Vaccine 37 (2019) 2171–2173

Contents lists available at ScienceDirect

Vaccine

journal homepage: www.elsevier.com/locate/vaccine

Commentary

Practical considerations in developing a successful school-located influenza vaccination (SLIV) program ☆

Stanley J. Schaffer [a,*], Cynthia M. Rand [a], Sharon G. Humiston [b], Cathleen Concannon [a], A. Dirk Hightower [c], Christina Albertin [d], Peter G. Szilagyi [e]

[a] Department of Pediatrics, Golisano Children's Hospital, University of Rochester, 601 Elmwood Ave., Box 777, Rochester, NY 14642, USA
[b] Department of Pediatrics, Children's Mercy Medical Center - Northland, University of Missouri – Kansas City (UMKC), 501 NW Barry Rd., Kansas City, MO 64155, USA
[c] Department of Clinical and Social Psychology, University of Rochester, and Children's Institute, 274 N. Goodman St., Rochester, NY 14607, USA
[d] Albertin Associates, 4110 Ruckle St., Indianapolis, IN 46205, USA
[e] Department of Pediatrics, UCLA Mattel Children's Hospital, University of California Los Angeles (UCLA), 10833 LeConte Ave., MC 175217, Los Angeles, CA, USA

Despite the Healthy People 2020 goal of increasing influenza vaccination coverage among children 6 months to 17 years of age to 80% [1], the U.S. is falling short of coverage goals. Nationally, only 60% of 5 to 12 year olds, and 47% of 13 to 17 year olds receive influenza vaccination [2]. Not surprisingly, childhood morbidity from influenza remains high, with 174 deaths in 2017–18 [3].

One strategy that has been recommended to raise influenza vaccination among school-aged children is school-based vaccination. There are two common models of school-based vaccination: vaccinating at school-based health centers, which are limited in number in most communities, or alternatively, vaccinating at school-located influenza vaccination (SLIV) clinics temporarily placed within schools. Since school-based vaccination is underutilized, with less than 5% of US children currently receiving influenza vaccination there [4], SLIV remains a potentially promising strategy to boost influenza vaccination rates.

Early studies of SLIV found multiple practical barriers (e.g., obtaining consent, billing), but also some successes with respect to numbers of children vaccinated in schools [5,6]. We conducted a series of SLIV trials in several school districts in Monroe County, NY, across six influenza seasons between 2009 and 2017. We performed 4 randomized controlled trials (RCTs), allocating schools to SLIV versus standard of care. Our published data showed SLIV could raise overall influenza immunization rates by 5% to 18% and that SLIV appeared to be somewhat more effective in elementary schools than secondary schools. We also found some evidence that schools that performed SLIV over successive years were able to vaccinate slightly more students during the second year than their first year, suggesting that experience with SLIV may have raised overall comfort with the program [7–10].

These studies are promising, but the above-mentioned publications did not detail the critical elements of a successful SLIV program. Based on our experience, this commentary provides practical lessons for communities wishing to implement and sustain SLIV.

Our SLIV Program: The structure of our program remained consistent throughout the study period. Faculty and staff at the University of Rochester Medical Center coordinated the studies and acted as liaisons between the school districts and the mass vaccinator, the Monroe County Department of Public Health (MCDPH). We worked with 8 school districts: the Rochester City School District (RCSD) which has high poverty rates (61–99% of children eligible for free/reduced lunch), and 7 surrounding suburban districts (with varied poverty rates, 5/7 districts having less than 33% free/reduced school lunch rates). We initially only used paper consent, adding online consent in 2014. When paper consent forms were used, study coordinators printed, distributed and retrieved consent forms from schools and delivered them to the MCDPH. Coordinators communicated with school nurses and administration regarding messaging to parents about influenza clinics. A company with a proprietary data management tool and existing contractor relationships with several school districts created a web-based consent system to minimize printing costs and enhance scalability. The RCSD elected not to use web-based consent due to limited computer access among parents; web-based consent was used in later years of the project in suburban districts. MCDPH provided vaccine and billed insurance plans. Prior manuscripts describe each year of the intervention and results in detail [7–10].

SLIV can be a powerful strategy to raise influenza vaccination rates. However, adequate planning is crucial for SLIV success and includes consideration of several components that are important for a SLIV program to be successful:

Abbreviations: SLIV, School-located Influenza Vaccination; RCT, Randomized Controlled Trial; MCDPH, Monroe County Department of Public Health; RCSD, Rochester City School District.

☆ **All authors attest they meet the ICMJE criteria for authorship.**

* Corresponding author at: Division of General Pediatrics, Golisano Children's Hospital, 601 Elmwood Avenue, Box 777, Rochester, NY 14642, USA.

E-mail addresses: Stanley_Schaffer@urmc.rochester.edu (S.J. Schaffer), Cynthia_Rand@urmc.rochester.edu (C.M. Rand), sghumiston@cmh.edu (S.G. Humiston), Cathleen_Concannon@urmc.rochester.edu (C. Concannon), DHightower@childrensinstitute.net (A.D. Hightower), Christina_Albertin@urmc.rochester.edu (C. Albertin), pszilagyi@mednet.ucla.edu (P.G. Szilagyi).

https://doi.org/10.1016/j.vaccine.2019.01.088
0264-410X/© 2019 Elsevier Ltd. All rights reserved.

1. Buy-in from school districts and school nurses
2. Timing of SLIV clinics
3. Publicizing SLIV to parents
4. Obtaining vaccination consent
5. Adequacy of resources
6. Billing
7. Sustainability

(1) Buy-in from school districts and school nurses

In regions that include multiple school districts, adequate time must be allotted to meet with each school district's leadership to explain SLIV and address questions or concerns. SLIV can be very beneficial to schools by decreasing illness-related absenteeism during influenza season, but scheduling times for dedicated SLIV clinics during the school day can be challenging [11]. Support from school nurses who can educate students and families about influenza and can help publicize SLIV clinics may increase the number of students vaccinated at SLIV clinics.

(2) Timing of SLIV clinics

Should SLIV clinics be held early in the fall when few children have already been vaccinated, or should they be held later after local medical providers have had an opportunity to provide influenza vaccine to their patients? In our community, some providers were concerned about potentially having unused vaccine at the end of the influenza season due to SLIV, particularly if SLIV substituted for (instead of adding to) practice-based vaccination. Therefore, we scheduled SLIV in late November and December, as a "mop-up" program to allow primary care practices to use up more of the vaccine they purchased. Across our RCTs, we found that in suburban settings where most vaccinations were commercially purchased and substitution was of greater concern, SLIV did not substitute for practice-based vaccination. However, among students in the single urban school district, where most students qualify for VFC-obtained vaccine, SLIV appeared to cause a small amount of substitution, which was more than offset by vaccination at SLIV clinics. In sum, collaboration with community medical practices on the timing of SLIV clinics is highly recommended.

(3) How best to publicize SLIV to parents

Some communities that have attempted SLIV have successfully used mass media to publicize it [5]. In our case, some local school districts did not participate in the project and within participating districts we did not perform SLIV in every school, so publicizing it via mass media was not possible. Instead, we used a multi-pronged communication strategy: in various years distributing flyers in students' backpacks and at parent nights, having schools email parents and send them text messages and automated phone calls and having information posted on school web sites. A contractor assisted school districts with these efforts in compliance with the requirements of the Federal Educational Rights and Privacy Act (FERPA). Communities considering SLIV should determine how best to publicize its availability.

(4) Obtaining consent

Our project offered both paper and electronic consent. Paper consent is resource-heavy; it involves photocopying, dissemination of information and consent forms to parents via students and collection of completed consent forms from students. Additional time is needed to contact parents if consent forms are improperly or incompletely filled out. Electronic consent offers the possibility of a more streamlined process, but requires resources for programming. In our experience, electronic consent was successful among suburban populations, but was not feasible for students in the RCSD, because many RCSD families did not have computers at home. Most urban families had smart phones that could potentially be used to provide on-line consent, but the volume of consent materials precluded the development of a smart phone app for consent. Careful consideration should be given regarding how best to obtain parent consent among specific population groups.

(5) Resources

Working with a mass vaccinator that can supply adequate numbers of nurses to administer vaccine at SLIV clinics is vital. In New York State, only local health departments are allowed to provide vaccinations in school during school hours, so other mass vaccinators could not be considered. Local health departments have many immunization priorities, limiting how many health department personnel could be devoted to providing influenza immunization in school. Parent volunteers who could accompany students between classrooms and SLIV clinics are also important in making SLIV clinics as efficient as possible. To the extent that mass vaccinators and schools can utilize existing personnel rather than hiring additional part-time personnel, SLIV will be more cost-effective and, thus, more feasible.

(6) Billing

While companies that serve as mass vaccinators have extensive experience billing insurers, local health departments often do not. If a local health department serves as the mass vaccinator, adequate time must be devoted to developing procedures to ensure the health department successfully bills both private and public insurers. Infrastructure for billing must also exist or be developed and dedicated personnel to fulfill the billing function must be assigned to the project. Having staff who can effectively process insurance claims can advance the sustainability of the program.

(7) Sustainability

In order for SLIV programs to be sustainable, they must pay for themselves. In our area, publically insured children are most likely to attend urban schools while children with commercial insurance are more likely to attend suburban schools. Vaccine administration fees paid by commercial insurers tend to be significantly higher than those paid by public insurers. Therefore, to make SLIV financially sustainable over time in communities with this type of vaccine financing, it is important to vaccinate a balanced mix of both commercially-insured and publically-insured children.

SLIV can successfully be implemented with adequate planning and careful consideration of local conditions. However, close coordination among all of the constituent groups (school district leadership, school nurses, mass vaccinator, community medical providers and health insurers) is vital. If these factors are all in place, an effective SLIV program can significantly increase the number of children who receive influenza vaccine.

Funding Source

The project cited was funded by the Agency for Healthcare, Research and Quality (grant #5R18HS021163). The funding agency did not have any role in the design of the study; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication.

Declaration of Interest

During the course of the project cited in this commentary, Dr. Humiston was a consultant to Immunization Action Coalition. Dr. Humiston received a grant from the Pfizer Foundation on 8/1/2016 (unrelated to the project cited in this commentary). Dr. Hightower has been the Executive Director of the Children's Institute, a 501(c)(3), and is Co-CEO of COMET Informatics LLC. Both the Children's Institute and COMET Informatics were sub-contracted to provide services to the project cited in this commentary, which included developing the web-based portal. The Children's Institute and Dr. Hightower own approximately 38% and <5% of COMET Informatics respectively. The remaining authors have no financial relationships relevant to this article to disclose.

Clinical trial Registration

This commentary cites the following clinical trial - ClinicalTrials.gov NCT02227186 (August 25, 2014), updated NCT03137667 (May 2, 2017)

Acknowledgments

The authors wish to acknowledge the assistance that they received from the Monroe County Department of Public Health (in particular from Michael Mendoza, M.D., M.P.H. and from Mary Younge, RN), the Churchville-Chili, East Irondequoit, Fairport, Greece, Penfield, Pittsford, and Spencerport, NY Central School Districts, the Rochester City School District (in particular from Erin Graupman, RN) and SophiTEC Information Technology Services (in particular from Fred Lossa) that made it possible to offer school-located influenza vaccination to children in Rochester and Monroe County.

References

[1] Healthy People 2020 [Internet]. Washington, DC: U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. https://www.healthypeople.gov/node/3527/objectives; Accessed December 26, 2018.
[2] CDC. Estimates of flu vaccination coverage among children - United States, 2017-18 flu season. https://www.cdc.gov/flu/fluvaxview/coverage-1718estimates-children.htm [serial online] 2018; Accessed December 10, 2018.
[3] CDC. Influenza-associated pediatric mortality. https://gis cdc gov/GRASP/Fluview/PedFluDeath html [serial online] 2018; Accessed September 17, 2018..
[4] Santibanez TA, Vogt TM, Zhai Y, McIntyre AF. Place of influenza vaccination among children–United States, 2010–11 through 2013–14 influenza seasons. Vaccine 2016;34(10):1296–303.
[5] Jenlink CH, Kuehnert P, Mazyck D. Key components of a school-located vaccination clinic: lessons learned from fall 2009. J Sch Nurs 2010;26(4 Suppl):14S–26S.
[6] Limper HM, Burns JL, Lloyd LM, Atilano J, Alexander KA, Caskey RN. Challenges to school-located vaccination: lessons learned. Pediatrics 2014;134(4):803–8.
[7] Szilagyi PG, Schaffer S, Rand CM, et al. Impact of elementary school-located influenza vaccinations: a stepped wedge trial across a community. Vaccine 2018;36(20):2861–9.
[8] Szilagyi PG, Schaffer S, Rand CM, et al. School-located influenza vaccinations for adolescents: a randomized controlled trial. J Adolesc Health 2018;62(2):157–63.
[9] Szilagyi PG, Schaffer S, Rand CM, et al. School-Located Influenza Vaccinations: a Randomized Trial. Pediatrics 2016;138(5):e20161746.
[10] Humiston SG, Schaffer SJ, Szilagyi PG, et al. Seasonal influenza vaccination at school: a randomized controlled trial. Am J Prev Med 2014;46(1):1–9.
[11] Hull HF, Ambrose CS. The impact of school-located influenza vaccination programs on student absenteeism: a review of the U.S. literature. J Sch Nurs 2011;27(1):34–42.