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Vaccination Perceptions and Barriers of
School Employees: A Pilot Study

Kim C. Houle

A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Science

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ABSTRACT

Vaccination Perceptions and Barriers of School Employees: A Pilot Study

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Background: Schools are group settings where vaccine-preventable diseases can spread quickly, especially if vaccination rates are suboptimal. Vaccination of school children has been the subject of many studies; however, data are lacking regarding the vaccination status, vaccination perceptions, and potential barriers to vaccination for school employees.

Method: A questionnaire was developed to measure school employees' perceptions, awareness of current vaccination status, and potential barriers to vaccinations. This study included a convenience sample of 277 employees from a small urban school district located in central Utah.

Results: Adult vaccination knowledge is lacking in the school employee population, with over half believing they were fully vaccinated even though 57.8% had not had an influenza vaccination this season. Many school employees were unaware of their vaccination status for highly virulent diseases such as measles and pertussis. In addition, most subjects believed vaccinations were safe and effective, although they believed vaccinations were more important for children than adults. Almost half of respondents believed vaccine mandates should exist for school employees.

Conclusion: Knowledge gaps regarding adult vaccines can be positively influenced by nurses, especially school nurses. These knowledge gaps may be especially important to bridge concerning adults working in the school setting, an environment ideal for the spreading of communicable diseases.

Keywords: immunization, vaccination, school employee, vaccination mandate, vaccination perceptions

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Vaccination Perceptions and Barriers of School Employees: A Pilot Study

Over the last half-century, childhood vaccinations in the United States have led to a significant reduction in morbidity and mortality rates associated with numerous vaccine-preventable diseases such as measles, small pox, and polio (Centers for Disease Control and Prevention [CDC], 1999; Roush, Murphy, & the Vaccine-Preventable Disease Table Working Group, 2007). The decrease in morbidity and mortality rates can be attributed to compulsory vaccination efforts involving children in the United States (Salmon, Teret, MacIntyre, Salisbury, Burgess, & Halsey, 2006). Trends, however, show that public support for vaccines is decreasing and, as a result, more outbreaks of vaccine-preventable diseases are occurring (Salmon et al., 2009). During the last decade, the number of parents in the United States claiming nonmedical exemptions to school vaccination requirements has increased significantly (Omer, Pan, & Halsey, 2006).

Although routine child health care visits are scheduled to coincide with the recommended CDC vaccination schedule (Kroger, Sumaya, Pickering, & Atkinson, 2011), adults are undervaccinated because, unlike children, they rarely obtain routine health check-ups. Only adults who have certain health risks, plan on traveling abroad, or work in health care settings generally seek adult vaccinations (CDC, 2012a). Even when adults see their health care provider, few are questioned about their vaccine status (Maurer & Harris, 2011). As a result, many adults are not aware of their vaccine status or the current vaccine recommendations for adults (Children's Hospital of Philadelphia [CHOP], 2010).

Like health care workers, school employees work in settings that place them at higher risk for contracting vaccine-preventable diseases and then transmitting the illness to others (Earn,

He, Loeb, Fonseca, Lee, & Dushoff, 2012; Gargano et al., 2011a; Wallis, 2009). Unlike health care workers, however, school employees are not required to provide proof of vaccination status prior to or during employment. Because communicable diseases, such as measles and pertussis, are highly virulent, these diseases have the potential to run rampant in the school environment (Maddern, 2009; Tennenbaum, 2008). Vaccinations for such highly communicable diseases reduce the incidence and spread of vaccine-preventable diseases (Glanz et al., 2009; Glanz, McClure, Magid, Daley, France, & Hambidge, 2010).

In 2009, there were approximately 700 school closures in the United States because of H1N1 influenza outbreaks (Gargano et al., 2011b), which was costly to communities and disruptive to families (Brown et al., 2011; CDC, 2011a; Dayan, Ortega-Sánchez, LeBaron, & Quinlisk, 2005; Yin, Wang, Skinner, Salkeld, & Booy, 2011). In April 2011, there was an outbreak of measles, started by a student in Salt Lake County requiring quarantine of many individuals. Many teachers came into contact with the student and others and who had been diagnosed with measles after exposure to the disease. As a result, some teachers had to stay home from work during the quarantine period because of inadequate or unknown personal vaccination status. This quarantine proved to be costly because these teachers needed to be temporarily replaced with substitute teachers who *were* adequately vaccinated (Stewart, 2011).

The Utah Department of Health has recently recommended (2011b) school employees receive adult vaccinations, however, it is unclear how many, and to what degree Utah schools are following this guideline. Furthermore, evaluating the perceptions and potential barriers that school employees might have in regard to adult vaccinations could be helpful (Cawley, Hull, & Rousculp, 2010). This information might be instrumental in leading to policy changes regarding school employee vaccinations and record-keeping. The purpose of this pilot study therefore, is

to look at the current status of employees' vaccinations and to measure school employee perceptions of potential barriers to compulsory vaccination.

Research Questions

1. What is the current status of urban school district employees' vaccination rates?
2. What are the general perceptions of urban Utah school employees regarding vaccinations?
3. Are urban Utah school employees aware of their personal vaccination status?
4. What are the barriers that limit school employees from being adequately vaccinated?

Methodology

Participants/Setting

This study received approval from the Institutional Review Board and included a convenience sample of 277 employees at a small urban school district located in central Utah. The setting for this pilot study consisted of one school district centrally located in the State of Utah that included various resources such as special education programs and Title I schools. The urban school district was selected because of the ethnic diversity of the student body and proximity to the research center. Three specific schools in the urban school district were selected to participate: one elementary school, one middle school, and one high school. To be eligible for participation, subjects needed to be employed in any capacity, either part-time or full-time, by at least one of the selected schools in the Utah school district. Volunteers and other non-paid workers without an assigned mailbox at the school were excluded from participation.

Design

After approval by the district superintendent, each of the principals and secretaries at the three schools were notified of the study. The week prior to questionnaire distribution, an email was sent from each school secretary to all employed faculty and staff members, outlining the study and indicating when to expect the questionnaire in their school mailbox. The following week, the two-page questionnaire was delivered to the school secretaries, along with the informed consent document, return address envelope with pre-paid postage, and \$1.00 as compensation for the employees' time. The school secretaries were responsible for distributing the questionnaires to employee mailboxes. After 2 weeks, the school secretary sent another email to all faculty and staff members, reminding them of the study and encouraging them to complete the questionnaire and then return it in the pre-paid envelope. The employee kept the \$1.00 regardless of choosing to participate or not in the study. Return of the questionnaire implied the subject's consent.

Instrument

A questionnaire was developed to measure a school employee's perceptions, awareness of current vaccination status, and potential barriers to vaccinations. Questionnaire items were selected based on the current literature regarding adult vaccination trends in the United States and was reviewed by a panel of public health experts prior to pre-piloting. These health experts included members of state and local governmental agencies; representatives of local, privately-owned pediatric offices and hospitals; and health care providers from subsidized clinics. The questionnaire was pre-tested in a neighboring school district by twenty-four school employees and then edited according to suggestions provided by these employees. The finalized, two-page questionnaire was then distributed during the pilot study and included 10 yes/no, 7 multiple choice, 7 demographic, and 2 open-ended items.

The yes/no items were intended to measure knowledge of adult vaccinations and the subject's vaccination status. Questions included whether or not the subject was fully vaccinated; whether the subject had discussed adult vaccinations with a health care provider; and whether the subject had received the influenza, measles, mumps, and rubella (MMR), tetanus (Td) booster, and tetanus booster with pertussis (Tdap), or if the subject had instead been diagnosed with any of the diseases. Participants were able to select the answer "I don't know" if they were uncertain of the answer.

Multiple choice items were included to measure vaccination perceptions and potential barriers to receiving adult vaccinations. If subjects noted they did not have a particular vaccination, they were then asked to identify the reason why they had not received the influenza, MMR, Td, or Tdap vaccination. For these items, participants were given a list of potential reasons for not vaccinating and encouraged to mark all that applied. Each of these items included an "other" category where subjects could fill in their own answer in the space provided.

Concerning the question about subjects' actions if they had no MMR booster or were unsure of their MMR vaccination status, researchers contemplated which responses to include. Initially, it was decided to withhold the incorrect option of going to work in the event of a measles outbreak because it is not a feasible option given the virulence of measles, but participants in the pre-pilot testing of the instrument almost always wrote this answer in on early drafts of the questionnaire. Thus, to avoid any possible confusion during data analysis, the researchers agreed to include the option of attending work despite no MMR booster or an unknown MMR status to determine whether or not additional MMR vaccination and measles outbreak education was needed.

Demographic items included the participant's gender and age. The number of years employed in the school district, occupation type (e.g., teacher, administrator, support staff) and employment status (i.e. full-time versus part-time) were also recorded. Finally, participants were asked to record their ethnicity and the type of school for which they worked.

One of the open-ended items requested participants identify reasons they believed school employees should not be required to be vaccinated for employment. Finally, subjects could include any additional comments in the space provided at the conclusion of the questionnaire.

Data Analysis

Responses were entered into version 19 of SPSS (SPSS Inc., Chicago, IL). The accuracy of the data entry was confirmed by two researchers. For all quantitative items, frequencies, measures of central tendency and dispersion, and reliability statistics were calculated. The open-ended items were transcribed and independently analyzed by two researchers for themes. Final themes were then identified.

Results

A total of 277 questionnaires were delivered to a Utah school district. After one distribution and one reminder email, 149 were returned for a response rate of 53.8%. Of those responders who reported gender, there were 106 females (73.6%) and 38 males (26.4%). The age of subjects ranged from 23 years – 69 years with an average age of 46.5 years. Length of employment ranged from 1 year – 34 years with an average of 11.9 years. The remaining demographic data are reported in Table 1.

Current Vaccination Status

When reporting on their personal vaccination status, 92 subjects (62.2%) believed themselves to be fully vaccinated, whereas 56 (37.8%) were either inadequately vaccinated or unsure of their vaccination status. Interestingly, over half ($n = 85$, 57.8%) of the sample had not

had an influenza immunization this season. Almost three-quarters ($n = 104$, 70.3%) of the respondents could not remember having a discussion about adult vaccinations with their health care provider. However, almost half of the subjects ($n = 68$, 46.6%) believed they would be able to locate their personal vaccination records if asked, although another 78 subjects (53.4%) either confirmed they would not be able to locate their vaccination record or were not sure if they would be able to produce a vaccination record if requested (see Table 2).

When specifically asked regarding the influenza vaccine, 57.8% ($n = 85$), reported that they had not received the influenza vaccination during the current influenza season. When asked to explain why they had not received the influenza vaccination, the most common response ($n = 31$, 20.8%) was that the subjects did not believe the injection would be effective in protecting them from the influenza disease. Another 22 (14.8%) employees explained they had not received an influenza vaccination because they could not find the time to do so or they simply forgot. Refusing the influenza vaccine because of concerns regarding potential side effects of the injection and worry the vaccine would make them sick was listed for 18 (12.1%) and 15 (10.1%) subjects, respectively. Finally, less common reasons for inadequate influenza vaccination status included not being sure of the need for the influenza vaccination ($n = 14$, 9.4%), the lack of a mandatory influenza vaccine requirement by the employer ($n = 10$, 6.7%), and concern regarding the cost of the vaccine ($n = 8$, 5.4%).

Subjects were also questioned about their MMR vaccination status. When asked if they had received the MMR vaccination as a child, 99 (70.2%) confirmed that they had; however, another 42 (29.7%) subjects either never received or could not remember if they had received the MMR vaccination during childhood. Subjects were also asked whether or not they had received an MMR vaccination during adulthood. Of those who responded, 93 (72.7%) either had not

received an MMR injection or were not sure if they had been vaccinated with an MMR during adulthood. Only 35 (27.3%) subjects could actually confirm they received an MMR vaccination as an adult. When questioned about the reason for not receiving the MMR booster during adulthood, the most frequently occurring response was that subjects were unsure about whether or not they needed one ($n = 46$, 30.9%). Table 2 includes additional reasons for the lack of MMR administration during adulthood.

When questioned about a tetanus booster, 83 (56.5%) subjects reported that they had, in fact, updated their tetanus vaccine during the past 10 years. Another 64 (43.6%) were either inadequately vaccinated or were unsure if they had received a tetanus booster during the past decade. Finally, when questioned about whether or not their most recent tetanus booster included protection against pertussis, 26 (29.5%) confirmed it had, although 62 (70.5%) subjects either did not know or denied receiving the tetanus/pertussis combination vaccine (see Table 2).

Personal Vaccination Beliefs

To assess the personal vaccination beliefs of the school employees, the subjects were asked about their impressions regarding the safety, efficacy, and importance of vaccinations for both children and adults. The vast majority of respondents ($n = 120$, 90.3%) either strongly agreed or agreed that vaccinations were safe. Another 6 (4.2%) subjects had no opinion, and 8 (5.6%) either disagreed, or strongly disagreed with the statement that vaccinations were safe (see Table 3).

Subjects were also questioned about their beliefs regarding the efficacy of vaccinations, meaning that in order to measure participants' belief in whether or not vaccinations prevent disease. Of those who responded, 139 (93.9%) either strongly agreed or agreed that vaccinations prevented disease. Another 5 (3.4%) subjects had no opinion and 4 (2.8%) either disagreed or strongly disagreed that vaccines effectively prevented disease (see Table 3).

The importance of vaccinations for adults, as opposed to school-aged children, was also evaluated. Whereas a high percentage ($n = 143$, 97.3%) believed that vaccinations were important for school-aged children, a lower percentage ($n = 111$, 80.4%) agreed that vaccinations were important for adults. Another 2 (1.4%) had no opinion and 2 (1.4%) either disagreed or strongly disagreed that it was important for children to receive vaccinations. In terms of the importance of adults receiving vaccinations 15 (10.9%) had no opinion and 12 (8.7%) either disagreed or strongly disagreed that it was important for adults to be vaccinated (see Table 3).

Subjects were also questioned about their beliefs regarding whether or not vaccinations should be mandatory for school employees. Almost half of the subjects ($n = 72$, 48.6%) believed school employees should have a vaccination requirement for employment. However, 35 (23.6%) of those who responded disagreed that there should be a vaccination mandate and another 41 (27.7%) subjects were not sure of their belief regarding school employee vaccination mandates (see Table 3).

Those responding to the question about vaccination mandates could also include free-write responses regarding why or why not vaccination mandates should exist. Those who were in support of mandatory vaccine requirements for school employees included responses such as, “[Vaccination mandates] would be a protection for us and our families,” and, “We work with many students and sickness spreads fast,” and, “So many [diseases] can be transmitted it’s probably a good idea.” However, some school employees disagreed with the concept of vaccination mandates and instead believed that vaccinations should be purely voluntary stating, “no one should be required [and] should do [it] on their own.” Other supporters of voluntary vaccinations expressed concerns about vaccine safety making statements such as, “I believe [the] choice remains with individuals [and] some vaccinations have side effects” and “some people die

from vaccinations.” Finally, subjects wrote in responses regarding the price of vaccinations, including “[Vaccinations are] too costly!”

Subjects were also asked to express their beliefs regarding existing vaccination mandates for select individuals employed in the school district. The majority ($n = 138$, 93.2%) of respondents were unaware of any vaccination requirement for employees of the school district. However, of the few ($n = 10$, 6.8%) who believed there was a mandatory school district vaccination requirement for employees, most speculated the employees in special education, physical education, or school nursing would be the only ones to have such vaccination requirements.

Planned Action in the Event of an Outbreak

In an attempt to discern subjects’ beliefs regarding how an outbreak of a vaccine-preventable disease would affect their work, behavior, and home life, subjects were asked how they would behave if there were a measles outbreak in their school. The highest percentage of respondents ($n = 67$, 52%) reported that they would plan on attending work, despite the fact that they were either unvaccinated with an MMR booster or were unaware of their MMR vaccination status. Another 43 (33.3%) employees could affirm they were up-to-date on their MMR booster and stated they would plan on remaining at work during a measles outbreak. A small percentage ($n = 18$, 14%) of employees had not received an MMR booster, or were unsure of their MMR vaccination status, and reported they would stay home from work in the event of a measles outbreak (see Table 4).

For the same item, subjects could also insert additional comments. Some of the free-write commentary included MMR-specific questions such as, “I have had all three diseases when younger, therefore aren’t I immune?” and “I’m not sure if I need one as an adult so I would ask what I should do.” A few school employees expressed that the inconvenience of planning for a

replacement would outweigh any concern over contracting measles during an outbreak, making statements such as, “Planning for a substitute would be much more hassle than [just] coming to work!”

Discussion

Even those adults who believe they are adequately vaccinated might not, in fact, be up-to-date. For example, even though over half of the adult school employees in this pilot study believed they were fully vaccinated, the majority of subjects had not received the influenza vaccination or discussed adult vaccinations with their health care provider, making it less likely that the school employee was truly aware of current guidelines for adult vaccinations or had compared his or her vaccination records with the current recommendations.

The suboptimum vaccination rates for influenza of over half of employees in this study was alarming, especially because it is estimated that 70% of influenza transmission occurs outside the household and 37% occurs in schools and workplaces (Ferguson, Cummings, Fraser, Cajka, Cooley, & Burke, 2006). Even more worrisome, Ferguson et al. (2006) report that contact with the influenza virus in the school environment is actually double that of contact in the traditional workplace. Not only would influenza vaccination of school employees reduce the transmission of virus at school, routine influenza vaccination of these employees could also have positive financial consequences by reducing influenza-related absenteeism rates. In fact, in one Australian study the teachers who were vaccinated against influenza showed a lower absenteeism rate than those who were unvaccinated (Yin et al., 2011), a finding that could directly correlate with a decreased cost because of the reduced need to hire substitutes.

In this study, 42.2% of respondents did not know their MMR status and another 30.5% did not know if they had received the MMR vaccination as an adult. These data are significant given the fact that between 2001-2010 there were a median of 60 measles cases and 4 measles

outbreaks each year in the United States (CDC, 2012b). In the State of Utah, there were 9 measles cases during 2011 that led to 12,126 identified contacts, 10,470 of whom were in the school environment (Salt Lake Valley Health Department [SLVHD], 2011). Unfortunately, containment of the outbreak required the quarantine of 184 people, 51 of whom were students, and came with a hefty price tag – about \$300,000 (Reinberg, 2011). Some of those quarantined included school employees who did not know their MMR vaccination status or who could not locate their vaccination records in a timely manner (SLVHD, 2011). Consequently, some of these school employees had to be temporarily replaced with substitutes during the quarantine, which was costly for the school district where the outbreak occurred. Such costs for school districts, however, could be averted with mandatory vaccination requirements for school employees.

It is noteworthy that almost half of respondents erroneously reported that they would plan on attending work, despite the fact that they were either unvaccinated with an MMR booster or were unaware of their MMR status. Indeed, if there were a measles exposure at school the employee who had not received their MMR booster or who were unsure of their MMR status would be among the quarantined individuals and would, in fact, be ineligible to attend work for up to 21 days (Utah Department of Health, 2011a), a fact that employees did not fully understand. What is also unknown at this time is if the employee or the school district would pay for the individual's time off.

Much more common than measles, mumps, and rubella, the rate of pertussis disease is dramatically increasing in the United States, with outbreaks occurring in the majority of states during 2012 (CDC, 2012c). Although pertussis can be prevented among the adult population with timely administration of the Tdap vaccine, almost half of the subjects in this study were

unaware of whether or not their last tetanus booster included protection against pertussis. Certainly, pertussis infections are most deadly to infants, although most of the time these infants are infected by a parent or an older sibling who might be school-aged (CDC, 2012d). Therefore, ensuring adults and school-aged children in the community are adequately vaccinated against pertussis can reduce pertussis rates and, as a result, protect infants against this deadly disease. Because infants cannot receive their first pertussis vaccination until they are 2 months of age, it is important to vaccinate everyone who might have contact with an infant, a strategy known as cocooning (CDC, 2011c).

As a setting where groups of people regularly gather, schools are ideal environments for the transmission of infectious diseases that can affect any school attendee, both adult and child alike (Keyserling, 2006). When questioned about the importance of vaccinations, almost all of our subjects believed it was important for school-aged children to receive vaccinations. However, when asked if it was important for adults to receive vaccinations, most respondents either agreed or strongly agreed with this statement. Certainly, vaccine-preventable diseases do not discriminate between infecting adults and children, although perhaps some of the school employees in this study were simply unaware of the equal importance of vaccinating adults, especially those who work in the school environment. Therefore, school employees should be especially cognizant of the importance of adult vaccines, a knowledge gap with which the school nurse can assist. Ensuring adequate vaccination among any school-attendee, adult and child alike, can greatly inhibit the spread of disease in the event of an outbreak (Tennenbaum, 2008).

Finally, when asked to provide commentary on why vaccine mandates should not exist for school employees, subjects often free-wrote responses that expressed concern regarding

vaccine cost. Even though the cost of vaccines is often covered by health insurance plans, not all school employees are eligible for health insurance benefits.

Recommendations for Nurses

Education is one significant strategy that can be employed by a nurse, especially a school nurse, to encourage adequate vaccination of school employees, a tactic that could contribute to the control of vaccine-preventable diseases in the school setting. The school nurse is in a critical position to promote awareness and influence action regarding mandated and recommended immunizations in the school community and is also responsible for counseling families and staff concerning immunizations throughout the lifespan (National Association of School Nurses [NASN], 2010). Educational information is available as a resource for school nurses, some of which are free to members of NASN, such as *Fighting Flu Begins with You!* and *Adolescent Vaccines: What School Nurses Need to Know*, both of which are available from the NASN website at www.nasn.org. The American School Health Association toolkit, *Give it a Shot!*, is a resource specifically for nurses, as well as other immunization advocates, who work with secondary schools. The toolkit is available for free at http://www.ashaweb.org/files/public/give_it_a_shot!_toolkit_2nd_edition.pdf and can be utilized for continuing education credit for a small fee. Finally, the CDC has published an *Immunization Practice Toolkit* that is appropriate for providers of health care services and is available at no cost from <http://www2.cdc.gov/nip/isd/immtoolkit/content/Quality/default.htm>.

The lack of knowledge regarding recommended adult vaccination reinforces the need for regular review and discussion of vaccination status between adults and their health care providers. In addition to this, any vaccination knowledge gap could also be addressed with school employees by the school nurse via email, newsletter, or presentation during regular staff meetings. It is the position of NASN (2010) that school nurses influence action related to

mandated and recommended immunizations in the school community, not only among school children but adults as well.

Another strategy for increasing vaccination knowledge among school employees is to assist them in obtaining their vaccination records and clarifying each employee's current vaccination status. If a statewide vaccination registry is available to the school nurse, the nurse can use this resource to print copies of the vaccination record for the school employee and identify any needed vaccinations to achieve an up-to-date status. Review of the employee's vaccination record could be conducted as new employees are hired and during annual Occupational Safety and Health Administration (OSHA) trainings or faculty/staff meetings.

Schools and school districts might also want to carefully consider implementing mandatory influenza vaccination among school employees, a policy that might not only reduce the transmission of the virus to students, but could also reduce the financial burden associated with hiring substitutes or covering salaries while employees are quarantined. The benefits of mandatory influenza policies have been clearly proven in the health care environment (CDC, 2011b), an idea the school nurse might want to promote in his or her schools when no such employee vaccination policy exists.

Given the fact that almost half of the respondents selected vague or incorrect responses regarding what they would do if a measles outbreak occurred at their school, additional education is certainly needed. Education on the MMR vaccination and procedures in the event of a measles outbreak might need to be implemented in schools as well. Appealing to school employees who might have contact with infants, school nurses might be able to positively influence vaccination rates for pertussis in his or her community, given the fact that this disease can be deadly to this population.

Because some school employees do not recall having a vaccination conversation with their health care provider, school nurses could bridge this knowledge gap. Current adult vaccination recommendations could be posted in common areas, such as teacher lounges and other areas of the school, as a time-efficient approach to educating school employees about adult vaccinations. Furthermore, email reminders or flyers in employee boxes might also be helpful, as well as mobile vaccination clinics for influenza and tetanus with pertussis.

Because not all school employees have health insurance, school districts might find that covering the cost of adult vaccines for these employees is less costly than absenteeism associated with disease outbreaks in the school setting. Public or private entities such as health departments, retail pharmacies, or outpatient clinics could be helpful in providing discounts or financial assistance to ensure school employees are adequately immunized, thus playing a significant role in protecting the health of the entire community.

Recommendations for Future Research

To our knowledge, this study is the first of its kind. Because it is a pilot study, larger sample sizes are needed to assess for consistency of data and to determine accuracy. Further research could also be conducted in both urban and rurally-located school districts to determine if there is a difference in vaccination perceptions between these two types of school employees. Additionally, research regarding absenteeism rates for inadequately vaccinated school employees might help school districts determine the cost-benefit ratio of providing vaccinations to school employees at little or no cost. It might also be helpful to include a current adult vaccination chart with our questionnaire for reference in order to obtain more accurate responses in reporting their vaccination status.

Limitations

The limitations of this study included having a small sample size ($n = 149$), and the fact that the sample consisted of only three schools from one school district in Utah. However, this was a pilot study. Additionally, school volunteers and those without an assigned mailbox were excluded from participation in this study. Nevertheless, including volunteers might have provided a more accurate assessment of vaccination perceptions among adults who have contact with children in the school setting.

Conclusion

Vaccinations are important, not only during childhood but throughout the entire lifespan; however, many adults remain unaware of their vaccination status and unaware of the importance of updating vaccinations. Even those adults who believe their vaccinations are up-to-date might not have had an influenza vaccination this season. This knowledge gap regarding adult vaccines might be especially important to bridge concerning adults working in the school setting, an environment which is ideal for the spreading of communicable diseases. The importance of influenza vaccine, as well as MMR and tetanus with pertussis, should be candidly discussed with school employees, a conversation that might be best delivered by the school nurse. Finally, school districts might want to consider enacting vaccination mandates for all school employees, an idea supported by many school employees, so that in the case of an outbreak unvaccinated employees would not be paid by the school district while quarantined. Such mandates might help avert costs associated with employee absenteeism in general, although the cost of vaccines for uninsured school employees might need to be subsidized by the school district.

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Table 1: Demographics

Demographic	Frequency	Percent
Gender		
Male	38	26.4
Female	106	73.6
Age		
Range: 23 years – 69 years		
Mean (SD): 46.5 years (11.71)		
Ethnicity		
Hispanic	10	7
Non-Hispanic	133	93
Type of School		
Elementary	48	33.1
Middle/Junior High	37	25.5
High School	58	40.0
Combination of Schools	2	1.4
Current Occupation		
Teacher	78	53.8
Administrator/Office Worker	14	9.7
Counselor	6	4.1
Education Specialist	16	11.0
Support Staff	30	20.7
Other	1	.7
Type of Employment		
Full-Time	104	71.7
Part-Time	39	26.9
Other (on call)	2	1.4
Years Worked in School District		
Range: 1 year – 34 years		
Mean (SD): 11.9 years (8.90)		

Table 2: Current Vaccination Status

Question	Frequency	Percent
Do you consider yourself fully immunized?		
Yes	92	62.2
No	15	10.1
I don't know	41	27.7
Has your health care provider discussed adult immunizations with you?		
Yes	37	25
No	104	70.3
I don't know	7	4.7
If you were asked for your immunization records, would you be able to locate them?		
Yes	68	46.6
No	47	32.2
I don't know	31	21.2
Have you had an influenza immunization this season?		
Yes	62	42.2
No	85	57.8
I don't know	0	0
If you have not received the influenza immunization this season, why not?		
Too costly	8	5.4
Didn't have time/forgot	22	14.8
Not required by employer	10	6.7
Wasn't sure I needed one	14	9.4
I'm allergic	0	0
Didn't believe it would help	31	20.8
Worried about side effects	18	12.1
Didn't want it, it makes me sick	15	10.1
Other	0	0
Have you received the MMR immunization as a child		
Yes	99	70.2
No	16	11.3
I don't know	26	18.4
Have you received the MMR immunization as an adult		
Yes	35	27.3
No	54	42.2
I don't know	39	30.5
If you have not received the MMR immunization as an adult, why not?		
Too costly	4	2.7
Didn't have time/forgot	10	6.7
Not required by employer	13	8.7
Wasn't sure I needed one	46	30.9
Worried about side effects	4	2.7
Didn't need it, I got a booster as a child	25	16.8

Didn't need it, I had the measles, mumps, or rubella disease	16	10.7
Didn't believe the immunization would work	2	1.3
Have you had a tetanus booster in the last 10 years?		
Yes	83	56.5
No	42	28.6
I don't know	22	15
If you did receive a tetanus booster during the past 10 years, did the booster include pertussis?		
Yes	26	29.5
No	7	8
I don't know	55	62.5

Table 3: Personal Vaccination Beliefs

Question	Frequency	Percent
I believe vaccinations are safe		
Strongly Agree	37	25.7
Agree	93	64.6
No Opinion	6	4.2
Disagree	5	3.5
Strongly Disagree	3	2.1
I believe vaccinations prevent disease		
Strongly Agree	50	33.8
Agree	89	60.1
No Opinion	5	3.4
Disagree	2	1.4
Strongly Disagree	2	1.4
I believe it is important for adults to receive vaccinations		
Strongly Agree	24	17.4
Agree	87	63
No Opinion	15	10.9
Disagree	9	6.5
Strongly Disagree	3	2.2
I believe it is important for school-aged children to receive vaccinations		
Strongly Agree	82	55.8
Agree	61	41.5
No Opinion	2	1.4
Disagree	0	0
Strongly Disagree	2	1.4
I believe that vaccinations should be mandatory for school employees		
Yes	72	48.6
No	35	23.6
I don't know	41	27.7
I believe vaccinations are required for some school employees		
Yes	10	6.8
No	138	93.2

Table 4: Planned Action in the Event of an Outbreak

Circumstance	Frequency	Percentage
I have had an MMR booster so I'd stay at work	43	33.3
I have not had an MMR booster so I'd stay home from work	4	3.1
I have not had an MMR booster but I'd plan on coming to work	17	13.2
I'm not sure of my MMR status so I'd stay home from work	14	10.9
I'm not sure of my MMR status but I'd plan on coming to work	50	38.8
Other	1	.7