Early Experience Conducting School-located Vaccination Programs for Seasonal Influenza

abstract

OBJECTIVES: We determined program effectiveness, feasibility, and acceptance of school-located vaccination (SLV) clinics for seasonal influenza that took place before the 2008 universal influenza vaccination recommendations.

METHODS: We surveyed program directors of 23 programs in the United States who conducted SLV clinics during the 2005 to 2006 and 2006 to 2007 influenza seasons.

RESULTS: Of 391,423 children enrolled in schools with SLV clinics, 61,463 (15.7%) were vaccinated at 499 sites (schools) in 23 programs. Of these, 22 were small- and medium-sized programs that vaccinated 32,875 (24.1%) of the 136,151 children enrolled there, averaging 31.9% of students per site. One populous county vaccinated an additional 28,588 (11.2%) of its 255,272 enrolled children, averaging 13.9% per school. Children in grades K to 6 had consistently higher mean vaccination rates (21.5%) compared with middle school children (10.3%) or high school youth (5.8%). Program acceptability was high, and no program had to forego any key public health activities; 5 hired temporary help or paid overtime. The outlook for continuing such clinics was good in 7 programs, but depended on help with vaccine purchasing (9), funding (8), or additional personnel (4), with multiple responses allowed.

CONCLUSIONS: These vaccination coverage rates provide a baseline for future performance of school-located mass vaccination clinics. Although the existence and conduct of these programs in our study was considered acceptable by leaders of public health departments and anecdotaly by parents and school administrators, sustainability may require additional means to pay for vaccines or personnel beyond the usual available health department resources. Pediatrics 2012;129:S68–S74

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KEY WORDS influenza vaccination, mass vaccination, immunization programs, school-age population, school health services

ABBREVIATIONS
ACIP—Advisory Committee on Immunization Practices
IQR—interquartile range
LAIV—live attenuated influenza vaccine
SLV—school-located mass vaccination
TIV—trivalent influenza vaccine

All authors made substantive intellectual contributions to this published study and met the following criteria: (1) made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; (2) drafted the article or revised it critically for important intellectual content; and (3) approved its final version to be published.

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Seasonal influenza is a substantial health burden to school children and their parents each year in the United States. In 2008, the Advisory Committee on Immunization Practices (ACIP) recommended annual influenza vaccination for all children 6 months to 18 years of age. Routine annual vaccination for all children could burden regular immunization providers, however, who may lack the resources needed to comply with this recommendation. Providing school-located vaccination (SLV) clinics to administer seasonal influenza vaccine could reduce this burden on primary care providers and increase vaccination coverage rates among schoolchildren. We report here the results of pilot SLV programs conducted up 3 years before the ACIP universal vaccination recommendation and before the 2009 to 2010 influenza pandemic. We describe program effectiveness, logistics, and local acceptability of SLV clinics for seasonal influenza to provide a performance benchmark and help guide such clinics in the future.

**METHODS**

**Participant Selection**

Programs were eligible if they conducted 1 or more immunization clinics during the 2005 to 2006 and/or 2006 to 2007 school years in a public or private elementary, middle, or high school in the United States. We compiled a roster of 25 potentially eligible programs from 3 sources. We contacted the immunization program managers of each state, territory, and large county via the Association of Immunization Managers looking for eligible programs. Separately, MedImmune, Inc (Gaithersburg, MD) provided a list of 18 SLV programs it had supported through donations of live, attenuated influenza vaccine (LAIV) and in some cases funding to programs during these school years. We also conducted snowball sampling, a type of purposeful (convenience) sampling method that uses the social networks of already identified programs to identify other programs.

All 25 program directors consented to be interviewed. Two programs were subsequently excluded from analysis because they lacked data needed to calculate vaccination coverage rates. Of the 23 remaining programs, 14 were managed by the local health department, 4 by the state health department, 4 by school nurses or administrators without direct health department support, 2 by local physicians aided by the local health department, and 1 by a private company (Table 1). Vaccination programs were conducted from October 2005 through June 2007. Sixteen programs received free LAIV directly from MedImmune, Inc, whereas others received from their local health department free LAIV and/or trivalent inactivated influenza vaccine (TIV) remaining after local pandemic planning exercises had ended. Twenty-two of these programs were judged to be either small- to medium-sized (∼400–37 000 total student enrollment in the schools where the program was delivered), whereas the single large program had an enrollment of 255 000 children. This project was reviewed by the Human Subjects Contact in the National Center for Immunization and Respiratory Diseases and was determined to be non-research program evaluation.

**Data Collection**

We developed a semistructured survey instrument to collect information retrospectively. A single interviewer (R.A.S.) conducted telephone interviews with each SLV program director between May 2007 and January 2008. For each site, data were collected concerning the span of grades at that school, the number of children enrolled and vaccinated by grade, and other programmatic information. A child was considered vaccinated if he or she received a single dose at the first (or only) set of clinics offered at that school site. For some children, the ACIP has recommended a second dose 1 or more

**TABLE 1** Selected Characteristics of 23 Programs Surveyed

<table>
<thead>
<tr>
<th>Program No.</th>
<th>No. of Sites (Schools)</th>
<th>Total Student Enrollment, n</th>
<th>Program Management</th>
<th>Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>275</td>
<td>255 272</td>
<td>Local health department</td>
<td>K–12</td>
</tr>
<tr>
<td>2.</td>
<td>51</td>
<td>36 996</td>
<td>State health department</td>
<td>K–6</td>
</tr>
<tr>
<td>3.</td>
<td>24</td>
<td>27 945</td>
<td>Private</td>
<td>5–12</td>
</tr>
<tr>
<td>4.</td>
<td>39</td>
<td>18 052</td>
<td>Local health department</td>
<td>K–5</td>
</tr>
<tr>
<td>5.</td>
<td>1</td>
<td>8018</td>
<td>Local health department</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>16</td>
<td>6928</td>
<td>Local health department</td>
<td>K–5</td>
</tr>
<tr>
<td>7.</td>
<td>17</td>
<td>6492</td>
<td>Local health department</td>
<td>K–12</td>
</tr>
<tr>
<td>8.</td>
<td>20</td>
<td>5409</td>
<td>Local health department</td>
<td>K–12</td>
</tr>
<tr>
<td>9.</td>
<td>9</td>
<td>4311</td>
<td>Local health department</td>
<td>K–6</td>
</tr>
<tr>
<td>10.</td>
<td>6</td>
<td>4030</td>
<td>School</td>
<td>K–12</td>
</tr>
<tr>
<td>11.</td>
<td>8</td>
<td>3686</td>
<td>Local health department</td>
<td>6–8</td>
</tr>
<tr>
<td>12.</td>
<td>14</td>
<td>3556</td>
<td>School</td>
<td>K–12</td>
</tr>
<tr>
<td>13.</td>
<td>4</td>
<td>2649</td>
<td>Local physician</td>
<td>K–8</td>
</tr>
<tr>
<td>14.</td>
<td>5</td>
<td>1911</td>
<td>Local health department</td>
<td>K–12</td>
</tr>
<tr>
<td>15.</td>
<td>1</td>
<td>1271</td>
<td>Local health department</td>
<td>10–12</td>
</tr>
<tr>
<td>16.</td>
<td>2</td>
<td>1250</td>
<td>Local health department</td>
<td>K–8</td>
</tr>
<tr>
<td>17.</td>
<td>1</td>
<td>855</td>
<td>State health department</td>
<td>K–3</td>
</tr>
<tr>
<td>18.</td>
<td>1</td>
<td>763</td>
<td>State health department</td>
<td>K–12</td>
</tr>
<tr>
<td>19.</td>
<td>2</td>
<td>620</td>
<td>School</td>
<td>K–5</td>
</tr>
<tr>
<td>20.</td>
<td>1</td>
<td>572</td>
<td>Local health department</td>
<td>9–12</td>
</tr>
<tr>
<td>21.</td>
<td>1</td>
<td>407</td>
<td>Local physician</td>
<td>6–10</td>
</tr>
<tr>
<td>22.</td>
<td>2</td>
<td>392</td>
<td>State health department</td>
<td>K–12</td>
</tr>
<tr>
<td>23.</td>
<td>1</td>
<td>98</td>
<td>School</td>
<td>K–8</td>
</tr>
</tbody>
</table>

Total 499 381 423
months later\textsuperscript{5}, however, not all sites conducted a second-dose clinic for such children, and among those that did, program records did not always distinguish whether the dose administered was the first or second dose. Accordingly, we limited our findings to vaccinations administered at first-dose clinics only.

The survey was developed in part to investigate several concerns articulated by some in public health. On the basis of such conversations, we wrote the instrument assuming that (1) SLV clinics would be difficult to organize because few such clinics had ever been held since mass vaccination clinics for hepatitis B were conducted in the mid-1990s\textsuperscript{6} and that few, if any, protocols existed; (2) the programs might tax the resources of local health departments and/or schools; (3) the programs might shift patients away from local medical providers; (4) routine health department work would suffer if health department staff time was used for SLV planning and execution; and (5) school officials and teachers would be reluctant to have SLV clinics in their schools because it might reduce the time available for classroom education.

Open-ended questions were included in the questionnaire to enhance respondent recollection and to gain insight from respondents in their own words. Such data were recorded verbatim, then recoded by using data-developed categories.\textsuperscript{7} Data were then analyzed by rank order of responses.

Analysis

For analysis of program effectiveness, the school site was the unit of record and the school and the program each served as units of analysis as appropriate. The key outcome variable was the vaccination coverage rate, that is, the proportion of children enrolled in each school (ie, site) who were vaccinated by this program. These values were stratified by grade grouping: grades K to 6, 7 to 8, and 9 to 12. Twenty school sites whose grade was denoted only as “K to 12” were excluded from the age-stratified analysis. No adjustment was made in school enrollment for children absent from school on the clinic day, or for those children with contraindications to vaccination with a live vaccine when it was the only formulation offered. All data are expressed here as unweighted counts and proportions. Because vaccination rates differed greatly within a program and often had a skewed distribution, we calculated the mean, median, and interquartile ranges (IQRs) to indicate the dispersion of values by using Microsoft Excel 2007 rather than conduct more extensive statistical testing that assumed a normal distribution. As a descriptive study, these data were not subjected to hypothesis testing or tests of variability of dispersion, as the sampling method used did not involve the element of chance.

RESULTS

Program Effectiveness

Twenty-three programs were conducted at 499 sites during fall/winter 2005 to 2006 \((n = 8)\), fall/winter 2006 to 2007 \((n = 14)\), or during both seasons \((n = 1)\). Programs took place in 16 states, representing 10 of the 12 Department of Health and Human Services regions. Each program conducted clinics in 1 to 273 sites (median 5, IQR 1–17). Ten programs immunized children at only 1 or 2 schools each. Details of these 23 programs are provided in Table 1.

Of 391,423 children enrolled in all schools where SLV clinics were held, 61,463 children (15.7%) were vaccinated at the SLV clinic (Table 2). The site-specific median vaccination coverage rate was 17.6% (IQR: 10.0%–31.11%). Vaccination rates varied widely among sites and age groups within a single program and across different programs. Sites with children in grades K to 6 had the highest vaccination coverage rate by site (mean 21.5%, median 20.6%) and the largest proportion of children receiving vaccination (76.2%), despite representing only 55.6% of children enrolled.

Table 2 also indicates the influence of results on the total from the single very large program. This county had 273 sites, comprising 54.7% of all sites and 65.2% of all children vaccinated. The mean vaccination rate of the 22 small- and medium-size programs (24.1% by student, 31.9% by site) was more than twice that of the single large program. The main reason offered by the director of this single large program for its relatively low vaccination rate was its considerable and unusual lack of preparation time available, limited to 2 weeks rather than several months.

Program Logistics

Time available for planning was very short, with a median of 2 months (range 0.5–12.0 months). Ten program directors noted that support by the local school administration was the single most important factor allowing each program to be conducted successfully. Some program directors and public health officials noted that it helped to have a preexisting relationship between the school administration and the local health department. Indeed, 7 clinic sites were selected because the school administrator was known to support such programs.

Parents were informed about upcoming SLV clinics through a letter sent home with the child, a school newsletter, or the Parent-Teacher Association group or other meetings. Seventeen programs used multiple means of informing the parents. The vaccination consent form was taken home by students in 19 programs and mailed home in 4 programs. Fourteen programs provided follow-up attempt(s) to obtain consent of non-respondents, usually by the school office.
Of the 23 programs, 3 attempted to bill for vaccine and/or its administration. Twenty-two of the 23 programs, represented by 172 (34.5%) of the 499 sites, reported the number of nurses and administrators and volunteers who staffed their clinics. Between 11 and 30 (median = 6) nurses and volunteer staff participated in each clinic. The median student-to-staff ratio was 20.7 students per staff member (range 0.4–140.8). One program needed 70 adults because of its large size, with 12 teams vaccinating 1000 middle school youth with LAIV or TIV in an 8-hour period. Eleven programs used school office staff to help manage clinic flow and efficiency in elementary schools. Thirteen programs specified using 1 to 3 volunteers at each clinic, and 2 programs each reported using ∼20 to 40 volunteers. Some programs paired each nurse with a volunteer to enhance throughput. Other volunteers directed the children who had been vaccinated to wait by the room exit until another volunteer led them back to the classroom. Older children returned to their classrooms independently. The vaccination process began when a volunteer or an older student came to the classroom to accompany eligible children to the SLV clinic site. In most cases, the teacher stayed in the classroom with the other children whose parent(s) did not consent to vaccination. On entry to the clinic site, a school official or volunteer verified the child's identity at a reception desk (used in each site of 13 programs) and reviewed the consent form for accuracy and completeness.

### TABLE 2 Vaccination Rates for All Students, by Student, Site, and School Grade

<table>
<thead>
<tr>
<th>Grades</th>
<th>Vaccination Rates, All Students</th>
<th>Vaccination Rates, by Site</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Student Enrollment, n (%)</td>
<td>Mean Vac’n Rate (%)</td>
</tr>
<tr>
<td>Smaller programs (n = 22)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K–6</td>
<td>70 926 (58.7)</td>
<td>24 704 (75.1)</td>
</tr>
<tr>
<td>7–8</td>
<td>16 480 (12.1)</td>
<td>1930 (5.9)</td>
</tr>
<tr>
<td>9–12</td>
<td>32 770 (24.1)</td>
<td>3622 (11.0)</td>
</tr>
<tr>
<td>K–12, NOS</td>
<td>6985 (5.1)</td>
<td>2619 (8.0)</td>
</tr>
<tr>
<td>Total</td>
<td>136 151 (100.0)</td>
<td>32 875 (100.0)</td>
</tr>
<tr>
<td>Very large program (n = 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K–6</td>
<td>138 836 (54.4)</td>
<td>22 552 (78.9)</td>
</tr>
<tr>
<td>7–8</td>
<td>39 594 (15.5)</td>
<td>3528 (12.3)</td>
</tr>
<tr>
<td>9–12</td>
<td>71 497 (28.0)</td>
<td>2435 (8.5)</td>
</tr>
<tr>
<td>K–12, NOS</td>
<td>5346 (2.1)</td>
<td>73 (0.3)</td>
</tr>
<tr>
<td>Total</td>
<td>255 272 (100.0)</td>
<td>28 588 (100.0)</td>
</tr>
<tr>
<td>All programs (n = 23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>K–6</td>
<td>217 489 (55.6)</td>
<td>46 821 (76.2)</td>
</tr>
<tr>
<td>7–8</td>
<td>57 327 (14.6)</td>
<td>5835 (10.3)</td>
</tr>
<tr>
<td>9–12</td>
<td>104 267 (26.8)</td>
<td>6057 (9.9)</td>
</tr>
<tr>
<td>K–12, NOS</td>
<td>12 340 (32.0)</td>
<td>2692 (4.4)</td>
</tr>
<tr>
<td>Grand Total</td>
<td>391 425 (100.0)</td>
<td>61 463 (100.0)</td>
</tr>
</tbody>
</table>

NOS, grade not otherwise specified; vac’n, vaccination.
The child would then be triaged to 1 of 2 to 6 stations, each managed by a registered nurse, who would double-check the consent form to ensure correct identification and absence of contraindications to the vaccine before administering it. All vaccinations in all programs were administered by a health professional.

LAIV was used to vaccinate children in all 23 programs. MedImmune, Inc provided free LAIV to 12 programs, and was the sole source of LAIV in 6 of these. Three programs additionally provided TIV to children, as either determined by parental choice in 1 program or by the existence of contraindications to LAIV in 2 others. No serious adverse events were noted to occur.

Among 22 programs reporting round-trip transit time from classroom to clinic and back, the vaccination process for an entire classroom averaged 18 minutes. Clinics were held in gymnasiums (n = 7), multipurpose/media rooms or libraries (n = 6), auditoriums (n = 2), cafeterias (n = 1), or hallways or other spaces available, according to a plan. Clinics that used the same door for the students’ entry and exit noted that a bottleneck and congestion commonly occurred there, which was obviated by using a separate entrance and exit. Twenty-one programs reported clinic duration. Clinics operated between 45 minutes and 12 hours (median of 3 hours and all but 3 programs lasted ≤4 hours). Fewer than 60 minutes was spent setting up and taking down most sites. Immunization records were maintained in 22 reporting programs by registry (8), paper (3), electronically (3), or not at all (8). After the clinic ended, 8 programs notified the parent or guardian of the vaccination through a note sent home with the child, 6 programs notified the child’s local provider of the vaccination, and 5 depended on a vaccination registry entry alone.

**Program Acceptability**

We asked the program directors, “What feedback, if any, did you get from parents and other stakeholders about the clinic?” Eighteen programs reported receiving very positive comments about their clinics from parents, teachers, or school administrators. Several program directors from health departments reported that the SLV program generated substantial enthusiasm among vaccination employees, even though their additional amount of work had been considerable. Two programs were popular at least in part because of a vaccine shortage at local providers’ offices. Eleven programs reported that public health nurses working in these clinics had to postpone some of their other regular duties, although they reported considering these clinics part of their regular responsibilities and felt good about the mission. Work was never left permanently undone; instead, most staff stretched their workdays and increased their level of personal effort to complete their regular duties later that day or on other days. Five public health departments needed to hire temporary staff or pay overtime during this period to conduct clinics or ensure timely completion of other work.

We asked the program directors what could have been done better. Appendix 1 describes some lessons they learned. A great deal of emphasis was put on starting planning early in the year.

Several issues of sustainability arose. Concerning the possibility of future clinics, 13 (56.5%) of 23 programs indicated the need for resources beyond what the school or health department ordinarily provided. Many programs had relied on donated vaccine for these clinics. When asked, 6 program directors thought the program would continue without additional support. Nine said they would need vaccine, 8 would need funding, and 4 would need personnel (multiple responses permitted).

Several negative aspects were noted. The problem of insufficient planning time was widely commented on. Some teachers were reportedly concerned that the LAIV used might spread its live (albeit attenuated) virus in the classroom. Three programs reported that 1 or more community physicians objected to the clinics, which was generally a matter of misunderstanding and readily resolved. In fact, 6 program directors reported that private providers had specifically supported the SLV program to their patients. Most programs did not attempt any billing or fee collection. At 1 school with many underserved students, a $10 fee was charged for vaccine administration, and the vaccination coverage rate there was <5%.

**DISCUSSION**

In general, these pilot programs were welcomed by those who participated. According to program directors, all but 1 was acceptable to the health department and the school system. This study suggests that mass SLV clinics can be conducted suitably and efficiently at the schools themselves. The chief lessons learned were the need for sufficient planning time, the value of collaboration between the health department and the school system that is built on an existing relationship, the anticipation of a low initial response rate, the value of parent consents, the value of volunteers in maintaining clinic flow, and the feasibility of vaccinating large numbers of children quickly with only a short interruption of usual classroom academic activities. Many programs received donated or leftover vaccine and help from volunteers, and about half the program directors expressed concern about their ability to conduct future programs without supplemental resources.

Establishing and conducting SLV clinics has some challenges. Their establishment requires a relatively strong relationship between local health
department and school system officials and administrators. The amount of planning time and the intensity of conducting the clinics on the day of vaccination is great. A sound public health infrastructure is needed to ensure that sufficient but not excessive quantities of vaccine are ordered, and that the appropriate cold chain is maintained. Wherever possible, members of the medical community who support such SLV clinics should be involved in their planning and, when appropriate, offer their professional vocal support to the local school boards, parents, and others. Local providers may object to SLV clinics held in their area either because of concerns about competition for medical care or about the school vaccination practices. In a recent study, however, only 4% of Maryland pediatricians surveyed indicated an objection to their patients receiving influenza vaccination at a local school site. Finally, at least some second-dose follow-up clinics in our study had difficulty capturing, vaccinating, and/or recording children for whom a second dose was recommended (data not shown).

The overall 21.5% SLV vaccination rate reported here occurred before the ACIP recommendations for influenza vaccination of all children were established, and this vaccination coverage rate may have been higher had it been measured after the publication of those recommendations. Other studies conducted before the ACIP made its recommendations describe higher SLV vaccination coverage rates for seasonal influenza, particularly among elementary schoolchildren, in single jurisdictions. In Maryland, King et al6 observed a 47% vaccine coverage rate by using LAIV in elementary schools. In Knox County, TN, Carpenter et al10 observed a differential uptake by age, with a 56% vaccine coverage rate among elementary schools, 45% among middle schools, and 30% among high schools. Although some schools in our pilot series achieved these high vaccine coverage rates, many did not.

We also compared our SLV rates with those of 2 other studies conducted across multiple states. In a 19-state survey conducted from 2008 to 2009 after the ACIP recommendations were made, 20.8% of 5- to 17-year-olds were vaccinated by all types of providers.1 A study of 8 immunization information system sentinel sites in the United States in the 2008 to 2009 and 2009 to 2010 influenza seasons indicated that 19.0% to 27.1% of children 5 to 12 years old and 10.9% to 15.3% of youth 13 to 18 years old received at least 1 dose of influenza vaccine. These vaccination rates are similar to ours and indicate the great amount of work remaining to achieve universal vaccination.

This study has several limitations. As a convenience sample, it is not generalizable to all SLV clinics in the United States, or to all school-age children. Data were collected retrospectively, often many months after the programs ended, potentially affecting recall accuracy. Only program directors were interviewed, not other school administrators, school or public health staff, parents, volunteers, or students. We could not determine any demographic, income, or other key indicators of socioeconomic status for each child, factors that could have affected the parent’s decision concerning consent. We made no attempt to determine the extent to which SLV services alleviated a parent’s burden of missing work for preventive care. Finally, some pilot programs were conducted at sites where the local health department knew the school officials would be cooperative, a factor that was likely to enhance vaccination rates.

Nevertheless, the results of these pilot clinics are encouraging because they suggest that SLV clinics may be acceptable to school administrators and function well in this environment. Public health and school officials in the programs noted in this study were enthusiastic about their participation. Although the overall mean vaccination coverage rate was low, the higher rates achieved by some programs were encouraging. Access to seasonal influenza vaccination through their school system might increase ease of access for children.

We suggest that further research be directed to several specific areas. First, follow-up investigations should examine the capability of states or large city health departments to lead a seasonal (nonpandemic) influenza SLV program. A recent report of SLVs in Hawaii indicated that such capacity does exist.13 Second, additional studies should be directed to look at potential third-party billing processes, including community vaccinator programs that can bill for vaccine and its administration for children ineligible for the Vaccines for Children program. Third, present systems should be examined to see if SLV personnel costs could be reduced, and if so, what the minimum number of vaccinators might be for clinics of different sizes. Fourth, the relative cost of vaccination by SLV clinics versus private provider offices should be examined. Fifth, the degree to which SLV programs are acceptable to private providers and the effect of SLV clinics on community vaccination coverage rates among children, vaccination record completeness, and delivery of other clinical preventive services should be studied in the updated context of a universal vaccination recommendation.

We and others note the continued low seasonal influenza coverage rates of children.12 SLV programs could have a positive influence on this by supplementing existing influenza vaccination efforts by private providers and health departments. The number of patient visits to primary providers each fall and winter is already high because of the excessive number of upper respiratory
and gastrointestinal infections occurring at that time in young children. Rand et al estimated that universal annual seasonal influenza vaccinations would require at least a 36% increase in the number of primary care visits for children and adolescents each year. Alternative vaccine delivery methods, such as SLV clinics, that make it easier to administer in such as SLV clinics, that make it easier to reach target vaccination rates. SLV programs may be of particular benefit to adolescents, who seek preventive care from providers relatively infrequently.

**APPENDIX 1. LESSONS LEARNED**

- Start planning in the spring or early summer.
- Consider ways to manage or compensate for the shortfall in funding SLVs.
- Get to know area school administrators and school nurses before requesting participation. They should be present the day(s) the clinic is held.
- Obtain written parental consent, although it may be difficult and time-consuming. Often, parents do not return a form, or even receive it in the first place.
- Use several methods of contacting parents, and consider asking school office staff to follow up to contact nonresponders.
- Accept a wide variety of types of spaces to hold the clinic, including gymnasiums, auditoriums, media centers, unused classrooms, cafeterias, and hallways.
- Manage clinic flow carefully. In particular, avoid having too many or too few children in the clinic waiting to be vaccinated. Volunteers can help manage flow.
- Have separate entrance and exit doors to improve flow and reduce confusion and congestion.
- Incorporate into the system a routine notification-of-vaccination for parents, guardians, and primary care providers of vaccinated children.

**REFERENCES**

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