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Vaccination Status and Attitudes of Urban
School Employees in Utah

Kim E. Thompson

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 Status and Attitudes of Urban School Employees in Utah

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Individuals who work with children are at risk for exposure to vaccine-preventable diseases. School settings can quickly become outbreak centers for communicable infection since school employees are in direct contact with children in confined areas for many hours each day. Therefore, it is important for school employees to be fully vaccinated. There are many reasons school employees may be inadequately vaccinated. One common myth is that adults believe vaccines are only for children. Another reason for inadequate vaccination rates among school employees is that many adults believe vaccinations received during childhood are still effective. Healthcare providers (HCPs) constitute the first line of defense to ensure adults are adequately vaccinated and, when vaccinations are tracked and recommended by HCPs, vaccination uptake is improved among patients. Unfortunately, many HCPs miss opportunities to vaccinate their adult patients. By discussing recommended vaccinations with adult patients, Nurse Practitioners can be instrumental in improving vaccination rates among school employees.

Keywords: vaccine, vaccination, school, employees

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Vaccination Status and Attitudes of Urban School Employees in Utah

During the 20th century, deaths from infectious diseases have drastically declined due to the advent of vaccines (Centers for Disease Control and Prevention [CDC], 1999; Choi & Manning, 2010). In 1974, the World Health Organization established the *Expanded Programme on Immunization* to ensure children had universal access to routinely recommended childhood vaccines (World Health Organization [WHO], 2011). Six vaccine-preventable diseases were initially targeted: tuberculosis, poliomyelitis, diphtheria, tetanus, pertussis, and measles. At that time less than 5% of the world's infants were fully vaccinated; however, by 2005, global coverage of vaccines had significantly improved (WHO, 2011).

Over the last four decades in the United States (US) several vaccine-preventable diseases have been eradicated or controlled due to routine childhood vaccinations (Glanz et al., 2009). For example, after widespread vaccination with smallpox vaccine, smallpox cases were non-existent by 1979 (Glanz et al., 2009). In addition to smallpox, poliomyelitis has been eliminated in the US, measles has also achieved elimination status (with only imported cases since 2000), and *Haemophilus influenzae* cases has decreased to 1.6 in 100,000 people (CDC, 2012a). However, in order to maintain the low incidence of vaccine-preventable diseases in the US, vaccination compliance must be maintained otherwise there will be a resurgence of these diseases (CDC, 2012b).

While diminishing rates of these childhood illnesses have been a profound benefit to society, one unintended consequence is that public concern has shifted from preventing disease with vaccinations to questioning vaccine safety (Choi & Manning, 2010; Glanz et al., 2009). Although vaccination rates remain high nationally for many vaccines, clusters of unvaccinated

people in some communities have left many people vulnerable to outbreaks of disease (CDC, 2012b; Omer et al., 2008). For example, since 2011 a 1,300% increase in pertussis infections have been reported in the state of Washington, the highest number of pertussis cases in any year since 1942 (CDC, 2012c). Similarly, in April 2011 there was an outbreak of measles in Utah after a family with unvaccinated children returned from international travel to Poland. The Utah measles outbreak affected one school district that prompted the quarantine of many teachers and students because teachers and students were either inadequately immunized against the measles or were unsure of their vaccination status (Stewart, 2011).

Individuals who work with children are at risk for exposure to vaccine-preventable diseases (Luthy, Thornton, Beckstrand, Macintosh, & Lakin, 2013b). Because school settings can quickly become outbreak centers for communicable infection, due to the fact that the school employees are in direct contact with children in confined areas for many hours each day, it is important for school employees to be fully vaccinated (CDC, 2012d; Gargano et al., 2011). The Utah Department of Health (2012) currently recommends adult vaccinations specifically for employees of schools and childcare facilities to prevent the spread of vaccine-preventable diseases; however, not all Utah school districts may be aware of these recommendations. While rural school employee vaccination status and perceptions have been studied in Utah, the vaccination status and perceptions of Utah's urban school employees remains unknown. The purpose of this study, therefore, is to ascertain the current vaccination status and perceptions of school employees in an urban Utah school district.

Research Inquiries

1. See how urban Utah school district employees describe their personal vaccination status.

2. Assess the perceptions of urban Utah school district employees regarding needed adult vaccinations.
3. Explore discussions between urban Utah school district employees and their healthcare provider (HCP).
4. Discover urban Utah school district employee's work-related action plan in the event of a measles outbreak at their school.

Methodology

The researchers received approval from the Institutional Review Board prior to collecting data. The urban Utah study, a nonexperimental mixed-method design, replicated a previous study conducted in rural Utah.

Setting

The urban school district was located in the greater Salt Lake City area, in the third most populous county in the State of Utah. Within the school district, special education, language emersion, and multiple Title I programs were offered. In addition, the district offered migrant education, Indian education, and homeless population education services.

Participants

Within one urban Utah school district, 1,400 participants were randomly selected by computer from 85 sites according to place of employment, such as the type of school or district office. Randomly selected sites included: 20 elementary, four junior high, two senior high, and seven district offices, which provided a matched sample to a study conducted the previous year in a rural Utah school district. Principals from two of the 20 elementary schools denied having questionnaires delivered to their respective school locations because they were concerned it would be a burden to the school employees. Of the seven district offices randomly selected for

participation, one refused to participate because they were in the process of relocating their office. Questionnaires were delivered to the remaining 18 elementary schools, six district offices, four junior high schools, and two senior high schools for a total of 1259 questionnaires distributed. To be eligible for participation, participants needed to be employed in any capacity, either full-time or part-time, by the school district. Excluded from participation were school volunteers and teacher aides because this population tends to be transient by nature and, as a result, may not accurately represent the views of permanent employees.

Instrument

The instrument was adapted from a questionnaire created for use in a Utah pilot study (Luthy, Houle, Beckstrand, Macintosh, & Lakin, 2013a), and then utilized again with a larger sample to measure vaccination perceptions among rural Utah school employees (Luthy et al., 2013b). The instrument was originally created by a team of Utah public health experts who pre-tested the questionnaire prior to its first use in the pilot study. Because the instrument was designed by public health experts and pre-tested, its face validity was not reevaluated prior to use in this study. The two page adapted questionnaire included 10 yes/no, seven multiple choice, two open-ended, and seven demographic questions.

The 10 yes/no items were designed to evaluate the school employees' vaccination status, availability of vaccination records, and vaccination awareness. Specifically, participants were asked if they were fully vaccinated, could find their vaccination record, were aware of any vaccination requirements for school employees, and were up-to-date on four particular vaccinations: 1) influenza (flu); 2) MMR as a child and as an adult; 3) tetanus-diphtheria (Td); and 4) tetanus with pertussis (Tdap). If participants were unsure of any of their answers to these questions, they had the option of selecting "I don't know" as a response. Participants were also

questioned about whether or not their HCP had discussed vaccinations with them. In lieu of a yes/no response, participants could also choose to report the absence of a HCP. Finally, participants were asked about their beliefs regarding the need for a mandatory vaccination requirement for school employees. Instead of selecting the yes/no choices participants could choose the response “undecided.” Some of the yes/no items also included space where the participants could share comments regarding their response.

The multiple choice items included perception-related questions on vaccination safety and importance, space for an explanation as to why the subject’s flu and MMR vaccines were out-of-date, and action plan in the event of a measles outbreak at their school. Likert-style questions related to vaccination safety and importance included six choices: strongly agree, agree, no opinion, disagree, strongly disagree, and “other.” When asked to report on the participants’ planned action in the event of a measles outbreak at their school, choices for responses included: 1) I have had an MMR booster so I’d stay at work; 2) I’m unsure of my MMR status but I’d stay at work; 3) I’ve already had the measles so I’d stay at work; 4) I have not had an MMR booster but I’d stay at work; 5) I have had an MMR booster but would stay at home; 6) I have not had an MMR booster so I’d stay at home; and 8) Other. The “other” choice included space where the subject could clarify their response.

Seven demographic questions were included in the questionnaire, asking individuals to report their gender, age, and employment status (either full-time or part-time). Individual respondents were also asked to report how many years they had worked as an employee in that school district and in what capacity they were employed (such as teacher, support staff, or administrator). Lastly, individuals were asked to disclose their ethnicity and where they were employed (such as elementary, junior high, high school, or district office).

Design

The study was approved by the school district's director of assessment, research, & evaluation. A few weeks prior to the distribution of the questionnaires each of the district directors, school principals, and secretaries were contacted by email concerning the study.

Upon delivery of the questionnaires at each participating site, secretaries received directions on how to distribute the study to employees. Secretaries were asked to e-mail each full-time and part-time employee at their school to announce the study and the presence of a questionnaire in each individual's school mailbox. The informed consent document and return address envelope, with pre-paid postage, was stapled to each questionnaire. In addition, a \$1.00 bill was attached to each questionnaire as an incentive for participation. Regardless of their participation in the study, the employee could keep the \$1.00 incentive. Return of the questionnaire provided implied consent.

Data Analysis

Data were entered into SPSS 19 (SPSS Inc., Chicago, IL, 2012). Frequencies, measures of central tendency and dispersion, and reliability statistics were calculated for all quantitative items. Qualitative data from the "comment" and "other" responses on the questionnaire were independently reviewed by two researchers and analyzed to identify common themes.

Results

A total of 1,259 questionnaires were delivered to full-time and part-time employees of the selected urban Utah school district; 852 questionnaires were returned for a response rate of 67%. Of those who responded, 695 (84.5%) were female and 127 (15.5%) were male. With regard to employment status, 710 (85.7%) worked full-time, while 114 (13.8%) worked part-time in the school district. The age range of respondents was 22 years to 78 years with a mean age of

46 (SD 11.324) years. The amount of time spent working in the school district ranged from 1 year to 55 years, with a mean of 12.9 (SD 8.962) years (see Table 1).

Current Vaccination Status

Several items on the questionnaire were meant to ascertain the current vaccination status of urban Utah school district employees. Of the 852 participants, 625 (74.7%) considered themselves to be fully vaccinated, 112 (13.4%) reported they were not fully vaccinated, and 100 (11.9%) were unsure if they were fully vaccinated. However, when questioned about specific vaccinations, only 317 (37.8%) of the participants reported having received the flu vaccine for the current season, although another 522 (62.2%) reported being unvaccinated against flu. In comparison, 519 (61.9%) reported their Td booster was updated in the last 10 years. When questioned about whether their last Td booster included protection against pertussis, only 227 (42.1%) of participants confirmed they had received a Tdap. Regarding the MMR vaccination, 616 (77.6%) of participants reported having received the MMR vaccine as a child, while 290 (34.0%) reported having received the MMR vaccine as an adult (See Table 2).

In addition to answering specific questions about their current vaccination status, participants also had the option to provide additional comments. There were two major themes that emerged from additional comments: 1) a need for guidance on boosters (n = 16); and 2) specific refusal of the flu vaccine (n = 12). Some employees wanted information about which of their childhood vaccinations needed a booster while other employees were curious if they needed any of the newer vaccines on the market. Such thoughts were evidenced by comments including, “I [may be] due for some boosters,” “I have heard recently that boosters are now needed for diseases we thought were life-time immunizations, but don’t know which ones,” and “I know that there are new immunizations that are suggested but I don’t know if I need them.” The

second theme – specific refusal of the flu vaccine – included comments by some school employees who consistently refused the flu vaccine, but also by others who inconsistently updated their flu vaccine. The theme was captured in comments such as, “I [do not] get flu shots,” and “[All] except [the] flu shot.”

Vaccination records. Participants were also asked if they would be able to locate their personal vaccination records, if needed. Of those who responded, 344 (41.3%) stated they would be able to locate their vaccination records, although 485 (58.3%) of participants were either unsure or confirmed they would be unable to locate their vaccination records. The participants who wrote in additional comments about locating their vaccination records (n = 87) believed they could, in fact, produce a copy of the record if given enough time. This theme emerged from comments such as, “I would [have to] ask my doctor to print them” and “I know the health department has them.” Additionally participants reported that while they might be able to locate their records, these records would likely be incomplete. Such thoughts were captured in comments such as, “Partly – I have my childhood records, but I don’t keep track of my adult immunizations” and “Not sure how accurate they are; they don’t go back very far.”

Vaccination Perceptions

Several items in the questionnaire were meant to assess school employees’ perceptions of the safety, importance, and effectiveness of vaccinations. Of the 852 participants, 780 (92.9%) either agreed or strongly agreed vaccinations were safe, 794 (94.5%) agreed or strongly agreed vaccinations prevented disease, 670 (79.8%) agreed or strongly agreed adults should receive vaccinations, and 790 (94.1%) agreed or strongly agreed school-aged children should receive vaccinations. When questioned about adult vaccination mandates, 389 (46.3%) believed there should be mandatory vaccination requirements for school district employees, 224 (26.7%)

were undecided about mandatory vaccination requirements, and 227 (27.0%) were opposed to mandatory vaccination requirements. Only 46 (5.5%) participants mistakenly believed there were already mandatory vaccination requirements in place for school district employees. The remaining vaccination perception data are reported in Table 3.

HCP Information

Participants were also asked whether or not their HCP had informed them about adult vaccinations. Of those responding, 352 (42%) reported having a conversation with their HCP regarding adult vaccinations although 465 (55.5%) reported their HCP had not discussed adult vaccinations with them. Only 21 (2.5%) said they had no HCP with whom they could discuss adult vaccinations (See Table 4).

In addition, participants could include comments regarding adult vaccination information received from their HCPs. Of the 38 comments, two main themes became apparent: 1) the HCP often only recommended the flu vaccine ($n = 10$); and 2) participants felt their HCP did not offer much information on vaccinations ($n = 7$). The first theme, that HCP often only recommended the flu vaccine, was captured in comments such as “They asked me if I wanted a flu shot.” The second theme, that participants felt their provider did not offer much information on vaccinations, was expressed in comments such as “I wish they would [offer information on vaccines],” “Not very extensively,” or “I brought it up though, he did not.”

Action Plan in the Event of a Measles Outbreak

Participants were asked about their work-related action plan if there was a measles outbreak in their school. Of those responding, 611 (74%) reported they would stay at work during a measles outbreak, 160 (19.3%) reported they would stay home during a school-based measles outbreak, and 55 (6.7%) were unsure of their action in the event of a measles outbreak.

Of the 611 participants planning to stay at work during a measles outbreak, only 246 (29.8%) had received an MMR booster, 161 (19.5%) were unsure of their MMR status, 131 (15.9%) had the measles disease during their lifetime, and 73 (8.8%) were sure they had not received an MMR booster. Of those 160 participants who reported that they would stay home during a measles outbreak, 33 (4.0%) had received an MMR booster, 45 (5.4%) had not received an MMR booster, and 82 (9.9%) were unsure of their MMR status. The remaining data concerning the participants' planned action in the event of a measles outbreak is reported on Table 5.

Discussion

In September 2013, the National Vaccine Advisory Committee (NVAC) updated the standards for immunization of adults, although they also acknowledged low vaccination uptake among adults. Williams et al. (2014) reported a mere 12.2% of American adults are up-to-date on the hepatitis A vaccine, only 14.2% are current on Tdap vaccine, and 20.1% are adequately vaccinated against shingles. The belief that vaccines are only for children is a common reason for poor vaccine compliance among adults (CDC, 2014a; Immunization Action Coalition, 2012). Our research also supports these findings since the school employees perceived vaccinations as important for school-aged children more frequently than for adults.

Because schools can serve as outbreak centers for communicable disease, all 50 states require childhood vaccines prior to school entry. Since school employees work in an environment which promotes the rapid spread of communicable and vaccine-preventable diseases, it was surprising that the vaccination rates of the Utah school employees and the average American adult were similar in spite of Utah Department of Health recommendations for adults working in school settings. For example, in this study the participants who had

received a Td booster in the last 10 years differed by only a few points from the national vaccination rate of Td (CDC, 2014b). Additionally, flu vaccine uptake is continually reported as suboptimal in all adults, with similar vaccination rates between the Utah school employees and adults nationwide (CDC, 2013).

According to national guidelines, an individual exposed to the measles virus during an outbreak must provide evidence of immunity through 1) documentation of vaccination; 2) laboratory titers; 3) birth before 1957; or 4) laboratory confirmation of the disease. If none of these criteria are satisfied, the susceptible contact is subsequently quarantined (Kutty et al., 2014). The school employees in this study, however, were unfamiliar with these guidelines since some of the employees reported that they planned to continue working even though they were either unsure of their MMR status or confirmed they had never received an MMR booster. As a result of study findings, it is advisable for school districts to include measles outbreak planning as part of their disaster preparedness training. Additionally, having a record of MMR status on each school employee prior to a measles outbreak would save significant time and money in the event of a measles outbreak.

Implications for Practice

HCPs are in a prime position to assess an adult's vaccination status at each clinic visit and then promote vaccinations among adult patients (Bridges, Coyne-Beasley, Advisory Committee on Immunization Practices (ACIP), & ACIP Adult Immunization Work Group, 2014). In this study, however, over half the participants reported never discussing adult vaccinations with their HCP and, even when vaccinations were discussed, the HCP usually only discussed the flu vaccine. NPs, similar to all HCPs, are encouraged to "take steps to help ensure that their adult patients are fully immunized" (CDC, 2014c, para. 1). While

pharmacies and other retail businesses may offer adult vaccinations outside the traditional clinic environment, the majority of adults still receive their vaccinations at the HCP office where they can discuss the benefits and risks of vaccination with a provider who is already familiar with their health history and who can assist in keeping vaccination records (Voelker, 2012).

Unfortunately, many HCPs miss opportunities to vaccinate their adult patients (Hurley et al., 2014), even though the majority of patients will, in fact, receive vaccinations if recommended by the HCP (Johnson, Nichol, & Lipczynski, 2008). To overcome missed opportunities, the NP should review the vaccination status of all patients during every clinic visit. To assist the NP in this process, medical assistants can be trained to provide an initial review of the patient's health record for missing immunizations. Multiple vaccination training resources are available free of charge at <http://www.cdc.gov/vaccines/ed/courses.htm>. Additionally, the medical assistant can provide vaccination handouts to adult patients immediately following vital sign assessment, thus allowing the patient a few minutes to review adult vaccination information while waiting for the HCP to enter the clinic room. Various vaccination handouts are available and free to download from the Immunization Action Coalition at <http://www.immunize.org/handouts/top-picks.asp>. Furthermore, many electronic health record (EHR) systems have a feature that will alert the HCP if a patient is overdue for a vaccination which, in turn, positively influences vaccination rates among patients (Au, Oster, Yeh, Magno, & Paek, 2010). If this feature of the EHR is not yet fully utilized, the NP may want to facilitate its use in his or her clinic.

Limitations

Participants were selected from paid employees of one urban Utah school district. As a result, this sample may not accurately represent the views of the volunteers in the school urban Utah school district, volunteers of other school districts, or employees of private or charter schools. Because this study was conducted in urban Utah, the findings may not be generalizable to other school districts in the state of Utah or in the US. Furthermore, including responses from school employees who refused to participate could have altered the results.

Recommendations for Further Research

Replicating the same study among school employees in private or charter schools may reveal similarities or differences between the urban school employees and school employees of other school districts. It may be of benefit to pilot an adult vaccination education program and evaluate whether such a program truly impacts the opinion of school employees who are undecided regarding vaccination mandates in their school districts.

Conclusion

School employees are at risk for contracting and spreading vaccine-preventable diseases when inadequately vaccinated. Thus, the vaccination status of adults, especially those working in the school setting, should be regularly assessed. Most adults, however, are unaware of the vaccines recommended for individuals over 18 years of age and are dependent on HCPs, such as NPs, to provide this important information. HCPs constitute the first line of defense to ensure adults are adequately vaccinated and, when vaccinations are tracked and recommended by HCPs, vaccination uptake is improved among patients. NPs can be

instrumental in facilitating clinic policy changes which, in turn, improve vaccination rates among adults.

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Table 1

Demographics

Demographic	Frequency	Percent
Gender		
Male	127	15.5
Female	695	84.5
Age: Range 22 years -78 years		
Mean (SD): 46 years (11.324)		
Ethnicity		
Caucasian		
Hispanic	780	96.2
Non-Hispanic	12	1.5
	19	2.3
Type of School		
Elementary		
Middle/Junior High	475	57.6
High School	149	18.1
District Office	85	10.3
Multiple Schools	101	12.2
	15	1.8
Current Occupation		
Teacher		
Administrator/Office Worker/Secretary/Counselor	550	66.4
Education Specialist/Computers/Librarian	161	19.4
Support Staff/Lunch Worker/Nurse/Custodian/Tracker	48	5.8
Other	25	3.0
	44	5
Type of Employment		
Full-time		
Part-time	710	85.7
Other	114	13.8
	4	0.5
Years Worked in School District: Range 1 year – 55 years		
Mean (SD): 12.9 years (8.96)		

Table 2

Current Vaccination Status

Question	Frequency	Percent
Do you consider yourself to be fully vaccinated?		
Yes	625	74.7
No	112	13.4
I don't know	100	11.9
If you were asked for your vaccinations records, would you be able to locate them?		
Yes	344	41.3
No	353	42.4
I don't know	132	15.9
Have you had an influenza (flu) vaccination this season?		
Yes	317	37.8
No	522	62.2
Have you received the MMR vaccination as a child?		
Yes	616	77.6
No	89	11.2
I don't know	89	11.2
Have you received the MMR vaccination as an adult?		
Yes	290	34.0
No	249	29.2
I don't know	170	20.0
Have you had a tetanus booster in the last 10 years?		
Yes	519	61.9
No	225	26.8
I don't know	94	11.2
If you did receive a tetanus booster during the past 10 years, did the booster include pertussis?		
Yes	227	42.1
No	86	16
I don't know	226	41.9

Table 3

Vaccination Perceptions

Question	Frequency	Percent
I believe vaccinations are safe.		
Strongly Agree	335	39.9
Agree	445	53.0
No Opinion	16	1.9
Disagree	23	2.7
Strongly Disagree	16	1.9
Other	5	0.6
I believe vaccinations prevent disease.		
Strongly Agree	391	46.5
Agree	403	48.0
No Opinion	8	1.0
Disagree	12	1.4
Strongly Disagree	18	2.1
Other	8	1.0
I believe it is important for adults to receive vaccinations.		
Strongly Agree	235	28.0
Agree	435	51.8
No Opinion	98	11.7
Disagree	32	3.8
Strongly Disagree	11	1.3
Other	28	3.3
I believe it is important for school-aged children to receive vaccinations.		
Strongly Agree	555	66.1
Agree	235	28.0
No Opinion	7	0.8
Disagree	7	0.8
Strongly Disagree	24	2.9
Other	12	1.4
I believe there are vaccination requirements for people employed by the district.		
Yes	46	5.5
No	730	87.1
I don't know	62	7.4
I believe school employees should have mandatory vaccination requirements.		
Yes	389	46.3
No	227	27.0
Undecided	224	26.7

Table 4

Healthcare Provider Discussion

Question	Frequency	Percent
Has your healthcare provider discussed adult vaccinations with you?		
Yes	352	42
No	465	55.5
I don't have a healthcare provider	21	2.5

Table 5

Action Plan in the Event of a Measles Outbreak

Planned Action	Frequency	Percent
I have had an MMR booster so I'd stay at work.	246	29.8
I'm unsure of my MMR status but I'd stay at work.	161	19.5
I've already had the measles so I'd stay at work.	131	15.9
I have not had an MMR booster but I'd stay at work.	73	8.8
I have had an MMR booster but would stay at home.	33	4.0
I have not had an MMR booster so I'd stay at home.	45	5.4
I'm not sure of my MMR status so I'd stay home.	82	9.9
Other	55	6.7