The Impact of School-Located Influenza Vaccination Programs on Student Absenteeism: A Review of the US Literature

Harry F. Hull, MD[1] and Christopher S. Ambrose, MD[2]

[1]HF Hull & Associates, LLC, St. Paul, MN, USA; [2]MedImmune, LLC, Gaithersburg, MD, USA

Introduction

- Influenza outbreaks in schools can cause significant disruption when large numbers of children or staff become ill, often resulting in short-term school closures.[1]
- Current recommendations call for all children 6 months to 18 years of age to be immunized every year against influenza.[2,3]
  - School-located influenza vaccination (SLIV) programs are an efficient means of immunizing large numbers of school-aged children.
- Decreased student absenteeism is a major potential benefit of SLIV programs.

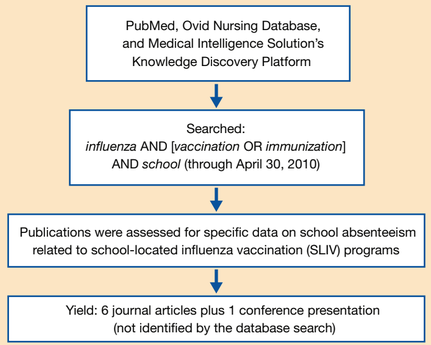
Objective

- To provide a comprehensive overview of the available published data describing the impact of SLIV programs on school absenteeism

Methods

- The National Library of Medicine PubMed database, the Ovid Nursing Database, and Medical Intelligence Solutions' Knowledge Discovery Platform (New York, NY) were searched for medical journal articles and conference abstracts.
- Search terms were *influenza* AND [*vaccination* OR *immunization*] AND *school* **(Figure 1)**.
- Publications that provided specific data regarding school absenteeism during the season following vaccination in SLIV programs were selected for this review; publications through April 30, 2010 were included.
  - Abstracts, presentations, and posters presenting data subsequently published in a medical journal were excluded in favor of the published manuscript.
  - One additional study known to the authors, but not identified through the PubMed search, was included in the review.[4]

Figure 1. Search Approach



Results

- 16 articles and 428 abstracts were identified in the initial search.
- 6 articles and 1 conference presentation provided specific data regarding school absenteeism **(Table 1)**.
- Programs vaccinated 185 to 5315 students, 35% to 86% of those enrolled.
- The methods for measuring differences in student absenteeism varied.
  - 6 studies examined control schools with no immunization program.
  - 3 studies compared immunized with unimmunized children in the same school.
  - All studies measured total, all-cause absenteeism; 2 studies also measured absenteeism due to influenza-like illness.
- None of the studies reported the the number of students who received influenza vaccinations outside of the SLIV programs.

Table 1. Summary of Studies Evaluating the Effect of School-Located Influenza Vaccination Programs on Student Absenteeism

				Absenteeism Results			
				School(s) With Vaccination Programs vs Control Schools		Vaccinated vs Unvaccinated Children	
Study	Geographic Scope of Vaccination Program (Number of Vaccinated Students)	Influenza Season (Estimated National Severity*)	Vaccination Rate (Vaccine Used)	Absolute Difference	Relative Difference	Absolute Difference	Relative Difference
1. Monto et al. (1970)[4]	All schools in 1 town (N=3159)	1968–1969 (Pandemic)	86% (TIV)	16% absent in control schools vs 8% in intervention schools during peak influenza week	Estimated 50% reduction in absenteeism during peak influenza week	NR	NR
2. King et al (2005)[5]	1 elementary school (N=185)	2003–2004 (Severe)	40% (LAIV)	3.6 fewer parent-reported ILI absences per 100 students (P=0.023) during the peak influenza week; no difference in total absenteeism during the 5-week influenza period	47% reduction in parent-reported ILI absences during the peak influenza week	1.7% decrease in the absenteeism rate during the 5-week influenza period (P=0.045)	66% reduction in the increase in absenteeism during the 5-week influenza period
3. King et al (2006)[6]	11 elementary schools (N=2717)	2004–2005 (Moderate)	47% (LAIV)	2.4 fewer parent-reported ILI absences per 100 students (P<0.001) during the peak influenza week; no difference in total absenteeism during the 9- to 11-week influenza period	38% reduction in parent-reported ILI absences during the peak influenza week	0.8% decrease in the absenteeism rate during the 9- to 11-week influenza period (P=0.006)	35% reduction in the increase in absenteeism during the 9- to 11-week influenza period
4. Wiggs-Stayner et al (2006)[7]	2 elementary schools (N=277)	2004–2005 (Moderate)	47% (LAIV)	1.4% reduction in full-year absenteeism rate (P<0.001)	26% reduction in full-year absenteeism rate	NR	NR
5. Davis et al (2008)[8]	21 elementary schools, entire county (N=5319)	2005–2006 (Moderate)	44% (LAIV)	1.18% decrease in the absenteeism rate during the 12-week influenza period (P=0.029)	66% reduction in the increase in absenteeism during the 12-week influenza period	NR	NR
6. Cook (2009)[9]	2 elementary schools (N=391)	2007–2008 (Moderate)	58% (LAIV, with TIV for those unable to receive LAIV)	1.77% decrease in mean daily absenteeism rate during the influenza season (P<0.001)	21% reduction in absenteeism during the influenza season	NR	NR
7. Mears et al (2009)[10]	1 high school (N=127)	2006–2007 (Mild)	35% (LAIV, with TIV for those unable to receive LAIV)	NR	NR	2.5-day reduction in mean absenteeism from January through June among LAIV recipients vs unvaccinated (P=0.027)	31% reduction in mean absenteeism from January through June among LAIV recipients

ILI=influenza-like illness; LAIV=intranasal live attenuated influenza vaccine; NR=not reported; TIV=injectable trivalent inactivated influenza vaccine.
*For all seasons except the 1968–1969 pandemic season, severity is based on Centers for Disease Control and Prevention Emerging Infections Program surveillance data at http://www.cdc.gov/flu/weekly/weeklyarchives2007-2008/07-08summary.htm.

Conclusions

- **Multiple studies have demonstrated that SLIV programs can help reduce student absenteeism during the influenza season.**
- **SLIV programs may be able to help schools achieve their educational mission by decreasing student absenteeism due to influenza.**
- **Additional research into sustainable funding sources and the comprehensive effects of SLIV programs on students, families, staff, and the community is warranted.**

References

1. Principi N, et al. *Pediatr Infect Dis J*. 2003;22:S207-210.
2. Fiore AE, et al. *MMWR Recomm Rep*. 2010;59:1-62.
3. Committee on Infectious Diseases. *Pediatrics*. 2008;122:1135-1141.
4. Monto AS, et al. *J Infect Dis*. 1970;122:16-25.
5. King JC, Jr., et al. *Pediatrics*. 2005;116:e868-873.
6. King JC, Jr, et al. *N Engl J Med*. 2006;355:2523-2532.
7. Wiggs-Stayner KS, et al. *J Sch Nurs*. 2006;22:219-222.
8. Davis MM, et al. *Pediatrics*. 2008;122:e260-265.
9. Cook C. Inschool influenza vaccine delivery reduces absenteeism. Presented at: 43rd National Immunization Conference; March 30-April 2, 2009; Dallas, TX.
10. Mears CJ, et al. *J Adolesc Health*. 2009;45:91-94.

Sponsored by MedImmune, LLC