

Influenza Education to Improve Vaccination Rates Among College Students

Shelley Vaughn

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Abstract

Objective The purpose of this project was to provide influenza vaccine education and improve vaccine uptake among Eastern Arizona College dormitory residents. College students living in dormitories are considered a high-risk population for influenza, and the current vaccination rate for this age group is reported as 41.1% nationally, compared to Healthy People 2020's goal for influenza vaccination of 80%.

Participants The population comprised 300 Eastern Arizona College dormitory residents aged 18 and older.

Methods During back-to-school week, students participated in an influenza education intervention. At 4 weeks post-intervention, a 10-item follow-up survey was administered electronically to measure the impact of the education intervention, ask about vaccine uptake during the previous influenza season, determine current-year vaccination status, and identify barriers to vaccination. Quantitative data analysis used cross-tabulation and chi-square.

Results Three hundred students were offered the education intervention, and 187 students responded to the post-intervention survey. The results did not show a statistically significant improvement in vaccination over the previous year. Influenza vaccine uptake in the respondents was unknown prior to the survey. Barriers to vaccination included students not thinking the vaccine was necessary and not believing they would get influenza.

Comments This population-based, brief video-based educational intervention did not impact the students' decisions to receive the influenza vaccination. Further assessment and education are needed to improve vaccination rates and decrease the risk of influenza among this high-risk population.

Influenza Education to Improve Vaccination Rates Among College Students

Influenza is a contagious respiratory illness caused by a virus. It is readily transmitted and causes local and pandemic outbreaks (U.S. Department of Health and Human Services [DHHS], n.d.). Despite the availability of primary prevention, influenza continues to cause a significant number of illnesses each year and presents a burden to health resources. In the 2012–2013 influenza season, there were more than 73,000 cases and 149 pediatric deaths reported in the United States (Centers for Disease Control and Prevention [CDC], 2013a). One goal of Healthy People 2020 is to improve influenza vaccination rates to 80% in all population groups (DHHS, 2013). In 2012, the American College Health Association reported that only 41.1% of college students received an influenza vaccination. College-age students are considered at risk for influenza because of close contact and dormitory-style living conditions.

Statement and Background of Problem

Influenza causes significant morbidity and mortality worldwide. The World Health Organization (WHO) reported 437,698 positive cases of influenza in the 2011–2012 influenza season and 421,424 positive cases in the 2012–2013 season (World Health Organization [WHO], 2013). The United States had 22,417 positive cases of influenza during the 2011–2012 influenza season (CDC, 2012b). Of those positive cases, 526 persons aged between 18 and 49 years were hospitalized, and 26 pediatric influenza-associated deaths occurred (CDC, 2012a). In the 2012–2013 influenza season, the CDC (2013a) reported 73,130 positive influenza cases, 2,023 hospitalizations among persons aged between 18 and 49 years, and 149 pediatric deaths (see Appendix A). The efficacy of influenza vaccination is well established. The CDC reported vaccine effectiveness of 52% for the 2011–2012 influenza season and 56% for the 2012–2013

influenza season (CDC, 2013a). Therefore, it is reasonable to assume that many of these infections could have been prevented.

Framework Theory

The Health Belief Model (HBM; Becker, Drachman, & Kirscht, 1974) is a useful framework for this project because it proposes that health-seeking behavior is influenced by the threat of a health problem and a cue to action (Merrill et al., 2010; Appendix B). In the case of influenza, education may help students understand the importance of vaccination as an intervention to reduce their risk of contracting influenza. Students who do not get immunized are at risk of illness that may subsequently have a negative impact on their daily activities. There is a possibility of these students missing classes, perhaps resulting in failure of courses. Students who are employed may miss work, which may put a strain on their financial status. The worst possible outcome from influenza is death.

A key component of the HBM is perceived susceptibility to an illness or disease. College students need to be informed that their age and living conditions make them susceptible to contracting influenza and that, in Arizona, the number of influenza cases in their age group rose from 1,352 in 2011–2012 (Arizona Department of Health Services [AZDHS], 2012) to 3,404 in 2012–2013 (AZDHS, 2013). Self-efficacy is an important component of the HBM and is manifested in actions taken to diminish a health care threat. In this scenario, students would recognize the risk of contracting influenza and the benefit of vaccination and then take appropriate action to minimize the possibility of contracting influenza. The cue to action was the education intervention that empowered the student so that he or she could understand the susceptibility to and benefits of vaccination.

Objective

The objective of this project was to improve influenza vaccination in a cohort of college-age students. It is important to educate college students regarding the need for influenza vaccination so that students can make informed choices about whether to receive the vaccine (Cummings, Jette, & Rosenstock, 1978; Merrill et al., 2010).

Proposed Implications

On the basis of the HBM, students who are educated will actively engage in health-seeking behavior to mitigate the threat of contracting influenza and subsequent adverse effects on their daily lives.

Critical Review of Pertinent Literature

A search for relevant evidence to support this project idea was undertaken using the following clinical question: *Will implementing an influenza education intervention improve college students' decision to receive the influenza vaccine?* The literature search for this review used CINAHL Plus with full text, Academic Search Complete, Health Business Elite, and MEDLINE search engines. Key search terms included *flu vaccination, influenza, influenza vaccines, flu vaccine, college students, directed education, improved vaccination rate, and patient education* (Appendix C). The search yielded eight peer-reviewed journal articles.

Synthesis of Literature

All of the studies identified concerned uptake of influenza vaccination in college populations (Appendix D). Evidence from the literature review on this topic indicates that the choice to get immunized is influenced by the person's health care provider (Brien, Kwong, & Buckeridge, 2012; Merrill et al., 2010; Poehling, Blocker, Ip, Peters, & Wolfson, 2012; Uddin et al., 2010). A common finding among the reviewed literature was that obtaining information from

official sources such as the CDC or a health professional increased the likelihood of vaccination (Brien et al., 2012; Merrill et al., 2010; Poehling et al., 2012; Uddin et al., 2010).

Factors that positively influenced vaccination included the following: male sex, younger age, higher education, health care provider recommendation, receiving a prior seasonal influenza vaccination, believing the vaccine was safe, and obtaining information from health care sources (Brien et al., 2012). Merrill et al. (2010) concluded that influenza vaccination is low among college students and is impacted by the perceived severity of the illness, place of employment or residence, and who recommends influenza vaccination. In another study, Poehling et al. (2012) reported that only 20% of students received a seasonal influenza vaccine and concluded that college campuses have the opportunity to enhance influenza vaccine coverage. Parental influence is important in the vaccination of college students, and Uddin et al. (2010) found an association between the level of parental educational on vaccination rates and college student vaccination rates.

Several studies identified barriers to vaccination, and these included lack of vaccine availability, vaccine cost, insurance status, language barriers, not understanding the risk of illness, and fear of vaccine side effects (Logan, 2009; Merrill et al., 2010; Poehling et al., 2012; Uddin et al., 2010). To improve availability, Poehling et al. (2012) recommended that colleges consider vaccine administration at campus-wide vaccine campaigns or sporting events to improve uptake rates. To address the cost, researchers have proposed barrier recommendations to improve public health funding to facilitate immunization (Logan, 2009; Merrill et al., 2010).

The accuracy of vaccination data is questionable, and collection of data can be problematic. Studies investigating influenza vaccination have been limited by the use of the survey methodology for data collection. Poehling et al. (2012) noted that the self-report survey is

as accurate as the immunization registry, although Brien et al. (2012) reported that surveys are subject to many biases involving selection, poor recall, and reliance on self-report. Another limitation with use of surveys is that data on participants' insurance statuses are not consistently collected, and a lack of insurance coverage for vaccines may have an impact on the decision to obtain the vaccine if the expense must be managed out of pocket (Poehling et al., 2012). Studies looking at immunization status also noted that students received monetary compensation for their participation, which could introduce bias (Uddin et al., 2010). Some studies did not question the reason for getting vaccinated or for refusing vaccination (Logan, 2009; Nasi, Bosse, & Hayney, 2009; Palin & Greer, 2012). Without knowing why students refuse to get vaccinated, efforts cannot be made to change their behavior. Despite the limitations of the studies, researchers generally agree that students are more likely to get vaccinated when health care providers recommend the influenza vaccine (Poehling et al., 2012).

Methods

Resources for Project

Northern Arizona University faculty provided detailed review and feedback in the development of the project proposal. Eastern Arizona College (EAC) administration was a key resource supporting the project and shared concern about the health and education of its students. The EAC's Information Technology Department assisted in creating the college student e-mail group to which the consent form, link to the video, and link to the survey were sent. The EAC dormitory director served as a conduit to dormitory residents and assisted with creating the e-mail group list.

Population and Setting

The population for this project comprised full-time college students residing in dormitories on the campus of EAC. EAC is a small, rural community college in Thatcher, Arizona. Recently reported demographics for the college indicate that there are 6,435 students, of whom 643 are full-time students and the remainder attend part-time (Eastern Arizona College [EAC], 2012). The distribution of all students by gender is 2,840 men and 3,595 women. The ethnic breakdown of all students includes the following: 18% Hispanic, 7% American Indian or Native Alaskan, 1% Asian, 3% Black, and 65% White (EAC, 2012).

Expected Outcomes

The project involved implementing an education intervention and collecting postintervention data to determine (a) the number of students who received the influenza vaccine the previous (2012–2013) season, (b) the number of students who reported getting the influenza vaccine this year (2013–2014), and (c) if the intervention influenced the students' decision to get the influenza vaccine. The goal was to compare the number of students vaccinated in 2012–2013 to the number of students who received the vaccine in 2013–2014. The expectation was that the EAC student population would surpass the 41.1% national vaccination rate for the 2013–2014 season, and the desired outcome would be that the population achieved the recommended influenza vaccination rate of 80%.

Health policy improvement for EAC is a goal of this intervention. Currently the college does not require or review the vaccination statuses of the college dormitory residents. After presenting information about the significance of influenza among dormitory residents and reviewing the low rates of vaccination uptake received from the survey, the researcher has made it a goal to discuss the findings with the college administrator and develop a student health

immunization policy consistent with recommendations from the CDC (2013b). This policy would be a practice change and would assist with achieving the Healthy People 2020 (DHHS, 2013) goal of 80% vaccination to create a healthier nation.

Education Intervention

A 10-minute CDC-created video presentation about influenza vaccination was presented to dormitory resident students (CDC, 2012a) during mandatory meetings that occurred the first week of school (August 19, 2013). In the video presentation, a physician presented key issues about influenza and vaccination. Specific components included an overview of the pathology of influenza and information about the seriousness of influenza, including the fact that healthy people do get influenza and spread it to family and friends. The presentation also included important information about vaccine benefits, side effects, and specifically that the vaccine does not cause influenza.

Survey Tool

Data was collected for the project using SurveyMonkey (2009). SurveyMonkey is a widely recognized Web resource with 10 years of experience in survey methodology. The privacy policy of SurveyMonkey (2013) indicates that the company keeps the surveys and responses private unless the survey creator provides written consent. The survey results were exported into SPSS for statistical analysis (SurveyMonkey, n.d.; Appendix E).

Data Collection

Data collected for this project included identification of student vaccination uptake in 2012–2013 and 2013–2014 and whether the video presentation impacted their decisions to receive the vaccination and to identify reasons for not receiving the vaccine. No private student data were collected during the mandatory meeting. Five weeks following the intervention, the

students received electronic mail with a list of influenza vaccine locations and a link to the CDC video, which provided students with another opportunity to view the video presentation. An influenza vaccination clinic was arranged for Tuesday, October 1, from noon to 5:00 P.M., sponsored by a local primary care clinic, Mt. Graham Family Practice. It was held on campus at the nursing building, which is in a central location at the college. The next electronic mail contained the SurveyMonkey link to the 10-item survey and the informed consent form, beginning Tuesday, October 8, and students received an e-mail daily until November 5, 2013; the survey was closed November 6.

Ethics

The dormitory director provided the student name list and did not include students who were under 18 years of age. The first question on the survey asked the student if he or she agreed to participate in the survey and informed the student that taking the survey was voluntary. If the student chose to not participate, he or she could delete the e-mail.

After the students had received two electronic mail messages, it was noted that there was no survey participation. On the evening of November 6, 2013 a group of nursing students and two nursing instructors went to the dining hall to provide the survey via electronic tablets, to encourage voluntary student participation in the survey. That evening, students completed 187 surveys. The survey link was open and available to the students from October 8 to November 6. On November 6, all completed surveys were from the dining hall participation session.

Results

The data analysis methodology used cross-tabulation between watching the video (yes/no) and getting the influenza vaccine this year (yes/no) using chi-square. The dormitory

resident population numbered 338 persons; 181 survey responses were needed to obtain data representative of the students (R. St. Laurent, personal communication, October 4, 2013).

Students completed 187 surveys for the influenza project. Of these 187 students, 14 answered not to agree to participate in the survey on the first question, and these responses were removed from the data. Sixty-four (34.59%) women and 121 (65.41%) men completed the survey, consistent with the demographic distribution at the college dormitory. The age range was from 18 to 23 years. Of the respondents, 157 (83.96%) students said that they have health insurance; 30 (16.04%) students stated that they do not have health insurance. Eighty-nine (47.59%) students said that they received an influenza vaccine last year; 98 (52.41%) said that they did not get the influenza vaccine; 52 (27.81%) students stated that they received an influenza vaccination this year; and 135 (72.19%) stated that they did not get an influenza vaccination. Forty-two (22.46%) of the students stated that the influenza education provided influenced them to get vaccinated; 145 (77.54%) stated that it did not. Thirty-seven (31.90%) students stated that they did not think they would get influenza. It is noted by the chi-square that there is not a significant *p*-value correlation to show that the education influenced the students' decisions to get an influenza vaccination. Appendix G contains the tables for the data listed.

Comments

The results show that the goal of achieving an 80% influenza vaccination rate for the college dormitory residents was not achieved. The results demonstrate two primary reasons students did not get vaccinated: (a) they did not think they would get influenza and (b) they did not think the vaccine was necessary. This is consistent with what was previously identified in the literature review. The influenza education did not achieve the 80% vaccination rate as recommended by Healthy People 2020 (DHHS, 2013). It is noted from the survey that only

27.81% of the dormitory residents were vaccinated, which is less than the 41.1% national average reported by the American College Health Association (2012). The data show that these college dormitory residents do not believe that they are at risk for getting influenza. As many of these residents have not received an influenza vaccine, they are vulnerable to an outbreak. The knowledge level of individuals, as well as ensuring the understanding of health-related information, is an outcome specific to advanced practice nursing (White & Dudley-Brown, 2012).

Limitations and Lessons Learned

Many steps need to be reviewed and discussed in the evaluation of this project, in addition to the limitations in planning the project. Program evaluation for translation into practice should include engaging the stakeholders, describing the importance of the project, focusing on the evaluation design, justifying the conclusions, and using the lessons learned from the project (White & Dudley-Brown, 2012, p. 237). Some of these steps were done for the influenza project, and some were not. The stakeholders were the college administration, the faculty, the athletic coaches, and the dormitory managers. Another question is whether, if the stakeholders had been part of the project planning, they could have assisted in promoting the vaccination. The education was too impersonal, and it is an assumption that the CDC video might not be best geared toward the college age group. The mechanism used to examine barriers was the last question on the survey, showing that 31.90% of respondents did not think they would get influenza and 29.31% did not think the vaccine was necessary (Appendix F). The education intervention should have been broader, including a pre- and posttest of the students' knowledge about influenza.

Implications for Practice

Prior to the project and the survey, the influenza vaccination rate among the college dormitory residents was unknown. This is an essential finding for continued research and health improvement. Further review is needed to determine a better educational approach for the college dormitory residents. A health policy that assists with the vaccination goal and allocates resources to make it a priority is needed to achieve an improved vaccination rate (White & Dudley-Brown, 2012). It is important to understand that the underlying system of beliefs and values must be transformed for change to be sustainable (Whit & Dudley-Brown, 2012). College students think they are not susceptible to influenza. An educational program needs to be developed to close the knowledge gap for these students, with the goal of increasing the students' vaccination rate.

The overall purpose of this project was to improve the rate of influenza vaccination of EAC students to 80%, which was the goal recommended by Healthy People 2020 (DHHS, 2013). Further assessment of college student knowledge of influenza and directed education are needed to increase the influenza vaccination rate among this population.

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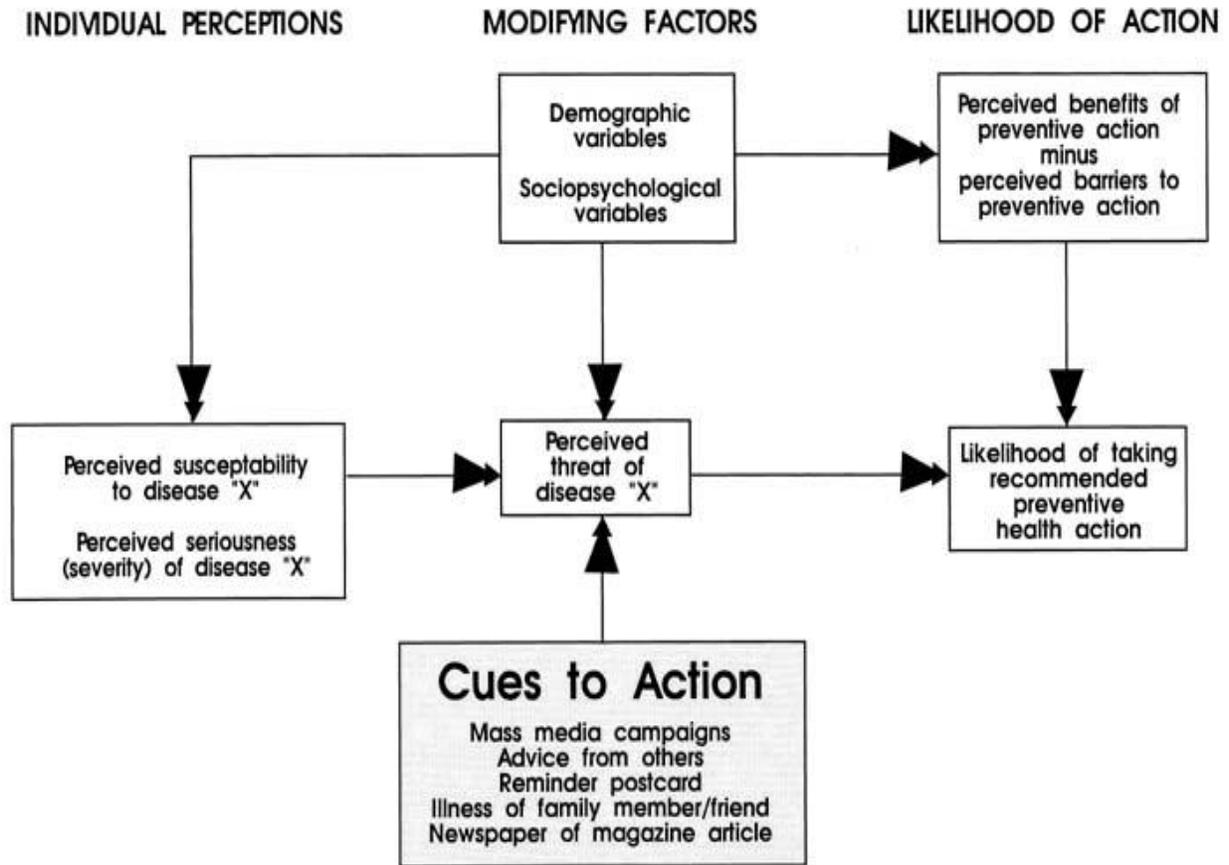
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Appendix A: Influenza Cases Compared by Year

Source	2011–2012 flu season			2012–2013 flu season		
	Cases	Hospitalized	Pediatric deaths	Cases	Hospitalized	Pediatric deaths
WHO ^a	437,698			421,424		
CDC ^b	22,417	2,356	26	73,130	12,337	149
CDC, ^b aged 18–49		526			2,023	
AZDHS ^c	4,004		1	12,623		4
AZDHS, ^c aged 19–49	1,352			3,404		
Graham County	89			212		

^aData from WHO (2013). ^bData from CDC (2012a, 2013a). ^cData from AZDHS (2012, 2013).

Appendix B: Health Belief Model Diagram



Adapted from "A New Approach to Explaining Sick-Role Behavior in Low-Income Populations," by M. H. Becker, R. H. Drachman, & J. P. Kirscht, 1974, *American Journal of Public Health*, 64, p. 206. Copyright 1974 by the American Public Health Association.

Appendix C: Search History

Searching databases included CINAHL, Academic Search, Health Business Elite, MEDLINE. Limiters were full text, scholarly journals, 2009–2013.

Search term	No. of articles
Flu vaccination	828
Influenza	9,665
Influenza vaccines	2,219
Flu shot	78
Flu vaccination and college students	8
Influenza and college students	47
Influenza vaccines and college students	9
Flu shot and college students	0
Directed education and flu vaccination and college students	0
Directed education and influenza and college students	0
Directed education and influenza vaccines and college students	0
Influenza improved vaccination rate and college students	0
Patient education and flu vaccination and college students	0
Patient education and influenza and college students	0
Patient education and influenza vaccines and college students	0
Patient education and flu shot and college students	0
Flu education and young adult	5
Flu education and adult	31
Abstracts reviewed (270 returned)	100
Full-text articles reviewed, based on inclusion and exclusion criteria	31
Articles retained	8

Appendix D: Methodological Matrix Table

Authors	Country	Dependent variable	Independent variable(s)	Study design	Sample size	Sampling method	Data collection	Evidence rating level ^a
Logan (2009)	USA	Influenza immunization	Access, insurance, cost	Review of guidelines	None			E
Nasi et al. (2009)	USA	Influenza immunization	Pharmacist recommendation	Literature review				E
Decker and Slawson (2012)	Canada	College student response to transmission risk	Transmission sites in colleges	Survey	656	All students	Survey	D
Palin and Greer (2012)	USA	H1N1 outbreak at 3 college campuses	Campus events		285	All students	Survey	D
Poehling et al. (2012)	USA	Influenza vaccination	Associated factors: race, gender, age, campus, parent education, activities, previous year vaccination	Bivariate analysis	4090	E-mail survey	Survey	B
Merrill et al. (2010)	USA	Influenza vaccination at BYU	Factors and barriers	Cross-sectional survey	421	Faculty that allowed questionnaire	Paper questionnaire	B
Uddin et al. (2010)	USA	Influenza vaccination of university students	Demographic and socioeconomic determinants	Cross-sectional analysis	845	Randomized, controlled	Electronic survey	B

Authors	Country	Dependent variable	Independent variable(s)	Study design	Sample size	Sampling method	Data collection	Evidence rating level ^a
Brien et al. (2011)	Several	H1N1 vaccine	Gender, age, education, previous year vaccination	Literature review	27 studies	PubMed search	PubMed search	A

^aEvidence rating levels based on definitions in “AACN Levels of Evidence: What’s New?” by R. Armola et al., 2009, *Critical Care Nurse*, 29, pp. 70–73. Copyright 2009 by American Association of Critical-Care Nurses.

Appendix E: Influenza Vaccination Survey

1. I agree to participate in the influenza vaccination survey. Participation in this survey is voluntary.
Yes or No
2. What is your gender?
Female or Male
3. What is your age?
4. What is your college grade level?
First year or Second year or Third year or Fourth year
5. Do you currently have health insurance?
Yes or No
6. Did you get a flu shot last year 2012-2013?
Yes or No
7. Did you view the CDC influenza (flu shot) video?
Yes or No
8. Did the influenza (flu shot) video influence your decision to get the flu shot?
Yes or No
9. Did you get a flu shot this year 2013?
Yes or No
10. I did not get the flu shot because:
Could not afford it
Afraid of the side effects
I do not think I will get the flu
I did not have a ride to the clinic
I do not think they are necessary

My parents did not want me to get the vaccine

Appendix F: Survey Data

Agree to survey			Gender		
Yes	92.51%	173	Female	34.59%	64
No	7.49%	14	Male	65.41%	121
Total		187	Total		185
College grade level			Health insurance		
First year	63.44%	118	Yes	83.96%	157
Second year	31.72%	59	No	16.04%	30
Third year	4.84%	9	Total		187
Fourth year	0%	0			
Total		186			
Influenza vaccine 2012–2013					
Yes	47.59%	89			
No	52.41%	98			
Total		187			
Viewed CDC influenza video					
Yes	43.85%	82			
No	56.15%	105			
Total		187			
Video influenced decision to get flu shot					
Yes	22.46%	42			
No	77.54%	145			
Total		187			
Influenza vaccine 2013					
Yes	27.81%	52			
No	72.19%	135			
Total		187			
Could not afford it	11.21%	13			
Afraid of side effects	6.90%	8			
Do not think will get flu	31.90%	37			
Did not have ride to clinic	8.62%	10			
Do not think they are necessary	29.31%	34			
Parents did not want me to get shot	12.07%	14			
Total		116			

Appendix G: Crosstab and Chi-Square

Research question: Did watching the CDC educational video influence getting the flu shot?

Methodology: Cross-tabulation between watching the video (yes/no) and getting the influenza vaccine this year (yes/no)

Test: Chi-square

Viewed video, frequency (%)	Received flu shot, frequency (%)		
	No	Yes	Total
No	79 (62.70)	16 (34.04)	95 (54.91)
Yes	47 (37.30)	31 (65.96)	78 (45.09)
Total	126 (100.00)	47 (100.00)	173 (100.00)