preparedness teams to use school-located influenza vaccination efforts as annual mass vaccination exercises (NACCHO, 2007a). These exercises are real-time and real-world models of how to train a cadre of LHD staff, volunteers, school staff, and others on how to plan, coordinate, and implement a process that vaccinates a large number of people of all different ages in a short timeframe.

Volunteers have been critical to the success of these school-located vaccination efforts. Local volunteers have helped with every aspect of planning and implementation of these clinics, such as staffing reminder-recall efforts, leading campaigns to help boost coverage by calling parents to let them know that their child needs a second dose of influenza vaccine, or to remind them of an upcoming clinic. Partnerships have been vital to success. LHDs have worked closely with private providers, hospital systems, and local medical societies. They have drafted letters to parent-teacher associations, school principals, school nurses, and other stakeholders to promote school-located vaccination efforts. LHDs also have made sure they had the backing of PCPs to assure that local providers were motivated to support the school-located efforts. PCPs are a critical source of education and information for parents; therefore, their support is paramount to community participation in school-located influenza vaccination clinics. Private provider support also helps with flow of information: (a) LHDs let providers know which children received influenza vaccinations at the school clinic, informing providers which of their patients are in need of a second dose; and (b) partnerships with PCPs helps assure consistent messages to parents and the school community about the importance of annual influenza vaccinations across the life span.

Local funding and investment are key elements of success for school-located influenza vaccination clinics. Programs with consistent investment of local sources of funds had more robust and sustainable activities, because those local funds allowed LHDs to cover costs associated with (a) training volunteers, (b) conducting more intensive community outreach and education activities, and (c) developing and disseminating promotional materials. The sustainability of school-located influenza vaccination efforts are tied to local investments, which are tied to political advocacy. Anne Arundel

County, MD, is the most salient example of the importance of advocacy. The county commissioner was vested in the program of providing influenza vaccination to school-age children. Because the health department had the county leaders' political backing, they had a much easier time gaining buy-in from the schools—principals, teachers, and PTAs. The outcome of this initial collaboration was the development of an enduring partnership, manifested as sustained annual school-located influenza vaccination clinics. Therefore, maintaining good relationships with local political structures are key elements of success for developing, executing, and sustaining annual school-located influenza vaccination clinics. If relationships, partnerships, and lines of communications with political leaders and community stakeholders are not in place, the health department's ability to deliver influenza vaccinations in school settings, to advocate for these types of special projects, and to receive adequate funding to support these efforts will be greatly hampered.

LESSONS LEARNED

In evaluating LHD experiences in implementing school-located influenza vaccination activities, there are key lessons that have been learned about these efforts. LHDs have examined their efforts to determine which actions worked well and which actions did not work out so well and need to be modified. The lessons learned from working with schools to deliver influenza vaccinations are outlined below.

- Create a means of making school-located influenza vaccination attractive to mass vaccinators.
- Ask, document, and characterize school perspectives and attitudes about the vaccination and use that information to foster collaborations with school systems and focus on solutions to their concerns.
- Gauge the perspectives and attitudes of school nurses about schools as appropriate venues for implementing universal childhood influenza vaccination recommendations. School nurses are the public health professionals who will lend the most credibility to parents about the importance of vaccinating in school settings.
- Work more effectively with PTAs and volunteer parents by including them in the planning and execution of the school-located clinics.
- If the schools have school nurses on staff, it is important to work with them through their school nurse

supervisor—that step usually assures that information goes out to school nurses throughout the school district targeted for influenza vaccination clinics.

- Work through different scenarios to find which fits with LHDs' community and schools within its jurisdiction—what works in Carroll County, MD, may not be applicable to an LHD in a very different geographical region of the country.
- Screening for the student's insurance status should not be done. LHDs, schools, and other community stakeholders have to partner to find appropriate public and private funding sources to assure that all (VFC- and non-VFC-eligible) children have access to the influenza doses.
- Language and culturally appropriate documents, especially consent forms, are crucial to program success.

CONCLUSION

As LHDs try to define their roles in implementing ACIP's universal childhood influenza immunization recommendations, they are being challenged to find innovative, sustainable, and pragmatic alternative access points in addition to the child's medical home. For school-age children, the school setting is the most obvious and logical platform for connecting children, annually, to influenza vaccines. Growing constraints on resources for LHDs, school systems (including a shortage of school nurses), and local governments have increased the need for, and the formation of, linkages, partnerships, and collaboration within communities. Partnerships with schools are being established to vaccinate school-age children against influenza. Previous NACCHO research efforts (NACCHO, 2007a, 2007b, 2007c, 2007d) suggest that LHDs and their partners can improve school-located influenza vaccination programs by these

As LHDs try to define their roles in implementing ACIP's universal childhood influenza immunization recommendations, they are being challenged to find innovative, sustainable, and pragmatic alternative access points in addition to the child's medical home.

five straightforward steps: (a) better understanding of schools' attitudes and perceptions about school-located influenza vaccination clinics; (b) improving advocacy and relationships with

political structures and policy makers; (c) forming new and strategic public–private partnerships; (d) conducting effective and culturally appropriate outreach and education efforts to parents and providers; and (e) encouraging greater levels of collaboration and integration with stakeholders.

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Feature Article

Championing School-Located Influenza Immunization: The School Nurse's Role

Christina Li, MPH, Marian Freedman, MA, and Lynda Boyer-Chu, MPH, RN

According to the 2008 recommendations of the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention, influenza vaccine should be administered on an annual basis to all children aged 6 months through 18 years. School-age children are more likely than any other age group to be infected with influenza, and young children are at high risk for hospitalization resulting from influenza-related complications. Given children's pivotal role in transmission of influenza to their schoolmates, household contacts, and members of their communities, it has been suggested that routinely vaccinating children against the disease might reduce the burden of disease in the US population as a whole. School-located vaccination clinics could go a long way toward improving the rates of pediatric influenza immunization and enhancing the pandemic preparedness of communities. School nurses are urged to consider ways in which they can help advocate for, plan, and/or implement school-located influenza vaccination clinics.

Keywords: influenza immunization; school-located vaccination clinics; vaccination coverage rates; trivalent inactivated influenza vaccine; live, attenuated influenza vaccine

In 2008, the Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC) expanded its recommendations for annual influenza vaccination to include all children aged 6 months through 18 years. Previously, annual immunization against influenza was recommended for all children aged 6 to 59 months and for high-risk children aged 5 to 18 years (CDC, 2008). Clearly, the newly expanded ACIP recommendation greatly increases the vaccination burden on pediatric health care providers.

School-located influenza immunization clinics can go a long way toward easing that burden and improving influenza vaccination rates, which historically have been low among individuals at high risk for influenza-related complications. In 2006, for example, little more than one third of the school-age children for whom flu vaccine was recommended actually were immunized (CDC, 2007). As immunization champions, school nurses can play a key role in laying the groundwork

for school-located influenza vaccination clinics and, at the same time, expand their professional profile. This article explains how those clinics would be beneficial, cites examples of successful school-located clinics, and suggests specific ways in which school nurses might advocate for, plan, and/or participate in their implementation.

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As immunization champions, school nurses can play a key role in laying the groundwork for school-located influenza vaccination clinics and, at the same time, expand their professional profile.

RATIONALE FOR IMMUNIZING SCHOOL-AGE CHILDREN AGAINST INFLUENZA

Annual influenza attack rates among school-age children are as high as 42%, making this group more likely to be infected with influenza than any other age group (American Academy of Pediatrics [AAP], 2008). In young children, virus shedding begins prior to symptom onset and continues for as long as 10 days after (AAP, 2008). Thus, children with influenza play a pivotal role in the transmission of influenza to their schoolmates, household contacts, and members of their communities (AAP, 2008). Infants and young children are more likely than older children to be hospitalized because of influenza; hospitalization rates are estimated at 240–720 per 100,000 children younger than 6 months and 17–45 per 100,000 children aged 2 to 5 years (AAP, 2008). Influenza-related deaths, while much less common among children than among older adults, do occur; during the 1990s, an average of 92 children younger than 5 years of age died each year as a result of influenza (AAP, 2008).

The best way to prevent influenza is to immunize high-risk patients and all schoolchildren on an annual basis (Longini & Halloran, 2005). Routinely immunizing children against influenza has the potential to benefit not only those who are vaccinated but also the population as a whole. According to a simulation model, vaccination of 20% of children aged 6 months to 18 years would reduce the total number of influenza cases in the United States by 46%, while 80% coverage would reduce the number of cases by 91%. Influenza-related economic costs and mortality would fall dramatically (Weycker et al., 2005).

Data from Japan show that vaccinating schoolchildren against influenza can protect other segments of the population (Reichert et al., 2001). From 1962 to 1987, most Japanese schoolchildren were immunized against influenza each year. During that time, excess mortality due to pneumonia

and influenza during the winter (primarily among older persons) dropped sharply, but when the immunization program was discontinued, the excess mortality rates rose once again. Notably, excess mortality rates from influenza in the United States remained nearly constant during that same time period. These findings suggest that annual influenza vaccination of all school-age children in Japan resulted in population-wide herd immunity.

TYPES OF INFLUENZA VACCINE

Two types of influenza vaccine are available in the United States for pediatric use. Trivalent inactivated influenza vaccine (TIV), which contains killed viruses, is administered via intramuscular injection (CDC, 2008). Live, attenuated influenza vaccine (LAIV) is an intranasal spray. Because the live, attenuated viruses in LAIV are temperature-sensitive, they do not replicate effectively at core body temperature. However, the vaccine can result in mild signs or symptoms of influenza, such as a runny nose, nasal congestion, a fever, or a sore throat (CDC, 2008).

Either TIV or LAIV can be used to vaccinate healthy nonpregnant individuals aged 2 to 49 years, according to the most recent ACIP recommendations (CDC, 2008). Notably, children aged 6 to 23 months should be given only TIV; they should not receive LAIV. Also, LAIV should not be administered to persons who are at high risk for complications of influenza infection because of underlying medical conditions. Such persons include adults and children with chronic disorders of the pulmonary (e.g., asthma) or cardiovascular systems; adults and children with chronic metabolic diseases (e.g., diabetes), renal dysfunction, hemoglobinopathies, or immunosuppression; children and adults receiving long-term aspirin therapy; persons who have any condition (e.g., cognitive dysfunction, spinal cord injuries, seizure disorders, or other neuromuscular disorders) that can compromise respiratory function or the handling of respiratory secretions or that can increase the risk for aspiration; pregnant women; and residents of nursing homes and other chronic-care facilities that house persons with chronic medical conditions. In addition, children with a recent history of wheezing should not receive LAIV (CDC, 2008).

WHY VACCINATE AT SCHOOL?

School-located immunization clinics in the United States have been instrumental in efforts to decrease the burden of diseases that were once considered an inevitable part of growing up. The polio vaccine, introduced in 1955, was administered primarily in schools to maximize its use (Lindley et al., 2008). When the rubella vaccine was introduced in 1969, school-located programs were instituted to immunize adolescents on a catch-up basis (Lindley et al., 2008). In a more recent example, school-located demonstration projects have extended protection against hepatitis B to adolescents who were not covered by a 1991 recommendation for universal infant vaccination (Lindley et al., 2008). Some of the most effective vaccination programs in schools have been in response to outbreaks of diseases such as measles, meningococcal disease, or varicella (Lindley et al., 2008). For example, when vaccination was offered in two schools with varicella outbreaks, immunization rates among susceptible children rose from 52.9% to 92.2% in one school and from 68.8% to 85.3% in the other (Hall, Galil, Watson, & Seward, 2000).

Current interest in school-located vaccination clinics has been heightened not only by the expanded ACIP recommendations for influenza vaccination but also by the approval of several new vaccines for adolescents within the past 3 years: human papillomavirus (HPV) vaccine, the tetanus and diphtheria toxoids and acellular pertussis vaccine (Tdap), and the tetravalent meningococcal conjugate vaccine (MCV4). The state of New Jersey now requires annual influenza vaccine for all children who attend preschool or day care; in addition, MCV4 and Tdap are mandatory for sixth graders in the state (Associated Press, 2007). Other states, New York, Washington, and Utah for example, have followed suit by requiring Tdap for sixth and/or seventh graders (Blog, 2007; Utah Administrative Code, 2008; Washington State Department of Health, 2008).

School-located influenza vaccination clinics have shown considerable success. In one study that included 28 schools in four states during the 2004–2005 influenza season, absentee rates for flu-like illnesses were far lower among children in the schools with an on-site vaccination program (including students who were not vaccinated),

compared with children in the control-group schools (King et al., 2006). An elementary school-located countywide influenza immunization program in Maryland also was associated with reduced absenteeism during influenza outbreak periods in 2005–2006 (Davis, King, Moag, Cummings, & Magder, 2008). Once again, protection appeared to extend to unvaccinated members of the school community. In both of those studies, the vaccine administered was LAIV.

Hawaii conducted a statewide influenza vaccination initiative in schools for the first time in 2007–2008, the most extensive school-located program anywhere (Figures 1-3). A collaborative effort of Hawaii's departments of health and education, several state public and private school associations, and two schools of nursing, the Stop Flu at School program vaccinated more than 60,000 students (about 40% of the state's children aged 5 to 13 years) as well as 9,000 teachers and school staff (Effler, 2008; Hawaii State Department of Health, 2008a). Although the initiative's impact has not yet been assessed fully, the program demonstrated the feasibility of conducting a statewide school-located influenza vaccination program using both TIV and LAIV and the appeal of such a program to both parents and public and private schools (Effler, 2008). The program also improved the state's preparedness for possible mass vaccinations of schoolchildren in the event of an influenza pandemic (Effler, 2008).

LAYING THE GROUNDWORK FOR A SCHOOL-LOCATED INFLUENZA IMMUNIZATION CLINIC

In its 2006 position statement on immunizations, the National Association of School Nurses (NASN) expressed support for recognition by the health care system and the community "of the school nurse's critical position to assess immunization needs, serve in a leadership capacity to develop school immunization programs, and promote community awareness of the value of immunizations . . ." (NASN, 2006). Indeed, a report on influenza immunization clinics conducted at 25 school sites during the 2005–2006 influenza season showed that the school nurse, along with the superintendent, principal, and school support



Figure 1. A Child Receives His Dose of Live, Attenuated Influenza Vaccine as Part of Hawaii's Statewide Influenza Vaccination Initiative, Stop Flu at School. Photo courtesy of the Hawaii State Department of Health.



Figure 2. Students Await Their Turn to Receive Influenza Vaccine as Part of Hawaii's Statewide Influenza Vaccination Initiative, Stop Flu at School. Photo courtesy of the Hawaii State Department of Health.

staff, is central to the programs' success (Schieber, 2008). The extent to which an individual school nurse participates in a particular influenza

immunization program will depend on a host of factors. Potential responsibilities range from publicizing the clinic and educating families to



Figure 3. An Adolescent Receives Her Dose of Trivalent Inactivated Influenza Vaccine as Part of Hawaii's Statewide Influenza Vaccination Initiative, Stop Flu at School. Photo courtesy of the Hawaii State Department of Health.

securing support (financial and otherwise) from community stakeholders. Fortunately, a number of resources are available to guide school nurses through the process (Tables 1-3). Important steps in that process are as follows:

Obtain the Support of Decision Makers for Setting up a Program

The decision makers within a school system are the principal, superintendent, and members of the school board (Lindley et al., 2008). You might want to call your local health department, clinic, and immunization coalition, as they may be able to sway the above-mentioned decision makers and lend technical support (Boyer-Chu & Wooley, 2008; Carpenter et al., 2007). Letters to the principal and superintendent as well as staff presentations on the importance of flu vaccination can be persuasive if those letters and presentations emphasize the potentially beneficial effect of immunization with respect to student and staff absenteeism. Health care providers in the community who are looking to reduce the immunization burden in their own offices are also likely to support school-located immunization programs, provided

that any provider misconceptions about LAIV or TIV have been corrected (Carpenter et al., 2007). Local pharmacists who are willing to serve as vaccine advocates may wish to be involved as well.

Establish Program Funding

When estimating the cost of a school-located vaccination clinic, be sure to take into account the number of doses of vaccine, materials such as syringes and cold boxes for transport, and the costs associated with reallocating the school nurse's time and hiring support staff. Consider the local school system, departments of health and education, and vaccine manufacturers as potential sources of funding and as partners in the endeavor (Carpenter et al., 2007). If most of the students are covered by a small number of managed care organizations (MCOs), keep in mind that the MCOs may be willing to cover vaccine and administrative costs in return for documents attesting to the immunization of their members. Such documentation enables the MCO to comply with quality standards at a lower cost than if members were vaccinated in their provider's office (Boyer-Chu & Wooley, 2008). Vaccines for Children funding may

TABLE 1. Resources for Setting up a School-Located Influenza Immunization Clinic

Give It a Shot! Toolkit for Nurses and Other Immunization Champions Working With Secondary Schools, 2nd edition, by Lynda Boyer-Chu, RN, MPH, and Susan F. Wooley, PhD, CHES. Manual available free at <http://www.ashaweb.org>; accompanying materials plus manual available from American School Health Association for US\$24.95.

Manual includes tips on collaborating with key health care providers and educating and motivating students and parents. Accompanying materials include a CD that contains the manual and many of the handouts, three colorful posters, and a DVD that contains teen-friendly and parent-friendly videos about vaccines.

Stop Flu at School, Hawaii State Department of Health. Many materials associated with Hawaii's statewide school-based influenza immunization program available for free at <http://hawaii.gov/health> or www.stopfluatschool.com

Includes frequently asked questions for parents/caregivers and school personnel, parent information cards, and student consent packet

TABLE 2. Tools for Immunization Clinic Administrators

Vaccine Information Statements from the CDC
<http://www.cdc.gov/vaccines/pubs/vis>

Most recent US-recommended immunization schedules
<http://www.cdc.gov/vaccines/recs/schedules>

Recommendations for storage and handling of selected biologicals
<http://www.cdc.gov/vaccines/pubs/vac-mgt-book.htm>

Immunization record cards, immunization screening questionnaires, and laminated immunization schedules available for purchase
<http://www.immunize.org/shop>

Centers for Disease Control and Prevention. *Epidemiology and prevention of vaccine-preventable diseases*, 10th edition (the "Pink Book")
<http://www.cdc.gov/vaccines/pubs/pinkbook>

TABLE 3. Helpful Web Sites for Students and Parents

American Academy of Pediatrics
<http://www.cisimmunize.org>

Allied Vaccine Group
<http://www.vaccine.org>

Centers for Disease Control and Prevention overview of vaccine safety
<http://www.cdc.gov/nip/vaccinesafety>

Childhood Influenza Immunization Coalition
<http://www.PreventChildhoodInfluenza.org>

Children's Hospital of Philadelphia Vaccine Education Center
<http://www.chop.edu/consumer/jsp/division/generic.jsp?id=75697>

Every Child by Two
<http://www.ecbt.org>

Immunization Action Coalition
<http://www.immunize.org>

Institute for Vaccine Safety, Johns Hopkins Bloomberg School of Public Health
<http://www.vaccinesafety.edu>

National Network for Immunization Information
<http://www.immunizationinfo.org>

Consider Scheduling Issues

Ideally, the clinic should take place no earlier than September and no later than December. Keep in mind that students younger than 9 years of age who have not been vaccinated against influenza previously or who received only one dose in their first year of vaccination will require two doses of vaccine administered 4 weeks apart for full protection (CDC, 2008). Some have suggested that a follow-up clinic, held at least 1 month after the first clinic, should be scheduled to allow for school-located administration of a second dose for children who require it and to provide a makeup date for children who missed the first clinic. During the second year of its Stop Flu at School program, Hawaii decided to hold only one clinic per school because 45% of all clinics in the first year of the program were follow-ups, which was not cost-effective (Effler, 2008). Therefore, in the future, children who would otherwise be offered a follow-up clinic will be directed to their regular health care provider instead.

Educate Students, Parents, Faculty, and Community

Consider appointing someone to assume the responsibility of publicizing the date of the clinic

be available to cover the cost of vaccines (but not of administration) that are given to students who meet the federal program's qualifications.

and educating caregivers, students, and staff (who also should be offered vaccine, if possible) about the importance of participating. It may make sense to partner with the local health department in efforts to target other groups for promotion and education, as such efforts may improve community-wide acceptance of the clinic. Preparations for a school-located influenza vaccination program held from October to November 2005 in a large, metropolitan public school system in Knox County, Tennessee, involved extensive outreach to the news media, local physicians' offices, and hospitals (Carpenter et al., 2007). A telephone help-line also was established to answer questions from parents, school staff members, students, and health care providers. Notably, the initial planning for this program included managers from both the county health department and the school system itself.

"Most people don't think of seasonal influenza as a serious disease because they don't know anyone who's died as a result of it," says Lynda Boyer-Chu, RN, MPH, a mentor school district nurse/wellness center nurse with the San Francisco Unified School District. Therefore, publicity relating to any school-located influenza vaccination program should emphasize that influenza often results in significant complications, even death. When developing education tools, it is important to consider caregivers' literacy levels and the languages commonly spoken in your community. Potential education tools include slide presentations for both students and parents, flyers, brochures, posters, newsletters, articles in local and school newspapers, and postings on school-associated listservs and school Web sites (with links to reputable sites) (Boyer-Chu & Wooley, 2008). Providing caregivers with the CDC's Vaccine Information Statements (VISs) well in advance of the clinic date and referring them to authoritative Internet sources of information will help to dispel myths about problems associated with vaccination.

Potential education tools include slide presentations for both students and parents, flyers, brochures, posters, newsletters, articles in local and school newspapers, and postings on school-associated listservs and school Web sites (with links to reputable sites).

Arrange for Vaccine Procurement/Storage, Staffing, and Other Practical Details

During the planning process, it will be necessary to determine how to obtain and where to store flu vaccine, arrange for and train medical and nonmedical staff, and gather the materials needed on vaccination day. Nonmedical equipment needed for clinic setup includes tables and chairs, refrigerators to store the vaccine, and an emergency phone. The best room to hold the clinic in a school setting is generally a gym or library with a separate entry and exit. Necessary medical equipment includes an adequate supply of vaccine, biohazard disposal containers, and an anaphylaxis protocol and emergency epinephrine kit.

The success of any school-located vaccination program depends on whether it is sufficiently staffed and whether the school nurse's time is allocated appropriately. In some communities, your local health department, hospital, or school of nursing may be able to allocate staffing (Effler, 2008). Medical staff should review guidelines for administering the vaccines and be fully trained to handle adverse events. A school employee can act as the vaccination coordinator who oversees all arrangements and ensures that clinic day goes smoothly. Remember that clerical staff also will be necessary to assemble information packets and process consent forms.

Expert advice on setting up a clinic is available from the immunization section of the local or state health department, the medical director or consultant to the school district, state school nurse consultants, and local immunization coalitions. When the school is partnering with a health department or other organization, a written agreement delineating the responsibilities of each party can be useful (Boyer-Chu & Wooley, 2008).

Obtain Consent

Distribute information packets to students to take home no later than 1 month before the vaccination clinic. Better yet, distribute those packets during the first week of school, when emergency-contact information is collected. The packet should contain a parental consent form for vaccination (Figures 4 and 5) and VISs for the influenza vaccines being offered. A letter to

STUDENT Vaccination Consent Form - **FLU SHOT**

STUDENT'S NAME (Last)		(First)	(M.I.)	STUDENT'S DATE OF BIRTH / /	
PARENT/GUARDIAN'S NAME (Last)		(First)	(M.I.)	STUDENT'S GENDER (circle) M F	
ADDRESS			PHONE: DAYTIME: CELL: HOME:		
CITY		ZIP			
SCHOOL NAME			GRADE (circle one) K 1 2 3 4 5 6 7 8 Other: _____		
HOMEROOM TEACHER'S NAME (Last)			(First)		
STUDENT'S DOCTOR'S NAME (Last, First)		Address		City Zip	
STUDENT'S HEALTH INSURANCE*: <input type="checkbox"/> Quest/Medicaid (Circle one: HMSA/Kaiser/Aloha Care/Summerlin) <input type="checkbox"/> Private Insurance (Circle one: HMSA/Kaiser/HMAA/UHA/Tricare/Other: _____) <input type="checkbox"/> No Insurance <input type="checkbox"/> Not sure					

*The Stop Flu at School program is FREE. Your insurance company will NOT be billed.

The following questions will help us to determine if your child may receive the **Flu Shot** (inactivated influenza vaccine). Please mark **YES** or **NO** for each question.

1. Has your child ever had a serious allergic reaction to eggs or to a component of any flu vaccine?	YES	NO
	<input type="checkbox"/>	<input type="checkbox"/>
2. Has your child ever had a serious reaction to a previous dose of flu vaccine?	<input type="checkbox"/>	<input type="checkbox"/>
3. Has your child ever had Guillain-Barré Syndrome (a serious nervous system disorder)?	<input type="checkbox"/>	<input type="checkbox"/>

If you answered YES to any questions, left any questions blank, or you are unsure of the answer to any of the above questions, your child may **NOT** receive the Flu Shot (inactivated influenza vaccine) through the school vaccination program (please talk to your child's doctor).

CONSENT FOR CHILD'S VACCINATION: I have received and read the 2008-09 Vaccine Information Statement for the **FLU SHOT** (Inactivated Influenza Vaccine). I understand the risks and benefits, and give consent to the State of Hawaii Department of Health and its authorized staff for my child, named at the top of this form, to receive the **FLU SHOT**. I also consent to having information regarding my child's influenza vaccination shared with my child's doctor and my child's health insurance company.

Signature/Parent or Legal Guardian _____ Date: ___/___/___

FOR ADMINISTRATIVE USE ONLY

Vaccine	Date Dose Administered	Site	Route	Vaccine Manufacturer	Lot Number	Expiration Date	VIS Publication Date	Name, Address, & Title of Vaccine Administrator
Inactivated Influenza Vaccine	/ /	RA LA	IM			/ /	/ /	

Reason **FLU SHOT NOT** given: Student had temperature of 100.5° or higher
 Student's consent form incomplete – parent/guardian could not be contacted
 Student refused **FLU SHOT**
 Student absent
 Other: _____

Hawaii Dept of Health
May 6, 2008

Figure 4. Consent Form for Receipt of Trivalent Inactivated Influenza Vaccine, Used by Hawaii's Statewide Influenza Vaccination Initiative, Stop Flu at School. Courtesy of the Hawaii State Department of Health.

parents (Figure 6), a product information sheet, and an informational brochure might be included as well.

Keep in mind that consent forms often generate questions. School nurses play a crucial role when it comes to answering queries from caregivers and obtaining completed consent forms (Schieber, 2008). To encourage timely return of the consent forms, consider offering incentives on an individual or group basis (Wilson, 2001).

Many prototypes for consent forms are readily available. In Hawaii's Stop Flu at School program, parents and caregivers indicate which type of vaccine (TIV or LAIV) they would like their child to receive (Hawaii State Department of Health, 2008b). Consent forms should be reviewed for completeness and to ensure that each student satisfies inclusion criteria. A letter should be sent home for any student who does not meet inclusion criteria, stating that the child

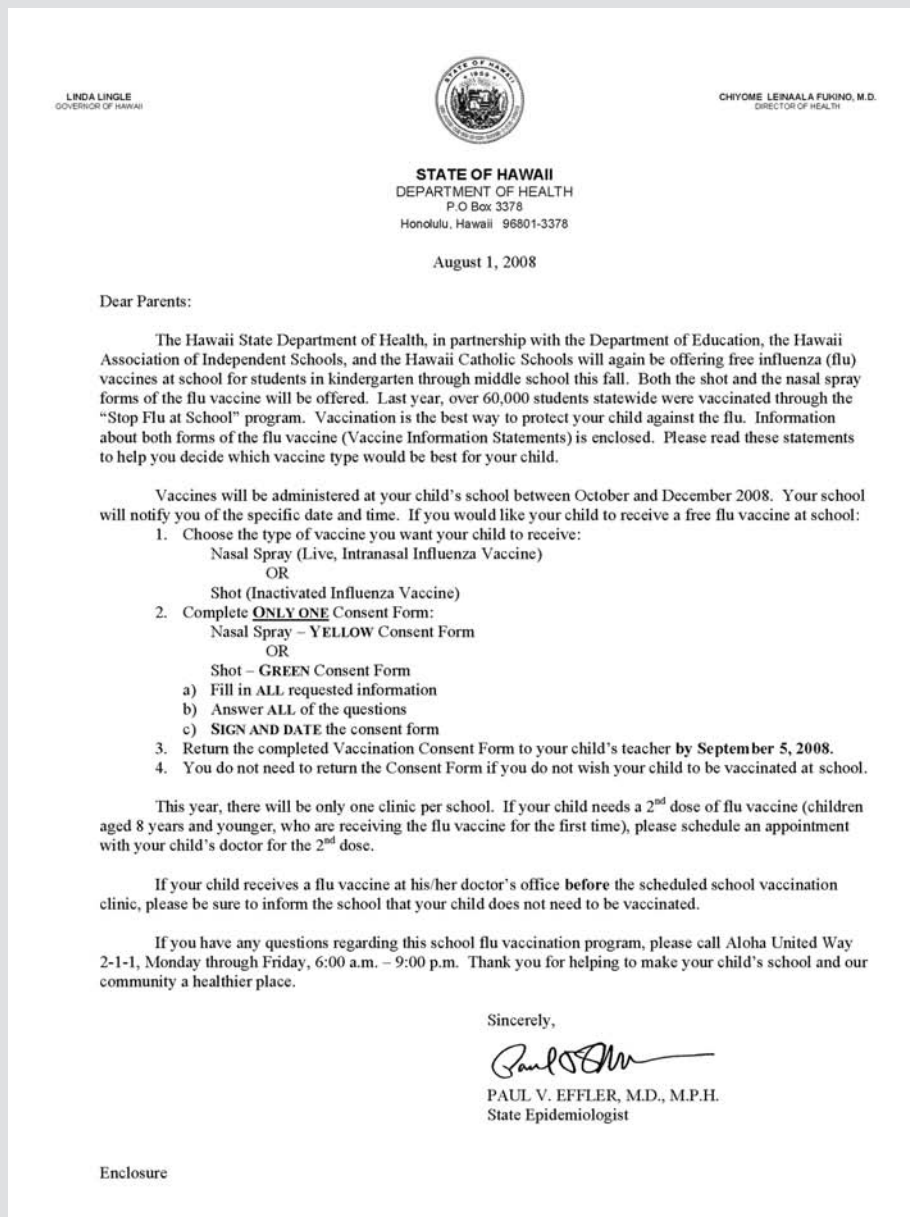


Figure 6. A Letter to Parents That Explains the Logistics of Hawaii's Statewide Influenza Vaccination Initiative, Stop Flu at School. Courtesy of the Hawaii State Department of Health.

Record All Necessary Information

For each immunization, staff should be sure to record the type of vaccine given, date and route of administration, vaccine manufacturer, lot number, expiration date, VIS publication date and date given to the patient, and signature or initials of the vaccinator. If your community or state has a computerized information system (immunization registry), try to arrange to have access to it during

the clinic (Boyer-Chu & Wooley, 2008). The registry provides a permanent record of all immunizations that is easily accessible to future providers. When a registry has not been established or will not be available on clinic day, a space can be included on the consent form for the required information, or the vaccination can be recorded on a separate vaccine administration record form available from the Immunization Action Coalition (<http://www.immunize.org>).

CONCLUSION

A rationale exists for the establishment of school-located influenza immunization clinics, given the high attack rates of influenza among school-age children, the pivotal role of children in transmission of the disease, and the high rates of absenteeism that result. School-located clinics could help improve vaccination coverage rates among those children with chronic conditions for

A rationale exists for the establishment of school-located influenza immunization clinics, given the high attack rates of influenza among school-age children, the pivotal role of children in transmission of the disease, and the high rates of absenteeism that result.

whom influenza vaccine has long been recommended. Such clinics also have the potential to enhance communities' pandemic preparedness. Last but not least, helping to establish school-located influenza vaccination clinics would represent an additional opportunity for school nurses to be recognized as immunization champions.

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School Nurse Perspectives

The following school nurses from across the country are championing for school-located influenza immunization within their communities.

Mary C. Borja, MSN, RN, FNP
Health Services Chair
El Monte City School District
El Monte, California



Figure 1. Mary C. Borja, MSN, RN, FNP.

El Monte City School District (EMCSD), located in Los Angeles County, California, is made up of 17 schools with a population of approximately 10,000 students. Students attending classes in the EMCSD are predominantly Hispanic (more than 60%) with a growing population of Asian American students (about 18%). EMCSD has a large Medi-Cal population, and a recent survey of sixth through eighth graders indicated that as many as 50% of students had not had a checkup in the past 12 months. If students are not getting regular checkups, it is not likely they are receiving a flu vaccination, now recommended for all school-aged children.

In our school district, school nurses are always looking for additional ways to serve our students and their families. We firmly believe that students

who are healthy miss school less often, and research has shown that they do better academically. In September 2007, staff from the Los Angeles County Immunization Program contacted our school district to find out whether we would be interested in offering flu vaccines to our student population. We were excited about the opportunity and agreed to give it a try.

September and October are always busy school months, but when I brought the idea up to the other nurses, three agreed to participate in the program. The decision was made to focus on the middle school students because they are older, easier to work with than younger students, and only require one flu dose, whereas younger students need two doses requiring additional flu clinics later on in the year. Not knowing what kind of turnout to expect from the school community, we asked the immunization project to give us 300 doses of the intranasal flu vaccine. Each participating K-8 site would be allocated 100 doses. The vaccine was stored in the district health clinic and later at school site refrigerators located in health offices. Refrigerators were monitored for correct temperatures.

Each school nurse had different ideas about how to proceed with their school site's flu clinic and made modifications that worked best for their school and for themselves. Each participating nurse consulted with the site principal to determine a date, time, and location for the

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clinic. Principals were supportive of the flu clinics and cooperated with their school nurses. This cooperative effort is critical to ensure success. All necessary documents were provided by the Immunization Project. Document templates of consents and informational handouts were provided in Spanish and English. The district health office provided multiple copies to each school participating in the clinics.

The first school nurse chose to present the flu clinic information during an evening event at school. The nurse distributed the nasal-spray flu vaccine information and consent forms to interested parents throughout the evening. Many parents completed the necessary paperwork that very evening, knowing that the actual flu clinic would occur during a regular school day when parents would not be present. The nurse was able to review the screening tool and answer questions. In addition, an electronic phone call was made to the remaining parents informing them of the availability of the vaccine at their child's school. These parents went in to the school health office and completed necessary consents for their child to participate in the school's flu clinic. On the day of the flu clinic, the nurse called each student out of class individually to receive the nasal-spray flu vaccine. Approximately 40 students were vaccinated the first day. The nurse continued giving the vaccine over a month's time period, giving a total of 79 vaccinations.

The other two K-8 site nurses held initial flu clinics before or after school hours. Phone calls were made electronically to families the night before the clinic, and informational fliers were sent out to all seventh and eighth graders' families a few days prior to the actual clinics. A large number of students were expected, but only a handful showed up. Health staff members walked out into the parking lot area and began to talk to each parent dropping off students. By the end of the morning, close to 40 students were vaccinated, far below the 100 we had anticipated. Vaccine was then administered to students on an as-needed basis after the original clinic.

Some roadblocks encountered were that the older students resisted being vaccinated. Students indicated they did not want anything sprayed up their nose or injected into their body even though

they had been told the vaccine was not an injection. Parents sometimes seemed uninterested or did not know about the flu clinic, while others seemed to be too busy. Some parents refused to accept the vaccine because they were worried about developing the flu after being vaccinated. By mid November, we still had doses of the intranasal vaccine, therefore, the immunization project agreed to allow the nurses to vaccinate parents and staff as well as students. All 300 doses were used before winter break in December. Because of the small number of students vaccinated, it was not possible to evaluate whether or not there was an impact on student attendance rates.

Implementing the flu clinics has been a rewarding learning experience for our health staff and we will continue our efforts to improve the delivery system and increase the percentage of students vaccinated annually in our school district.

Having the flu clinics is a worthwhile endeavor. Increasing the number of students who are vaccinated against influenza should decrease their chances of actually coming down with the disease, subsequently reducing student absenteeism. Our 2007 turnout for student flu vaccinations was low. Our goal for 2008 is to double or even triple the number of students receiving the vaccine. Participating school nurses have expressed their desire to continue providing this service to the community, and additional school nurses have volunteered to conduct mass flu clinics at their school sites as well.

Public health nurses from the County of Los Angeles Public Health Immunization Program are working with our district during the 2008–2009 school year. Five schools (four nurses) will be participating, and we hope to give over 800 doses of nasal-spray flu vaccine. All students will be allowed to participate, not just middle school students. Fliers will be sent out, phone calls will be made, and a request will be made to the school's community liaison for assistance in advertising the flu clinics. In addition, banners will be placed in front of each school where they can be easily seen to remind parents of the upcoming flu clinics.

By providing more advertising directly at the school site, we are hoping to vaccinate at least 20% of the student population at each school. Implementing the flu clinics has been a rewarding learning experience for our health staff, and we will continue our efforts to improve the delivery system and increase the percentage of students vaccinated annually in our school district.

Christine Amidon BSN, RN, NCSN
Health Services Coordinator,
Crawfordsville Community School
Corporation
Crawfordsville, Indiana



Figure 2. Christine Amidon, BSN, RN, NCSN.

The Crawfordsville Community School Corporation, located in west central Indiana, is just wrapping up its annual influenza vaccination campaign. We have about 300 full-time and 150 part-time staff, and 300 doses of trivalent inactivated influenza vaccine (TIV) were administered to staff members who elected to be immunized. Each of the nurses on our staff also has been immunized. We feel that not only is it essential to protect ourselves and our students and staff against influenza, it is important to model good preventive health care to children, families, and staff members.

We try to make the program as easy as possible for employees, eliminating barriers that often keep people from being immunized. The immunizations are brought to each school building so staff members do not have to travel, make a doctor's appointment, or take time off from work to receive their flu shot. In addition, staff can come

to the school's clinic during designated hours to receive their immunization. School nurses even make "house calls" to the classroom if teachers prefer, which provides an excellent educational opportunity for students. At that time we can discuss the benefits of immunization while students see their teacher bravely roll up a sleeve for a flu shot. Kids love that, whether they are in kindergarten or a senior-level economics class. We also can take this time to provide hand washing education, particularly to elementary school students. It is also important to emphasize the importance of getting a flu shot each year to children who have chronic health conditions, such as asthma and diabetes.

We try to make the program as easy as possible for employees, eliminating barriers that often keep people from being immunized.

Another barrier we try to overcome for our staff is cost. For the past 4 years, vaccine has been provided at no charge to employees. Immunizations are offered to everyone, from nurses and administrators to teachers and aides as well as custodians and cafeteria staff. The vaccine is ordered through the local health department, which provides it at their cost. The school district pays for it through a health/insurance fund that the corporation's business manager operates. He believes this is a good investment in employee health. The cost is minimal, about US\$12–US\$13 per employee, because our school nurses administer the vaccinations. The employees have been very appreciative of this benefit as it makes them feel the school district values their health.

The school corporation also provides hepatitis shots at no cost to anyone who elects to receive them. We use the same system for ordering and administering the hepatitis vaccine as we do for flu shots. We have noted an increase in the number of staff requesting hepatitis A and B vaccinations in the past 2 years, and we speculate that, aside from continuing educational efforts regarding bloodborne pathogens, perhaps some people are more amenable to receiving vaccinations because of their positive experience with flu shots.



Figure 3. Health Services Coordinator Christine Amidon Administers an Influenza Vaccine to School Nurse Amy Rigger.

As school nurses, we always follow the nursing process when planning any kind of care. Therefore, each year we evaluate our program and make changes in an ongoing attempt to improve the efficiency of the influenza immunization program. We are currently evaluating this season's effort and are already planning for next year.

In light of the new Advisory Committee on Immunization Practices (ACIP) recommendations on influenza immunization, our nursing team is considering taking this to a new level next year by expanding influenza vaccination to all children aged 18 and younger. We have a model in place that we have used for in-school clinics in recent years. We used this model for "catch up" immunization of teens for hepatitis B and for meningococcal vaccine clinics in our schools. Funding and nursing time would likely be the major obstacles. We are fortunate to have a strong working relationship with our local health department and are exploring ways we might collaborate to provide immunizations for our student population next flu season.

We have used materials from the National Association of School Nurses' "Don't Get Sidelined By The Flu" campaign to help educate

students and parents about influenza and prevention measures. With all of the emphasis on student achievement being linked to attendance, we can certainly make a strong argument for a student immunization effort.

We in the Crawfordsville Community Schools feel fortunate to have a strong emphasis on health and wellness. Our corporation sees the clear link between preventive measures, such as flu immunizations, and increased productivity among teachers and staff and has made a financial commitment to continue this program for staff. Demonstrating the importance of regular immunizations to our student population in maintaining health and wellness is an added benefit. In the coming years, we are hopeful that students have the same access to free or low-cost in-school influenza immunizations with the added benefit of increased attendance and achievement.

Diane Spellings, BSN, RN
School Nurse
Timmerman Elementary School
Pflugerville, Texas

Susan Franzetti, MSN, RN
Student Health Coordinator
Pflugerville Independent School District



Figure 4. Diane Spellings (Left) and Susan Franzetti (Right).

School nurses make significant contributions to public health in respect to immunization of school-age children as oftentimes they are the

ones who provide assurance that children will have the mandated immunizations to enroll and attend school. Realizing that seeking immunizations may place an economic and productivity burden on parents, school nurses often explore methods to address these needs. In doing so, they collaborate with community members and organizations as well as other stakeholders to develop programs to address disease prevention, such as vaccines to prevent influenza in the school setting. This article will summarize what one school district in central Texas, serving approximately 21,000 students, has done to address influenza prevention.

During the peak of the 2004–2005 influenza season, the absentee rate reached an average of 50 to 60 students and staff daily at one elementary school serving 495 students. This placed an overwhelming burden on our school nurses and directly affected the school district financially in terms of lost revenue. Parents were affected by lost wages when they had to care for sick children, and local employers experienced decreased productivity due to employee absenteeism. In an effort to address this burden, the elementary school nurse consulted with a local pediatric group and discussed the potential to implement an influenza immunization program in the school setting. School-age children easily and unknowingly spread illness from one person to another. It seemed logical to introduce mass vaccination to this population with the newly released live intranasal attenuated influenza vaccine (LAIV). After approval through the school district administrative chain of command, we offered the first LAIV clinic in the fall of 2006. Our plan was to offer the vaccine in the school setting at a low cost, making it affordable and convenient for parents to avoid lost time from work and have children vaccinated against influenza without enduring a shot.

During our first year, intranasal influenza vaccine was offered at three schools at a cost of US\$25.00 per student with approximately 300 students participating. School district liability was eliminated as services for the immunization were contracted. The same pediatric group provided services the following year to include 10 schools, reaching approximately 1,000 students. In 2007, the school district became Vaccines for Children (VFC) provider through the Texas Department of State Health Services under the direction of a local physician, providing free vaccines for eligible

students. During the 2007 school year, the intranasal influenza vaccination was added to the VFC program with the school health coordinator providing immunizations for approximately 1,200 students who qualified for the free and/or reduced meal program. As a result of this collaborative effort and use of existing resources, an example of a nurse-managed during-school immunization program was developed and implemented.

We did learn that school nurses in collaboration with the local medical community and VFC programs can successfully and efficiently provide flu immunization programs in schools that are sustainable and easily reproduced.

To obtain VFC vaccine, a VFC program has to be in place with a physician assisting to review vaccine protocol and order vaccine. Ten percent of the student population is a starting point for ordering a specific quantity of vaccine, but having adequate refrigerated storage for the prepackaged vaccine is most important. Influenza vaccine orders are usually placed in the spring or summer to be given in the fall. Ordering sufficient vaccine information statements (VIS) to allow dispersal to all the schools is also recommended in contrast to the number of vaccine ordered. Other planning considerations include setting a service date after the arrival of vaccine and obtaining student rosters with grade level, teacher name, and class size. Printing letters, attaching VIS forms, creating teacher folders prepackaged with the number of students per classroom took 4 hours for 600 students. A two-sided letter sent home with students informed parents about the benefits of influenza prevention on page 1 and information specific to the vaccine, including parent signature for consent, teacher name, and grade level on page 2. In addition, we sent home letters and VIS forms in Spanish. Each teacher received a folder with information about the upcoming vaccine clinic on the front of the folder. As consents were returned, the teacher placed them into the folder rather than returning them to the school nurse.

On the day of service, two volunteers assisted the vaccine provider, collected the teacher folder, and escorted 6 to 8 students at a time, staggering groups

to avoid wasting time waiting for students. Each student handed their consent form to the provider to be reviewed. Parents were encouraged but not required to attend. When parents were not present, the vaccine can be administered at a rate of 50 students per hour, using hand sanitizer to disinfect between students. When parents are present, the rate is approximately 15 students per hour. Ideally, students should not miss more than 15 minutes of class time.

The procedure for setting up a flu immunization clinic not using the VFC program differs slightly in that money needs to be collected in advance of services being provided. This is best handled by asking for payment in the form of a check and attaching the check to each student's consent form.

After implementation of the influenza immunization clinic, we observed a decrease in student and staff absenteeism related to influenza as well as a decreased rate of other respiratory illness, especially among students with asthma. While we did not have the opportunity to compare the attendance rates with the previous year or in comparison to rates at schools that did not have influenza immunization clinics, we realize the need to collect this data in the future. We did learn that school nurses in collaboration with the local medical community and VFC programs can successfully and efficiently provide flu immunization programs in schools that are sustainable and easily reproduced.

**Mary Nasuta, BSN, RN
Nurse Coordinator,
Harford Public Schools
Bel Air, Maryland**



Figure 5. Mary Nasuta, BSN, RN.

For our third consecutive year, the Harford County Public Schools and the Harford County Health Department in Harford County, Maryland, have collaborated to deliver a school-based intranasal influenza vaccine program. The program offers free vaccine to all eligible Harford County elementary school students in 33 elementary schools during school hours. Approximately 50% of the population participates annually for an average of 10,000 doses per year.

Within each elementary school, the school nurse assumes the role of program coordinator.

In addition to the distribution of the consent forms, school nurses are responsible for screening the consents to ensure that students are eligible. For those students deemed ineligible for the intranasal vaccine due to asthma, other chronic conditions, or other live vaccinations within a 30-day period, school nurses send home a form letter informing parents of the situation. These students can present their letter of ineligibility to the county health department for a free injectable form of vaccine at a health department clinic. The nurse is then available for further explanations related to specific students. School nurses also organize the consent forms to ensure an efficient system for vaccine administration.

In preparation for the day of immunization, each school nurse secures an available space for the flu vaccination clinic to take place. In addition, school nurses recruit and coordinate parent volunteers to assist in the classrooms on the day of vaccination so teachers can bring students to the designated area for identification.

On the day of immunization, school nurses serve as an important liaison to the health department staff. In addition to orienting the team to the site, school nurses provide valuable insight about the students. They are able to assess children who appear ill and to communicate with parents by telephone. At the end of the vaccination day, school nurses make copies of the consent forms to add to each child's school health record.

As a school nurse and now as nurse coordinator for the Harford County Public Schools, I have

participated in the nasal influenza vaccination program since its beginning. Over that time, we have learned some important lessons. During the first year, our major obstacles centered on role definition and communication. Although the health department nurses were responsible for the actual administration of the vaccine, the school nurse was vital to preparation and organization. We quickly realized that sorting through and organizing consents was more time-consuming than originally anticipated and had to be accomplished during a very busy time of year. One situation we did not anticipate was reconciling consents for students whose guardians did not signify that they had asthma, even though asthma was documented in their school health records. In addition, there was no initial clarity about who should answer specific concerns. Some nurses contacted the nurse coordinator, and others sought help from the health department. This inconsistency created some frustration and confusion among the school nurses and highlighted the need for a clear chain of command.



Figure 6. Retired School Nurse Rosa Hubbard Administers an Influenza Vaccine to a Student During a 2008 School-Located Clinic in Harford County, Maryland.

When I was hired as the nurse coordinator prior to the second year of the program, it was determined that all questions would be filtered through my office. I worked closely with the health department's medical and nursing staff to obtain timely answers to questions and then disseminated answers to all of the school nurses via email. Although the school nurses had clearly defined roles and consistent communication, we were

presented with the challenge of vaccine delays. Although most schools were able to receive the vaccine on the appointed dates, some schools needed to postpone immunization until a later date. When vaccine did become available, we realized the consents had expired and were faced with the predicament of contacting parents to re-consent. School nurses sent home numerous letters and made many calls to have consents returned.

The relationship between our departments has grown immensely, and school nurses feel empowered to continue to work together with the health department beyond this program.

As we prepare for this year, the biggest challenge is funding. Our first year of nasal influenza vaccination was made possible with moneys from the state of Maryland and the vaccine manufacturer. During the second year, we secured funding from our school system, the health department, and vaccine manufacturer. This year no funds were available from the school system, but funds from the Harford county executive and the health department are making the program possible.

Working in collaboration with the health department has also presented us with the opportunity to develop partnerships and learn more about the organization. In our first year, the health department used the program as an opportunity to practice mass immunization in the event of a potential disaster. Initially, the suggestion to schedule one class every 5 min seemed impossible to the school nurses. However, it was a reasonable time frame, and the administration went very quickly and smoothly. The relationship between our departments has grown immensely, and school nurses feel empowered to continue to work together with the health department beyond this program. Last year, we used health department resources to present a pandemic influenza awareness PowerPoint presentation to our school staff. The deputy health officer has helped update nursing protocols to include the use of discretionary medications. The health department's epidemiologist and immunization program coordinator were featured speakers at our fall in-service educational program.

The keys to the success of our program have been clear, consistent communication and flexibility. Communication about the program must be generated by one source. The superintendent and health officer co-sign an information letter that is sent home to parents, along with a vaccine information sheet and a consent form. Information about the program is also included in the school newsletter, an electronic school system newsletter, and the local newspaper. This year the school system purchased an advertisement in the local newspaper and used our school system's rapid phone message service to remind parents to return consent forms.

Flexibility is also vital to the success of a school-based intranasal influenza vaccination program. The health department teams want to administer vaccine quickly, and schools need to accommodate by creating a schedule that minimizes wait

time for the health department teams. The health department, in return, needs to work around lunch schedules, field trips, and assemblies. The delay of vaccine also tested our ability to be flexible. Even with the difficulties endured with the vaccine delay, a survey of school nurses indicated that they supported the program and looked forward to continuing to work with the health department.

The literature supports the use of mass influenza immunization programs to ensure the health of the community. This year, in the collaboration with the health department, we will be conducting research to evaluate the impact of the program in the hopes of using these data to secure continued funding. We are hopeful that we can continue this very valuable program and our strong partnership with our county health department.

CNE POST-TEST AND EVALUATION

(3.0 CNE Contact Hours – Free to NASN Members)

CNE is offered for the feature articles of this supplement (pages 4S-28S). To receive CNE credit and a certificate, please complete the post-test and evaluation. There are two options for completion:

Electronic Option

- Visit www.nasn.org and choose "Online CE" under "Quick Links".
- Log-in to receive NASN Membership Discount Code.
- Carefully review NASN's Online Continuing Education Learning Center instructions.
- Complete post-test.
- Complete program evaluation.
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Mail-in Option

- Mail the below form to:
National Association of School Nurses
8484 Georgia Avenue, Suite 420
Silver Spring, MD 20910
Attn: Deborah Griffin
- Please allow two to four weeks for processing.

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MEMBER INFORMATION

Name _____

Address _____

Member ID _____

POST-TEST ANSWER FORM

1.____ 2.____ 3.____ 4.____ 5.____ 6.____ 7.____ 8.____

9.____ 10.____ 11.____ 12.____ 13.____ 14.____ 15.____

EVALUATION

1. The course objectives were met.	4	3	2	1	N/A
2. The course was informative and well organized.	4	3	2	1	N/A
3. The topic(s) presented were pertinent to school nursing.	4	3	2	1	N/A
4. The course contributed to my professional growth.	4	3	2	1	N/A
5. The content was NOT affected by commercial interest.	4	3	2	1	N/A

Comments:

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POST-TEST QUESTIONS

"Seasonal Influenza: An Overview"

- 1) How long are young children typically infectious after influenza symptoms appear?
 - a. 5 or more days
 - b. 48 hours
 - c. 10 or more days
 - d. 36 hours
- 2) What is the best way to prevent influenza and its complications?
 - a. Routine check-ups
 - b. Annual vaccination
 - c. Hand sanitizer
 - d. Vitamins
- 3) What are the two types of influenza vaccines available?
 - a. TIV & LAIV
 - b. TIV & URD
 - c. URD & LAIV
 - d. CYV & LAIV
- 4) Antiviral medications are
 - a. Shown to reduce the duration of viral shedding by 72 hours.
 - b. Not currently approved by the FDA.
 - c. Most effective if begun within the first 48 hours of symptom onset.
 - d. Likely ineffective during periods of increased influenza activity in the community.
- 5) Which of the following statements about influenza is true?
 - a. Immunization can cause influenza.
 - b. Healthy children and adults are at risk for complications of influenza.
 - c. Influenza is not severe enough to warrant vaccination of healthy children or adults.
 - d. Influenza vaccine is in short supply and therefore should be reserved for patients who need it most.

"School-Located Influenza Vaccination Clinics: Local Health Department Perspectives"

- 6) Which population is historically overlooked during influenza season?
 - a. Newborns
 - b. Children
 - c. Elderly
 - d. Administrators
- 7) How far in advance should immunization clinic dates be set at schools?
 - a. At least one year
 - b. Six months
 - c. Six weeks
 - d. Four weeks
- 8) What is a major factor preventing LHDs from working with mass vaccinators?
 - a. Community opinion of the vaccinator.
 - b. Ability to transport the vaccines.
 - c. Reimbursement incentive for the vaccinator.
 - d. School staff knowledge of vaccines.
- 9) Each of the following are NACCHO's suggestions for LHDs and their partners to improve school-located influenza vaccination programs except:
 - a. Exploring new and innovative funding sources.
 - b. Forming strategic public-private relationships.
 - c. Encouraging greater levels of collaboration and integration with stakeholders.
 - d. Better understanding of the schools' attitudes and perceptions about school-located influenza vaccination clinics.
- 10) How can LHDs work better with PTAs and volunteer parents?
 - a. Distribute literature.
 - b. Transport children to the vaccine clinic.
 - c. Contact them personally for permission to vaccinate their children.
 - d. Include them in the planning and execution of school-located clinics.

"Championing School-Located Influenza Immunization: The School Nurse's Role"

- 11) In 2008, the ACIP expanded its recommendations for annual influenza immunization to include:
 - a. Only high-risk populations.
 - b. All children aged 6 to 59 months and high-risk children aged 5 to 18 years.
 - c. All children aged 6 months through 18 years.
 - d. All children from birth to 18 years.
- 12) Annual influenza attack rates among school-age children are as high as:
 - a. 13%
 - b. 36%
 - c. 42%
 - d. 79%
- 13) The Stop Flu at School Program offers both TIV and LAIV to students, teachers, and school staff in the state of:
 - a. New York
 - b. New Jersey
 - c. Maryland
 - d. Hawaii
- 14) Information packets given to students should include all of the following except:
 - a. A parental consent form.
 - b. Vaccine Information Statements for the influenza vaccines being offered.
 - c. Educational materials on influenza.
 - d. An insurance billing information sheet.
- 15) Ideally the school-located influenza immunization clinic should take place:
 - a. From August through May.
 - b. In September only.
 - c. From September through December.
 - d. From December through June.