Master of Public Health

Integrative Learning Experience Report

AN ANALYSIS OF WEBIZ USAGE IN KANSAS SCHOOLS

by

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MPH Candidate

submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

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Abstract

Kansas Department of Health and Environment (KDHE) is a state agency that is responsible for Kansas' public health, environment, and health care finance. The Kindergarten Immunization Coverage Survey is an annual survey conducted by the Kansas Immunization Program (KIP) to determine vaccine coverage levels among children enrolled in a public or private school with a kindergarten class in Kansas. The Kansas immunization information system (IIS), WebIZ, serves as a database for Kansas immunization data. To validate the viability of WebIZ data at the population level, IIS data was examined for completeness and compared to current methodology used in the Kindergarten Vaccine Coverage Study. KDHE would like to use WebIZ as the data source for kindergarten immunization coverage, in efforts to reduce the cost and resources spent on the annual assessment. Part II of this study determined current usage of the WebIZ school module by schools in Kansas with a kindergarten class.

Immunization data was pulled for all students assigned to a kindergarten class in a public or private school from WebIZ for the 2017-2018 academic year. An online survey was developed to assess the current usage and identify barriers to WebIZ utilization among schools to understand why such a large percentage of schools did not have associated kindergarten students in WebIZ. Barriers assessed included lack of time, lack of knowledge, lack of access, and use of another electronic immunization system or paper records. The greatest barrier associated with not using WebIZ was lack of access (OR=23.20). Lack of knowledge, use of an alternate electronic database, and use of paper records were also statistically significant barriers to WebIZ usage identified. Information from each of these studies will be used to guide future interventions to increase WebIZ utilization by schools in Kansas.

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Chapter 1- Background

I completed my Master of Public Health applied practical experience (APE) at the Kansas Department of Health and Environment (KDHE) in Topeka, Kansas. KDHE is a state agency that is responsible for Kansas' public health, environment, and health care finance. The Division of Public Health is divided into seven separate bureaus: Community Health Systems, Disease Control and Prevention, Epidemiology and Public Health Informatics, Family Health, Oral Health, Health Promotion, and the Center for Performance Management. My APE was completed within the Bureau of Epidemiology and Public Health Informatics. Kelly Gillespie, MPH, served as my preceptor during the extent of my APE from October 10, 2018 to April 10, 2019. Kelly has been at KDHE for four years and is currently an advanced epidemiologist. In her role at KDHE, she focuses on the epidemiology of hepatitis and vaccine preventable diseases.

Kindergarten Immunizations

Per Kansas statutes K.S.A 72-5208-5211a and K.A.R. 28-1-20, all students enrolling in school in Kansas for the first time are required to receive vaccinations "deemed necessary by the secretary[i]." Current requirements follow the Advisory Committee on Immunization Practices (ACIP) schedule of childhood vaccinations[ii]. Table 1.1 displays national immunization recommendations, requirements for school entry in Kansas, and Healthy People 2020 (HP2020) goals. HP2020 is a national program which includes objectives to reduce preventable diseases by increasing immunization rates[iii].

Table 1.1[iv]: ACIP Birth to Seven Years Immunization Recommendations

	Vaccination	Kansas Requirement for School	Number of Doses	Healthy People 2020 Coverage Goals
DTaP5	Diphtheria, Tetanus, Pertussis	Yes	5	95%
DTaP4			4	
HepB3	Hepatitis B		3	
MMR2	Measles, Mumps, Rubella		2	
IPV4	Polio		4	
IPV3			3	
Var2	Varicella	Yes (or history of disease)	2	
HepA2	Hepatitis A	Recommended	2	85%
Hib3	*Haemophilus influenzae* type b		3	90%
PCV4	*Streptococcus pneumoniae*		4	

Any child entering a public or private school in Kansas must have five doses of DTaP (diphtheria, tetanus, pertussis) or four doses if the fourth dose was administered on or after the fourth birthday. Four doses of IPV (polio) or three doses if third dose was administered on or after fourth birthday is also required[v]. Additionally, the same statutes allow for vaccine exemptions due to medical or religious reasons[vi]. Lastly, while these requirements are mandated by law, the power of enforcement and exclusion of non-up-to-date students resides at the school level[vii].

The Kindergarten Vaccination Coverage Survey is an annual survey conducted by the Kansas Immunization Program (KIP) to determine vaccine coverage levels among children

enrolled in a kindergarten class in Kansas, exemption rates, and exclusion policy trends. The results from that study identify statewide kindergarten vaccination coverage in Kansas, exemption rates, and how Kansas compares to HP2020 goals. Knowledge of coverage rates allows for an understanding of the extent of herd immunity for preventable diseases and identifies where unvaccinated populations exist. In the event of an outbreak, this information assists with determining what public health resources are necessary to prevent further spread of disease. Identifying areas of low vaccination coverage become target areas for intervention programs. Results from this study were compared to data from the 2016-2017 Kindergarten Vaccination Coverage Survey[viii].

Vaccinations are important due to the ability to prevent communicable infectious diseases. Adequate vaccination coverage is important to ensure herd immunity. Herd immunity is the resistance of the spread of a communicable disease throughout a population when a specific proportion of that population is immune to the disease. While some individuals cannot receive immunizations due to medical contraindications or age, herd immunity is necessary to protect them from these diseases. In 2018, Kansas was among 21 states that experienced a measles outbreak. Measles is a vaccine-preventable disease, however, due to lack of immunized individuals, 372 cases were reported nationwide[ix]. The spread of measles in the United States was a result of unvaccinated communities[x]. To protect unvaccinated individuals from measles, 95% of the population must be vaccinated for measles to achieve herd immunity[xi]. During this outbreak in Kansas, vaccination coverage was important in controlling the spread of the disease, though, many who became infected were too young to be immunized.

<u>WebIZ</u>

The Kansas immunization information system (IIS), WebIZ, serves as a database for Kansas immunization data. IIS help consolidate immunization records and provide an electronic, reliable source of patient immunization data. IIS can be used at the point of care by health care providers to manage vaccination records and support clinical decisions. IIS can also be beneficial at the population level, for use in surveillance or immunization program support[xii]. However, for IIS to be used at this level, data must be consistently entered at the point of clinical care. In 2020, all providers in Kansas will be required to begin entering immunization data into WebIZ. While current overall usage of WebIZ has not been fully assessed, it has been identified that it is not being utilized accurately or to its fullest potential.

Currently, medical providers in Kansas enter patient vaccination data into WebIZ. The WebIZ school module allows for schools to enter student vaccination history and assign a student's immunization records to a school and grade. By ensuring high data quality, KDHE is working towards utilizing WebIZ data to determine vaccination coverage among Kansas kindergarteners, and reducing cost and time required by the annual Kindergarten Vaccination Coverage Survey. This study focuses solely on the use of WebIZ by professionals at Kansas schools with a kindergarten class.

<u>Project overview</u>

Part 1 (Data Quality Analysis)

Annually, KIP, which houses WebIZ, performs an analysis of vaccination records of kindergarteners in Kansas to determine vaccination coverage. Currently, immunization records are collected directly from school nurses via mail. KDHE would like to change the process of retrieving kindergarten immunization records for annual assessments. Due to the time and cost associated with this annual assessment, KIP seeks to utilize data in WebIZ to determine vaccination rates. To validate the viability of using WebIZ at the population level, IIS data were examined for completeness (including age, grade, school, and vaccination data) and compared to results from the 2016-2017 Kindergarten Immunization Coverage Study.

Part 2 (Barrier Analysis)

The school module is a tool in WebIZ that is available to school nurses or other professionals who maintain vaccination records for a school. This module can be used to enter vaccination data, assign students to a school, grade, and promote students to the next grade. To use WebIZ data for kindergarten vaccination coverage, there must be a good representation of schools utilizing this module, indicating that WebIZ data is comparable to current data. It was observed in part 1, analysis of current data, that a majority of schools were not represented in WebIZ. Additional analysis was performed to determine what factors affected the school module utilization by schools in WebIZ. The aim of this study was to identify which barriers were statistically associated with lack of WebIZ use and measure the strength of that association.

Chapter 2- Methods

Part 1 (Data Quality Analysis)

Immunization data was pulled from WebIZ for all students assigned to a kindergarten

class in a public or private school during the 2017-2018 academic year (796 schools). For the

comparison of WebIZ data for coverage, all vaccines other than those required for school

admission were excluded. WebIZ data was examined for indicators of completeness; total

number of kindergarten students aged 5 to 7 years old, percentage of schools, and number of

private vs public schools represented. Frequencies were calculated for all factors examined.

Vaccination coverage for required immunizations was assessed; up-to-data status was based on

HP2020 goals[xiii].

Findings were compared to data from the 2016-2017 Kindergarten Vaccination

Coverage Study and HP2020 vaccination coverage goals. SAS®software was used for all data

analysis. Survey frequencies were calculated for to evaluate the variables to indicate

completeness of the data. Means with 95% confidence intervals were calculated for vaccine

coverage to assess whether there was a significant difference between coverage in WebIZ and

the Kindergarten Immunization Coverage Study.

Part 2 (Barrier Analysis)

To assess for current WebIZ usage and barriers to use by schools, an online survey tool

was developed in Qualtrics® (Appendix 2) and distributed via email (Appendix 1). The survey

was sent to individuals who maintained immunization records for each school (public and

private) with a kindergarten class in Kansas. A list of the 802 schools (698 public, 104 private)

with a kindergarten class (2018-2019 school year) in the 105 Kansas counties was obtained

from the Kansas State Department of Education and emails were obtained from the annual

KDHE Kindergarten Vaccination Coverage Study. Schools were contacted via phone for updated

information if email delivery failed after one attempt. The survey was designed with skip

patterns so that questions may be skipped based on a participant's answers, allowing for more

tailored results. Individuals who kept immunization records for more than one school were

instructed to complete a separate survey for each school that they keep immunization records

for.

The goal of the survey was to assess the current use and identify barriers to WebIZ

utilization among schools to understand why such a large percentage of schools did not have

associated students in WebIZ. Factors assessed included lack of time, lack of knowledge of

WebIZ, method for maintaining records (paper copies and/or electronic database), and lack of

WebIZ access. To address the perceived lack of knowledge barrier, at the conclusion of the

survey, the option for training was assessed. It was evaluated whether individuals felt

additional training would be beneficial, and if so, preferred method (webinar, in-person, etc.).

SAS® software was used for all data analysis. Frequencies, chi-squared, and odds ratio

analyses were calculated and used to identify significant barriers to WebIZ usage, and strength

and directionality of association. Questions that addressed barriers to WebIZ usage within

WebIZ users and non-users, were combined for analysis. A chi-squared and p-value analysis was

first conducted to determine overall significant relationships. For barriers that had a significant

p-value (<0.05), odds ratios, and a 95% confidence interval were calculated. To assess for

possible confounders, Mantel-Haenszel odds ratios were calculated.

Chapter 3- Results

Part 1 (Data Quality Analysis)

The dataset from the 2017-2018 school year from WebIZ contained a total of 452 students assigned as kindergarteners from 75 schools. 344 (76%) were aged five through seven (range 4-23 years, median age of five), the inclusion criteria used to categorize a kindergartener in this study. 108 (24%) students were assigned to a kindergarten class but were not of ages five to seven. These entries were removed from further analysis. With a total of 38,484 students enrolled in kindergarten in Kansas during the 2017-2018 school year, WebIZ data has only a 0.89% representation of all kindergarteners in Kansas.

Out of 796 schools in Kansas holding a kindergarten class during the 2017-2018 school year, 8.42% were represented in WebIZ; 67 total schools (95.5% public, 4.5% private) with 40% of Kansas counties represented. Table 3.1 displays the kindergarten student, school, and county representation of WebIZ data compared to the Kindergarten Vaccination Coverage Study data.

Table 3.1: Data Comparison: WebIZ vs. Kindergarten Vaccination Coverage

	WebIZ data	Kindergarten Vaccination Coverage Study	Representation in WebIZ
Kindergarten students	344	38,484	0.89%
Schools	67	796	8.42%
Counties	42	105	40.00%

Common data entry errors observed in the WebIZ data included duplicate data entries and school misclassification. Four students (1.2%) had duplicate vaccination entries due to association with multiple schools. Furthermore, eight (10.7%) schools with kindergarten students were misclassified as middle schools, high schools, central offices, and one unspecified.
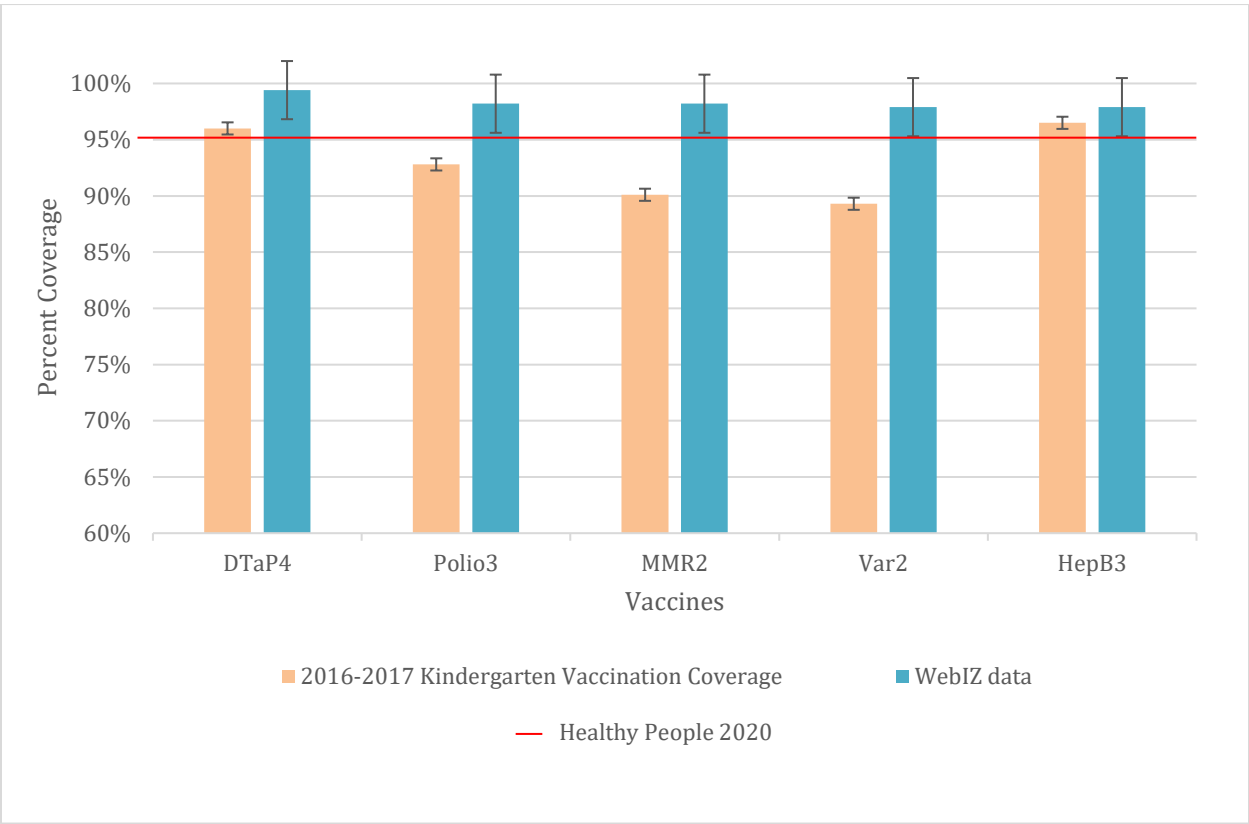
Figure 3.1 Vaccination Coverage Among Kindergarteners, WebIZ vs. Kindergarten Vaccination Coverage 2016-2017

Vaccine coverage from WebIZ data compared to coverage rates from the 2016-2017 Kindergarten Vaccination Coverage Study is displayed in Figure 3.1. The error bars represent 95% confidence intervals, allowing for significant differences to be easily observed. Polio3, MMR2, and Var2 coverage rates were significantly higher in WebIZ data compared to the kindergarten study data.

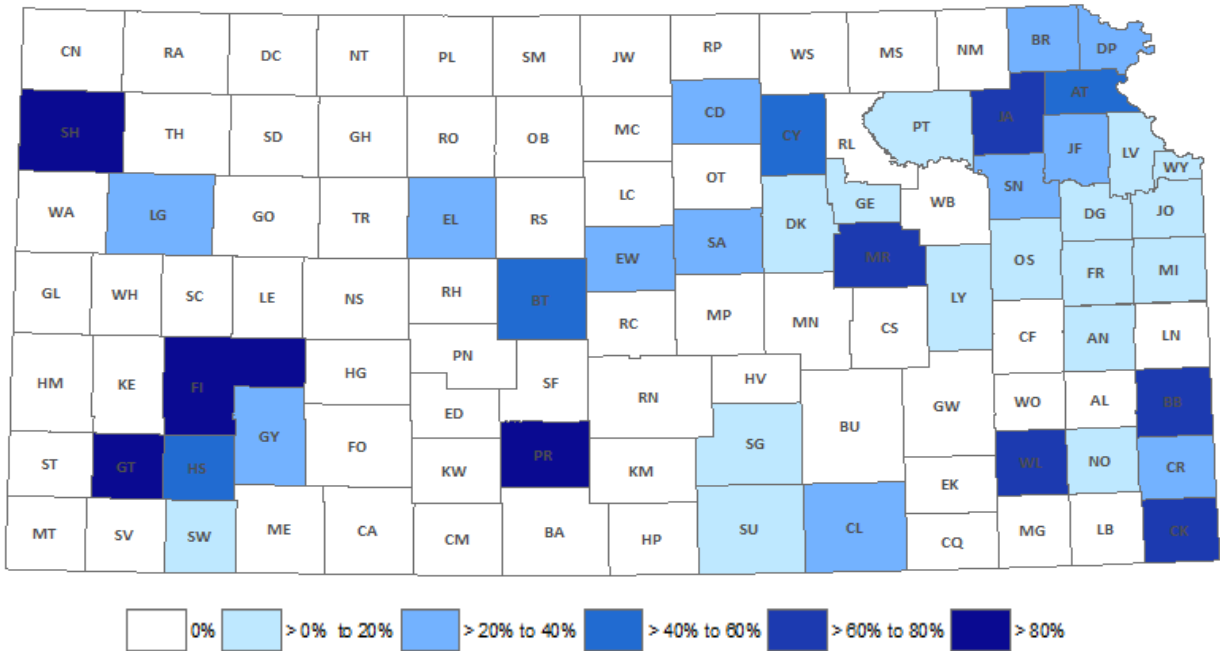**Figure 3.2. Saturation map of WebIZ usage use by county**

Figure 3.2 displays the saturation of WebIZ school module use by county, as indicated by the WebIZ data. The white illustrates the counties without WebIZ representation. The darkest blue represents counties with the most WebIZ representation. Table 3.2 presents the percentage of counties within each range of WebIZ representation. The majority (61.0%) of counties have 0% of schools using the WebIZ school module.

Table 3.2: Percent school representation by county

School Usage	Counties
0 %	61.0%
>0-20%	15.2 %
>20-40%	11.4%
>40-60%	3.8%
>60-80%	4.8%
>80%	3.8 %

Part 2 (Barrier Analysis)

Respondents from 501 schools with a kindergarten class in Kansas participated in this survey, a 62% response rate. Respondents included school nurses (83.4%), administrative assistants/secretaries (10.4%), health aids (2.4%), directors of health services (1.8%), principals (1%), county health department staff (0.4%), contract nurses (0.4%), and district clerks (0.2%). 28.5% (142) of the schools represented in this study have a staff member who also kept kindergarten immunization records for at least one other school (range: two to seven schools). Of 498 responding schools, 50 (10%) school respondents were not aware of WebIZ or its purposes. 23% of schools that were aware of WebIZ still choose to not use it. However, 69% (343) schools utilize WebIZ and figure 3.3 shows which functions they utilize. The majority of schools solely use WebIZ to retrieve kindergarten student immunization records, when they are not provided by the student.
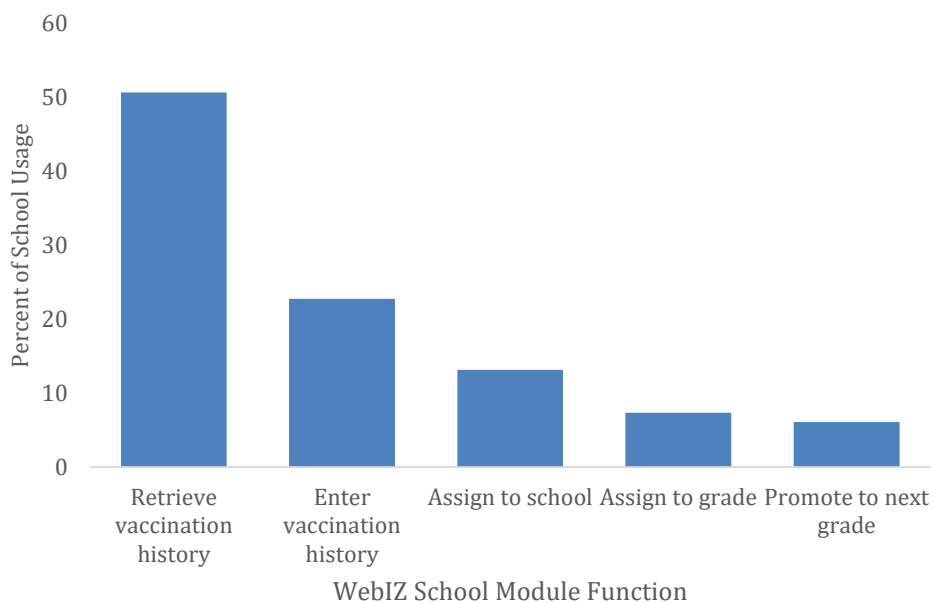

Figure 3.3 School Use of WebIZ School Module (n=162)

Factors affecting full utilization of the WebIZ school module were assessed; frequencies are shown in Table 3.3. The purpose of this query was to further analyze why individuals do not use specific functions of the school module. The greatest factors with the highest frequencies

were "lack of time to assign students to the next grade (46%), "unsure of how to promote students to the next grade" (45%), "lack of time to assign students to their current grade"(44%), "lack of time to enter vaccination records"(41%), and "lack of time to assign students to my school"(40%).

Table 3.3 Factors that affect use of WebIZ

Factor		Percent (yes)
Lack of Time		**43%**
	To assign students to next grade	46%
	To assign students to current grade	44%
	To enter vaccination records	41%
	To assign students to my school	40%
Lack of Knowledge		**27%**
	To promote students to next grade	45%
	To assign students to current grade	33%
	To enter vaccination records	20%
	To assign students to my school	31%
	Lack of training	20%
	Unable to enter exemptions	17%

Due to sample size, individual factors were regrouped into time and knowledge to allow for additional analysis. Table 3.3 shows how the individual factors were regrouped. All of these factors address either a lack of time issue or lack of knowledge of how to use WebIZ to its full extent. These combined barriers provide us with a larger picture of what the main issues that

users face when utilizing WebIZ. Once combined, lack of time was the greatest barrier to full

utilization of the school module, accounting for 43% of responses.

Reasons for lack of WebIZ usage was assessed; the greatest barrier indicated by survey

participants was lack of access. Figure 3.4 displays the frequencies of each barrier to using

WebIZ. Lack of access, lack of time, lack of knowledge, use of an alternate electronic database,

and use of paper records were all identified as barriers. Other barriers to use included

perceived cost and lack of district/administrator approval. Two people responded that cost was

associated with them not using WebIZ, however, there is no direct cost to using WebIZ. Nine

individuals mentioned that they did not use WebIZ because of lack of district or administrator

approval. Aside from these two barriers, all schools do not use WebIZ for reasons that we
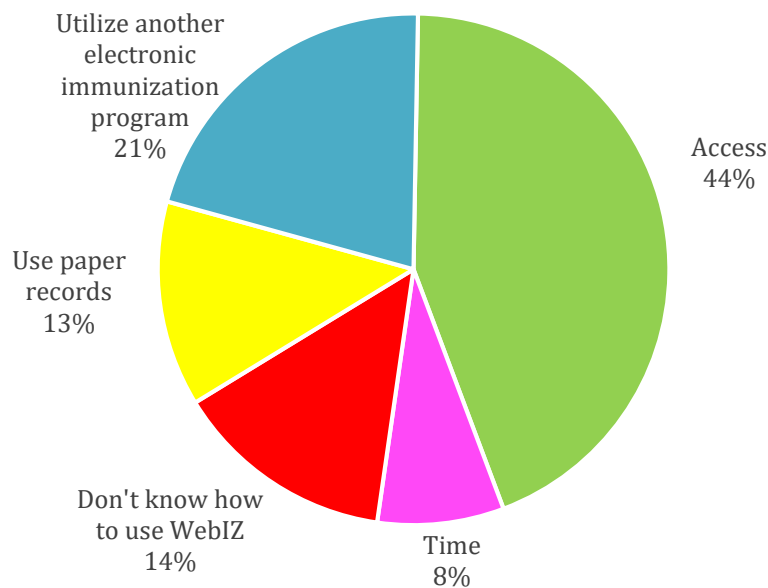
suspected.

Figure 3.4 Reasons that schools do not use WebIZ (n=100)

Table 3.4 Odds ratios for barriers to WebIZ use

BARRIER	Chi-Square (P-value)	ODDS RATIO	95% Confidence Interval
LACK OF TIME *(Yes v. No)*	45.23 (<0.0001)	4.94*◊ *(adj for lack of access)*	2.45 – 9.99
USE OF ALTERNATE DATABASE *(No v. Yes)*	5.62 (0.0178)	0.08* *(adj for use of paper records)*	0.01 – 0.66
LACK OF KNOWLEDGE *(Yes v. No)*	10.31 (0.0013)	2.23	1.35 – 3.68
OTHER BARRIERS *(Yes v. No)*	4.31 (0.0379)	2.20* *(adj for lack of time)*	1.13 – 4.28
USE OF PAPER RECORDS *(No v. Yes)*	14.45 (0.0001)	4.16 * *(adj for lack of access)*	2.26 – 7.67
LACK OF ACCESS *(Yes v. No)*	134.38 (<0.0001)	23.20* *(adj for lack of time)*	10.20 – 52.78

*Adjusted OR after controlling for confounding factors
◊DV = "Does use WebIZ school module"

Odds ratios were assessed for each factor associated with use of WebIZ from responses from users and non-users; determined by a chi-squared p-value <0.05. Table 3.4 displays the chi-squared values, odds ratios, and 95% confidence intervals for each factor associated with WebIZ non-use. To control for confounders, Mantel-Haenszel odds ratios were used if the ratio was greater than 10% different than the crude. All barriers were assessed for their possible confounding effects for each barrier. The greatest barrier associated with WebIZ non-use was lack of access. Respondents who stated lack of access as a barrier had 23.20 increased odds of not utilizing WebIZ compared to those who did not. Use of paper records (adj OR = 4.16), lack of knowledge (OR = 2.23), and other barriers (adj OR =2.20) were associated with lack of WebIZ usage. After controlling for use of paper records, it was observed that schools which did not have an alternate database were 92% less likely to not utilize WebIZ. Lastly, after adjusting for lack of access, it was observed that schools who responded that lack of time was a factor had 4.94 increased odds to use WebIZ compared to those who did not list time as a factor. Lack of time and lack of access were frequently confounding variables.

WebIZ training benefit and desired platform for delivery was assessed among all participants. 324 (66%) of participants stated that they would find a WebIZ training beneficial, webinar being the preferred method of delivery. Figure 3.5 displays the responses to each type of training offered. Other types of training mentioned were written information/directions, training at the annual School Nurse Conference, and nursing continuing education credits. Reasons that a training would not be beneficial include previous training, district/administrative resistance for WebIZ use, lack of knowledge of WebIZ, lack of time to attend, lack of personnel to attend, lack of interest, and lack of funding.
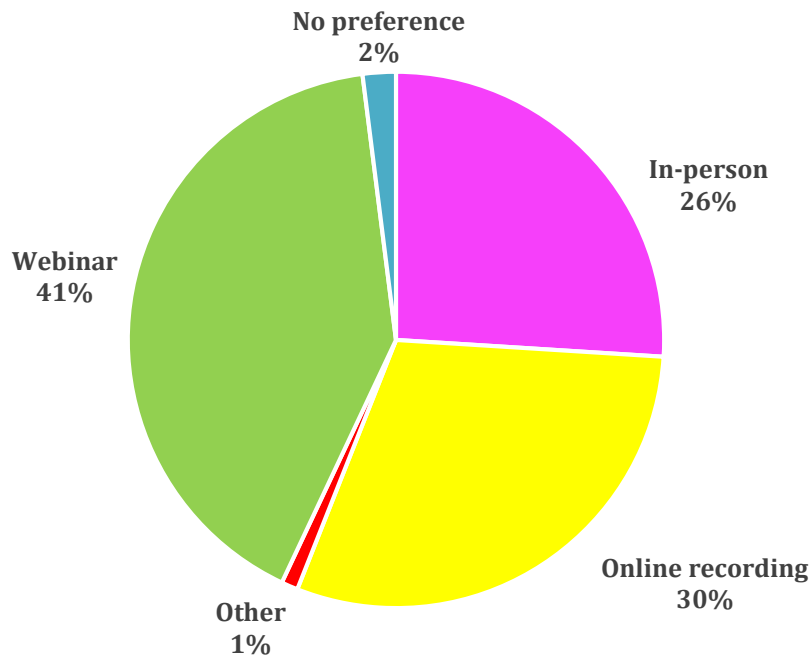

Figure 3.5 Frequencies of preferred WebIZ training by type

Chapter 4-Discussion and Conclusion

Part 1 (Data Quality Analysis)

Current WebIZ data does not provide an accurate representation of kindergarten vaccination coverage to support accurate surveillance. Data from WebIZ represented fewer than 10% of schools and less than 1% students in Kansas. Counties in the eastern part of the state had more representation per county; although, counties with the largest proportion of school participation were located in the western region of the state. This may be due to western counties having a fewer number of schools in the county. Three of the four schools in western Kansas with >80% school WebIZ usage, only have one or two schools in the county. All counties with >60% to <80% WebIZ representation, only have three or four schools in the county. The exception to this is Finney county, which has 14 schools and >80% WebIZ representation. There was a significant difference in vaccine coverage for three of the five vaccines between WebIZ and the annual Kindergarten Vaccination Coverage Study. WebIZ data suggests that kindergarten vaccine coverage in Kansas exceeds the Healthy People 2020 goals; however, data from the annual kindergarten study showed that we have not yet reached the goal, as seen in Figure 3.1. The differences in vaccination coverage between the two data sources may be that schools are more likely to use WebIZ if they have a larger percentage of vaccinated students. Also, since guardians of students currently have to opt-in to WebIZ, selection bias could affect the data. These differences in vaccine coverage and lack of geographical representation suggests that WebIZ data is not reliable for statewide coverage analysis.

While the data was not abundant, providing a large representation of Kansas kindergarten students or schools, the quality of the data in WebIZ was also poor. Students assigned as a kindergartener ranged in age from four to 23 years old, indicating that students were inaccurately assigned to a grade and/or are not being promoted to the next grade in WebIZ. Since the median age of the kindergarteners was five years, majority of the students assigned as a kindergartener were of kindergarten age. Duplicate immunization data and

inaccurate school associations were observed, indicating that data was not updated when students moved to another school.

Limitations to the analysis of the current WebIZ data were due to small sample size. Due to under representation (3.1%) of private schools in WebIZ, private vs public school vaccination coverage could not be assessed. Varicella vaccine coverage may be underrepresented if students were exempt from the varicella vaccine due to history of disease. Lastly, an analysis of vaccine exemptions entered into WebIZ could not be analyzed because of a small sample size (n=seven).

The strength of this study include that it utilized compared state-level data from two sources, enabling a direct comparison of methodology. This allowed for identification of how the WebIZ school module was being used inaccurately; driving future implementations to address these issues.

Part 2 (Barrier Analysis)

Odds ratios were calculated for each barrier assessed and mentioned in the survey. With the largest odds ratio, those who perceive lack of access as a barrier have 23.20 increased odds of not using WebIZ. The odds of not using WebIZ were the greatest for lack of access, use of paper records, lack of knowledge, and other barriers.

Analysis of barriers to WebIZ usage indicated the strongest barrier affecting the odds of not using WebIZ was lack of access (OR=23.20). While some stated that lack of access is due to lack of district approval, the majority of it is due to lack of knowledge of how to gain access. Lack of access was often mentioned by professionals who were not the school nurse, such as the administrative assistant. Every school should have access to WebIZ, however due to employee turnover and lack of knowledge of how to gain access, individuals believe that they cannot use WebIZ. This barrier can easily be addressed by education and outreach to the schools. One recommendation is to ensure each school has an active WebIZ account. Lack of

district approval can be addressed by conversations between KIP, school boards, and superintendents of districts to gain approval of WebIZ.

Use of paper records (OR=4.16) was the second greatest barrier to affect the odds of not using WebIZ. Future research should focus on why schools use paper immunization records and not WebIZ. Analysis was not conducted to determine whether there was an association between the paper record use and the school size, location, type, number of schools that personnel keep immunization records for, and district; however, these factors may affect why schools choose to use paper immunization records.

Lack of knowledge was identified as a barrier to WebIZ use. Education and outreach can easily address this barrier, as well as the 14% of schools who do not know how to use the tool. Also, with 10% of schools not aware of what WebIZ is, education will be an important key in expanding the use of the tool. The survey also evaluated how KDHE could address identified barriers through training. More than half (66%) of the participants indicated that a training would be beneficial. Training via an online platform (i.e. webinar) was the most preferred method of training. This indicates that schools are willing to use WebIZ, however they may not know how to use the tool to its full extent. Training should emphasize all aspects of the school module and the importance of its use, since majority of the schools that are using the school module are only using it to retrieve vaccination records. Use of WebIZ to retrieve vaccination records does not improve data completeness, which does not support for use of this data for surveillance efforts.

Utilization of another electronic immunization program affects the likelihood that schools will not use WebIZ. Some individuals who use WebIZ stated that another immunization information system that they use automatically syncs information into WebIZ. Survey participants responded that SNAP, an alternate immunization system, syncs with WebIZ, however, many of these schools do not use WebIZ past this feature. Other commonly used immunization systems used by schools, that do not sync to WebIZ, include Skyward, PowerSchool, CareDox, Edupoint, and Synergy. Getting schools to completely change their IIS

might not be achievable, but efforts to get information to sync from IIS to WebIZ would improve completeness of WebIZ immunization data. Current methods of syncing immunization records from one system to another does not utilize any aspects of the school module other than entering vaccination histories. Therefore, other strategies will need to be implemented in efforts to assign students to a school, grade, and promote students to the next grade.

Time may remain an issue to ease of use. The ease of WebIZ usage may be addressed by decreasing the time it takes to enter vaccination histories or assign students to school and grades. Of those schools with awareness of WebIZ, barriers for why 23.4% of schools with prior knowledge of WebIZ have still choose not to use it in any capacity. Analysis of the survey reveals that the main use of WebIZ is for schools to retrieve student immunization records, however, this does not require data entry into WebIZ, therefore it does not support surveillance efforts.

As stated in the background, as of 2020, providers in Kansas will be required to report all immunization data to WebIZ. This requirement will improve the coverage of complete immunization data in WebIZ but use of the entirety of the school module will still be necessary to use WebIZ data for kindergarten vaccination coverage analysis at the population level. Lack of time and knowledge both affect complete utilization of all school module functions (Table 3.3). Educational outreach, such as trainings, as mentioned before, could also address the lack of knowledge barrier. Perceived lack of time may be addressed with training of multiple personnel at each school. Once providers enter complete immunization records, those who maintain immunization records are familiar with the capabilities of the school module, entering student information, grade and school promotion, and transferring of records for a student who has moved, use of the WebIZ school module will take less time.

Limitations to this study included small sample sizes for some variables and technical errors stemming from the online survey platform. The question, "To what extent does this school use WebIZ?" was not active at the start of the survey, causing approximately half of participants unable to answer this question. The survey contained skip patterns to provide

more tailored results, based on participants responses. Since the questions displayed to participants were based on their response to the previous question, denominators for each question differed. Due to small sample size for some of the job titles, it was unable to be analyzed whether job title was associated with odds of utilizing WebIZ. Participants were also not required to respond to every question on the survey, so some questions may have been skipped entirely.

These two studies observed that current WebIZ immunization data is not valid to be used as a source for population level kindergarten vaccination coverage analysis. Results from the survey support the hypothesis that specific barriers can contribute to WebIZ usage by schools. Access, use of another IIS, use of paper records, and knowledge are all barriers to use of WebIZ. Through future interventions, an increase in WebIZ usage by schools should focus on addressing barriers identified in this study.

Chapter 5- Competencies

Student Attainment of MPH Foundational Competencies

Table 5.1 Summary of MPH Foundational Competencies

Number and Competency		Description
1	Apply epidemiological methods to the breadth of settings and situations in public health practice	I used my knowledge of epidemiological methods to understand daily conversations and situations about infectious diseases and outbreaks during my time in the Bureau of Epidemiology and Public Health Informatics. Epidemiology allowed me to understand how diseases were spread and the importance of control through vaccinations. Epidemiological knowledge was also in my data analysis to understand odds ratios and evaluate vaccine coverage based on the data.
2	Select quantitative and qualitative data collection methods appropriate for a given public health context	I developed a survey to collect quantitative data to inform KDHE about the barriers to WebIZ use.
3	Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate	Biostatistics was used to understand different ways that the data could be analyzed. Use of SAS software to analyze current WebIZ data and survey data. Biostatistical skills were also used to interpret SAS output.
9	Design a population-based policy, program, project or intervention	I designed a study to examine the population who maintains kindergarten vaccination records at each school in Kansas with a kindergarten class.
21	Perform effectively on interprofessional teams	Performed project by collaborating with professionals at KDHE within Bureau of Epidemiology and Public Health Informatics, the Kansas Immunization program, as well as school nurses and office staff within the schools with a Kindergarten class in Kansas.

Competency 1: Apply epidemiological methods to the breadth of settings and situations in public health practice

I used my knowledge of epidemiological methods to understand daily conversations and situations about infectious diseases and outbreaks during my time in the Bureau of Epidemiology and Public Health Informatics. Epidemiology allowed me to understand how diseases were spread and the importance of control through vaccinations. Epidemiological

knowledge was also in my data analysis to understand odds ratios and how barriers affect the odds of not using WebIZ. I also used my knowledge of epidemiology to evaluate vaccine coverage based on the data from my project. Knowledge of herd immunity was important to understanding the implications that vaccine coverage would have on a population.

Competency 2: Select quantitative and qualitative data collection methods appropriate for a given public health context

I developed a survey to collect quantitative data to inform KDHE about the barriers to use of the WebIZ school module by schools with a kindergarten class in Kansas. This method was selected as it could evaluate many quantitative variables and be easily distributed to the study population, which were located all over the state.

Competency 3: Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming and software, as appropriate

Biostatistics was used to understand different ways that the data collected from the survey could be analyzed. Use of SAS software to analyze current WebIZ data and survey data. Biostatistical skills were also used to interpret SAS output. Use of SAS to calculate chi-squared values, p-values, 95% confidence intervals, and Mantel-Haenszel odds ratios to control for confounders were all methods learned in biostatistics. SAS software was also used to calculate frequencies of numerous variables within parts 1 and 2 of this study. Biostatistics was also used to determine the best strategies for displaying the data from this project.

Competency 9: Design a population-based policy, program, project or intervention

I designed a study to examine the population who maintains kindergarten vaccination records at each school in Kansas with a kindergarten class. This project was designed to determine many different factors that could guide future interventions to improve the use of the WebIZ school module. While the Kansas Immunization Program was aware that the WebIZ school module was not greatly being used, this study was developed to determine the current extent of usage by schools. The information provided by the first part of the study guided the development of the survey for part two of the study. All aspects of the study were presented to KIP along with their public health implications, in efforts to guide their future program efforts.

Competency 21: Perform effectively on interprofessional teams

I performed this project through close collaboration with professionals at KDHE within Bureau of Epidemiology and Public Health Informatics and the Kansas Immunization Program. Professionals within the Bureau of Epidemiology and Public Health Informatics were epidemiologists or veterinarians. Professionals within the Kansas Immunization Program were not epidemiologist, nor did they have much epidemiology or biostatistics knowledge. At the conclusion of my project, I communicated the results of the project through the presentation and report of results in a way that professionals without a strong ability to interpret data could understand. Results were explained to KIP as if they were being explained to the general public.

Communication regarding the survey with school nurses and secretaries was performed via phone and email. Since the contact list of professionals who keep kindergarten immunization records was from the Kindergarten Vaccination Coverage Study from the

previous year, some emails were no longer active. Throughout this process, I called

approximately 100 schools. I also had contact with school nurses via email regarding the survey,

technical errors, changes in roles, etc.

<div align="center">**Student Attainment of MPH Emphasis Area Competencies**</div>

<div align="center">**Table 5.2 Summary of MPH Emphasis Area Competencies**</div>

MPH Emphasis Area: Infectious Diseases/Zoonoses		
Competency		**Description**
1	Pathogens/pathogenic mechanisms	Evaluate modes of disease causation of infectious agents.
2	Host response to pathogens/ immunology	Investigate the host immune response to infection.
3	Environmental/ ecological influences	Examine the influence of environment and ecological forces on infectious diseases.
4	Disease surveillance	Analyze disease risk factors and select appropriate surveillance.
5	Disease vectors	Investigate the role of vectors, toxic plants and other toxins in infectious diseases.

Pathogens/pathogenic mechanisms

Throughout my MPH coursework, I have learned the different modes of disease

causation by infectious agents in many different courses. MPH 802, Environmental Health,

provided me with a broad scope of knowledge of the routes of exposure for many different

infectious diseases. This course covered diseases spread through fecal-oral, respiratory, direct

contact, fomite transmission, and direct contact. I learned more in-depth knowledge of how the

infectious agents directly affect the host in DMP 822: Veterinary Virology. This course covered a

range of viral pathogens and their effects on animal hosts.

While my project did not directly address this competency, my knowledge of this

information was beneficial during my time at KDHE. Since I was working directly with

epidemiologists, who study the spread of diseases, understanding the causation of infectious

agents benefited me to think critically during daily meetings about infectious disease cases that

came through the Epi Hotline.

Host response to pathogens/immunology

        I learned about the host immune response to an infection through the DMP 705:

Principles of Veterinary Immunology coursework. This course provides knowledge about how

the animal host's immune system responds to the invasion of a pathogen. Since my project

focused on vaccinations, it was important for me to know how vaccinations are effective at

providing an immune response in the host in order to prevent future infections.

Environmental/ecological influences

        I examined the influence of environment and ecological forces on infectious diseases

throughout my coursework in MPH 802: Environmental Health and DMP 710: Introduction to

One Health. The main focus of MPH 802 was to evaluate how the environment and ecological

forces of all types affect health, which includes infectious diseases. One Health is the concept

that animal health, human health, and environmental health all play a role in achieving optimal

health. Many different aspects of the environment can play a role in the transmission of

disease, the stability of a disease, or be the home for an infectious agent to produce, live,

and/or thrive.

Disease surveillance

The purpose of my project was to determine whether current WebIZ data was sufficient for use in vaccination surveillance efforts. During a disease outbreak, vaccination coverage rates by location are important to determine where interventions need to be focused, in order to prevent further spread of disease. Understanding of disease surveillance and the public health implications from my project were important in the decisions made in the future. For example, KDHE would like to use WebIZ data for vaccination coverage surveillance during a disease outbreak, but due to the inaccurate representation of vaccination coverage portrayed by the data, use of WebIZ for surveillance would be harmful.

During my coursework, analysis of disease risk factors and appropriate surveillance measures, were learned during DMP 710: Introduction to One Health and MPH 802: Environmental Health.

Disease vectors

I investigated the role of vectors, toxic plants and other toxins in infectious diseases during my coursework in DMP 710: Introduction to One Health and MPH 802: Environmental Health. The environment plays an important role in providing a home for vectors, toxic plants, and other toxins, such as anthrax, that all cause infectious diseases. Throughout these courses, the environment was an important focus on how it impacted human and animal health in many different ways.

Appendix 1

Good Afternoon Kansas Elementary School Nurse/Secretary,

The Kansas Department of Health and Environment (KDHE) is working to increase use of the Kansas Immunization Information System, WebIZ, as a source of kindergarten vaccination data and would appreciate your participation in the 2018 School Nurse WebIZ Usage Survey. The goal of this survey is to assess current usage of WebIZ among schools with a kindergarten class and identify barriers with using WebIZ.

If you are responsible for maintaining immunization records for a kindergarten class, please complete the survey at the link below by **January 18th, 2019**. The survey should only take about 5 minutes to complete. If you maintain kindergarten immunization records for more than one school, please complete the short survey for each school.

2018 School Nurse WebIZ Usage Survey

If you do not keep immunization records for a kindergarten class, please forward this survey to the individual responsible for kindergarten immunization records at your school. If you are not a school nurse or someone who maintains kindergarten immunization records, please notify Heather Poole at Heather.Poole@ks.gov so that we can remove your contact information from our records.

If you have any technical difficulties or questions regarding this survey, please contact Heather Poole (Heather.Poole@ks.gov) or Kelly Gillespie (Kelly.Gillespie@ks.gov).

We greatly appreciate your participation.

Appendix 2

The Kansas Department of Health and Environment (KDHE) is working to increase use of the Immunization Information System, WebIZ, among schools in Kansas. The goal of this survey is to assess current usage of WebIZ among schools with a kindergarten class and identify barriers with using WebIZ. We request your participation in this survey that should take 5-10 minutes to complete. Please complete a survey for **each** school you keep kindergarten immunization records for. If you have any technical difficulties or questions regarding this survey, please contact Heather Poole (Heather.Poole@ks.gov) or Kelly Gillespie (Kelly.Gillespie@ks.gov).

Q1 Please provide your contact information. We only ask in the event that we need to contact you for clarification purposes.

        First Name _____

        Last Name _____

        Email Address _____

        Phone Number _____

Q2 Please select the county, district number, and school name for which you are entering data. Please note that school districts starting with "D" are public school districts and districts starting with "Z" are private school districts.

        County Name

        School District Number

        School Name

Q3 What is your position title at the school identified above?

        School nurse

        Administrative assistant

        Other (please specify) _____

Q4 How does this school keep track of kindergarten immunization records?

        Paper

        Electronic system (e.g. PowerSchool, SNAP, etc.)

        Both

Skip To: Q7 If How does this school keep track of kindergarten immunization records? = Paper

Q6 What electronic system does this school use to keep track of student immunization records?

      PowerSchool
      SNAP
      Skyward
      Infinite Campus
      WebIZ
      Other (please specify) _____

Q7 Do you keep track of kindergarten immunization records for more than one school?

      Yes
      No

Skip To: Q9 If Do you keep track of kindergarten immunization records for more than one school? = No

Q8 How many schools do you keep kindergarten immunization records for? Please enter a numeric value (for example, "3").

      _____

Q9 Are you aware of Kansas' Immunization Information System (WebIZ)?

      Yes
      No

Skip To: Q16 If Are you aware of Kansas' Immunization Information System (WebIZ)? = No

Q10 Does this school use WebIZ?

      Yes
      No

Skip To: Q18 If Does this school use WebIZ? = No

Q11 To what extent does this school utilize WebIZ? (Check all that apply):

Enter student vaccination history into WebIZ
To retrieve student immunization records
Assign students to my school
Assign students to their current grade
Promote students to the next grade
Other (please specify) _____

Q12 Do any of the following affect your use of WebIZ at this school?

	Yes	No	Don't Know / Unsure
Lack of training of WebIZ	○	○	○
Unable to enter exemptions	○	○	○
Unsure of how to enter vaccination histories	○	○	○
Lack of time to enter vaccination histories	○	○	○
Unsure of how to assign students to my school	○	○	○
Lack of time to assign students to my school	○	○	○
Unsure of how to assign students to their current grade	○	○	○

Lack of time to assign students to their current grade	○	○	○
Unsure of how to promote students to the next grade	○	○	○
Lack of time to promote students to the next grade	○	○	○

Q13 Please explain any other issues that affect your use of WebIZ at this school, if any.

_____
_____
_____
_____
_____

Display This Question:
If Does this school use WebIZ? = No

Q14 Which of the following reasons affect why this school does not use WebIZ? (Check all that apply)

Utilize another electronic immunization program
Do not have enough time
Do not know how to use it
Use paper records
Do not have access to WebIZ

Display This Question:
If Does this school use WebIZ? = No
Q15 Please explain other reasons why this school does not use WebIZ, if any.

_____
_____

_____

_____

_____

Q16 Would this school use WebIZ if you did not have to send vaccination records to KDHE as part of the annual Kindergarten Immunization Assessment study?

Yes

No

Q17 Would you find WebIZ training beneficial?

Yes

No

Q18 What form of training would you prefer? (Check all that apply)

In-person

Webinar

Online recording

Other (please specify) _____

Q19 What would prevent your attendance to a WebIZ training? (Check all that apply)

Lack of interest

Lack of funding

Lack of time

Other (please specify) _____

Q20 Are you aware that the Kansas Immunization Program Help Desk Hotline (877-296-0464) is available to answer questions regarding WebIZ?

Yes
No

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