

The Shot College Students Don't Like: The Flu Vaccine

Will Information Persuade Students to Become Vaccinated?

by

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A thesis presented to the Honors College of Middle Tennessee State University in partial

fulfillment of the requirements for graduation from the University Honors College

Spring 2018

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Dedication

First and foremost, I would like to dedicate this research to God Almighty; “I say to the LORD, ‘You are my Lord; apart from you I have no good thing’” (Psalm 16:2). Truly without the wisdom, guidance, strength and hand of God, this project would not have been completed. May all honor and praise be directed to Him, for He is the Giver of all good things, and the ability to complete this research project and nursing school concurrently is only possible because of Him.

Secondly, I would like to dedicate this work to my parents: To my late father, who always encouraged me to excel academically, and my mom, who always believed in me and helped me. Mom, without your support this project would never have gotten off the ground, and I do not know what I would have done without your hours of editing and design support. I love you, and thank you for everything.

To Justin, my sweet fiancé, your love and support during this project was felt across the ocean. Thank you for letting me rant to you during the more stressful moments of this thesis, and thank you for always be so proud of me, no matter what. You are the best, and I cannot wait for our life together. I love you.

Acknowledgments

Dr. Lancaster, even if I said “thank you” a million times, it still would not properly convey my gratitude. Your positivity, patience, knowledge and guidance were invaluable during this project, and I appreciate and am thankful for every second of time that you gave me. Thank you for agreeing to be my project advisor, because I truly could not have asked for anyone better. We did it!

Dr. Flagg, thank you for letting your personality seep into second semester Introduction to Nursing Research, because you made it fun and interesting. I would have never considered conducting research before your class.

To Sam White, thank you for coming up with the project title as we walked to Sonic last September, and for keeping me from becoming completely absorbed and isolated in schoolwork. To Emma, my sister, thank you for the supply of late night Diet Coke from J’s. To David and Jason, my brothers, for your feedback on early drafts of the survey. To the Fun Fam, for being the best friend group that MTSU has ever had; I know I would not have made it through nursing school without you.

Abstract

Every year, the United States experiences an epidemic of influenza. The flu vaccine is an effective way to protect against the virus, and yet college students, who are at an increased risk of getting the flu because of their environment, resist becoming vaccinated. In recent years, an anti-vaccination movement has taken root due to several misconceptions about vaccinations. The purpose of this research is to test whether or not receiving the facts about influenza and the flu vaccine would persuade college students to receive the flu vaccine. This research was performed through a questionnaire, which was completed by 171 college students in a one-group stratified random sample. For the 121 (70.2%) participants who had not received the 2017-2018 flu vaccine prior to the survey, it was found that education did have a statistically significant effect on increasing the likelihood that they would receive next year's vaccine. Further, this researcher found that targeting flu vaccination campaign efforts at teenagers or parents with young children, and teaching students about reliable information sources, could have a great effect on the number of college students who are vaccinated.

Key Words:

Influenza, vaccination, education, college students

Table of Contents

Dedication.....	iii
Acknowledgments.....	iv
Abstract.....	v
List of Tables.....	viii
List of Figures.....	ix
Introduction.....	1
Thesis Statement.....	7
Methodology.....	8
Results.....	11
Discussion.....	16
Limitations.....	19
Recommendations.....	21
Conclusion.....	22
References.....	24
Appendices.....	26
Appendix A: Glossary of Terms.....	26
Appendix B: IRB Approval Form.....	27

Appendix C: IRB Approved Research Flyer.....28

Appendix D: Copy of the Informed Consent.....29

Appendix E: Copy of Survey for Vaccinated Students.....31

Appendix F: Copy of Survey for Non-Vaccinated Students.....33

List of Tables

Table 1: Comparing the Likelihood of Non-Vaccinated Students Receiving the 2018-2019 Flu Vaccine, Pre- and Post- Intervention.....14

Table 2: A Paired Samples t-Test Comparing the Students' Scale Values Pre- and Post-Intervention.....15

List of Figures

Figure 1: Student Vaccination Rates.....	11
Figure 2: Reasons Why Students Were Vaccinated, Pre-Survey.....	12
Figure 3: Reasons Why Students Were Not Vaccinated, Pre-Survey.....	13
Figure 4: Reasons Why Students Would Not be Vaccinated, Post- Intervention.....	14

The Shot College Students Don't Like: The Flu Vaccine

Will Information Persuade Students to Become Vaccinated?

Introduction

Every year, the cold weather brings the inevitable “flu season,” which is an epidemic of influenza that peaks in severity from December to February (CDC, 2018a). Influenza is a respiratory virus whose symptoms include a cough, sore throat, chills, fever and muscle aches (Lewis, Dirksen, Heitkemper, & Bucher, 2014). Some years are worse than others, and in the worse years, influenza can cause school districts to close, employees to miss work, hospitalization, and even death. Flu viruses are spread in droplets that come from the infected person when they cough, sneeze or talk (CDC, 2017a). These droplets can travel through the air up to 6 feet away from the infected person, and can land in other people’s mouths or noses, or be inhaled into their lungs (CDC, 2017a). This is why people with suspected or confirmed flu and the people with them are given face masks to wear. It is also important to note that an infected person can pass the virus to another person before they even know they are sick, because symptoms do not start until 1 to 4 days after the initial infection (CDC, 2017a).

There are 4 types of influenza viruses: A, B, C, and D (CDC, 2017b). The CDC (2017b) writes that it is human influenza A and B viruses that cause the flu season almost every year, influenza type C viruses that cause a mild respiratory illness but not an epidemic, and influenza type D viruses that affect cattle and not people (CDC, 2017b). The influenza A and B viruses are thus what the CDC focuses on when developing the

yearly flu vaccine. The A and B viruses are further broken down and named based on the types of proteins on their surfaces and their host of origin. The CDC includes protection against influenza A(H1N1) and influenza A(H3N2) in each year's vaccine (CDC, 2017b), as these are the most common subtypes of influenza A currently found in humans (CDC, 2017b). Of these two strains, H3N2 is the deadlier (Sun, L.H., 2018), and was the most common strain circulating this 2017-2018 season (CDC, 2018b). This year's vaccine is 36% effective overall, according to midseason estimate by the CDC on February 16, 2018 (CDC, 2018c); more specifically, the vaccine is 25% effective against H3N2, 67% effective against the other influenza A strain, and 32% effective against flu B (CDC, 2018c).

The reason why the 2017-2018 flu season was particularly bad is that the dominating circulating virus is an influenza A(H3N2) strain (CDC, 2018c). Although protection for this is included in the vaccine, the vaccine tends not to be as effective against H3N2 strains (CDC, 2018b). This is because though all strains of influenza go through frequent genetic changes, H3N2 strains undergo viral changes more frequently (CDC, 2018a). This means that from the time the flu shot is created and the time that the circulating H3N2 virus infects a person, the virus could have changed in such a way as to render the vaccine ineffective. Influenza A(H1N1) and influenza B strains are less likely to have changed so drastically in the same amount of time, which is why the vaccine is better at protecting against these strains (CDC, 2018a).

Estimates of the burden on the healthcare system from the 2012-2013 and 2014-2015 flu seasons provide an indication of what to anticipate for the 2017-2018 season because these seasons also experienced a predominance of an influenza A(H3N2) strain

(CDC 2018a, 2018c). For these seasons, the CDC estimated “35.6 million illnesses, 16.6 million medically attended visits, 710,000 hospitalizations and 56,000 deaths” related to the influenza (CDC, 2018a, paragraph 20), and stated that the 2017-2018 flu season is expected to reach or exceed these seasons estimates (CDC, 2018c). The CDC monitors outpatient influenza statistics through the Influenza-like Illness Surveillance Network (ILINet) (CDC, 2018a), and states that for the 2017-2018 flu season ILI activity levels have been the highest since the 2009 pandemic (CDC, 2018a). The national baseline for outpatient visits to healthcare providers for influenza-like illness is 2.2% (CDC, 2018a), and this baseline was first exceeded during the week ending in November 25, 2017, and then remained above baseline for 11 consecutive weeks (CDC, 2018a). On January 19, 2018, TIME Magazine posted a map created from CDC data that showed that every U.S. state except Hawaii was experiencing widespread influenza activity as of January 6, 2018; the first this has happened in the CDC’s 13 years of influenza monitoring (Ducharme, J., & Johnson, D, 2018).

In the 2012-2013 flu season, which also had a dominant H3N2 virus, the vaccination rate for adults was estimated at 41.5% (CDC, 2016). For that season, it was estimated that 79,000 flu-related hospitalizations, 3.2 million flu-associated medical visits, and 6.6 million flu-related illnesses were prevented by vaccination (CDC, 2013a).

Yet, despite the prevalence of influenza and the fact that the vaccination can help to prevent the flu or lessen its effects, annual vaccination rates are less than 50%. In 2015, flu vaccination in the South was 42.4%, the second lowest of any region, and a position it had held since 2012 (National Center for Health Statistics, 2017). On U.S. college campuses, flu vaccination rates are even lower, ranging from 8% to 39%

(National Foundation for Infectious Diseases, 2016). In spring of 2010, when the American College Health Association (ACHA) set its Healthy Campus 2020 goals, it reported the college student vaccination rate at 39.9%, and set a goal rate of 43.9%.

So, the questions were raised: why aren't college students getting vaccinated, and how can that percentage be increased? One study found that, "among college students who did not receive the flu vaccine, 47.8% believed they would get influenza from the vaccine, 41.6% believed the vaccination may have dangerous side effects, and 39.6% believed they were not at risk for contracting influenza" (Benjamin and Bahr, 2016, page 1). However, each of these beliefs is false: the flu vaccination cannot cause influenza; there are no dangerous side effects from the vaccine; and Agarwal (2014) writes that college students are actually at an increased risk of catching the flu.

It is a common misconception that the flu vaccine can give someone the flu. The flu vaccine contains an inactivated virus, meaning it is unable to undergo viral replication and grow. Therefore, the vaccine cannot cause the flu (U.S. National Library of Medicine, 2015). After a person receives the flu vaccine, it can take his body about 2 weeks to develop immunity to the flu (CDC, 2017c). The reason why some people may get the flu even after getting vaccinated is because they were exposed to the virus before their body built immunity to it (CDC, 2017c). Another explanation for why some people may get influenza even after getting vaccinated is that the circulating flu virus to which they were exposed is different than the strain that was provided in the vaccine (CDC, 2017c), such as with influenza A(H3N2). However, overall receiving the flu vaccine can prevent a person from getting influenza (CDC, 2017d) or may help to make its course milder.

Another common rumor is that flu vaccines, and vaccinations in general, are harmful or dangerous because of a preservative in the vaccine called thimerosal. This rumor began when Andrew Wakefield, a British doctor specializing in the digestive system, published a paper that led people to believe that the measles, mumps, and rubella (MMR) vaccine caused autism because of the thimerosal in the vaccine (Immunization Action Coalition, 2014). However, his results could never be duplicated in the numerous studies that followed. Later, the journal that originally published Wakefield's paper retracted it, stating it was dishonest research (Immunization Action Coalition, 2014), and Wakefield's license to practice medicine was also revoked by the British authorities (Immunization Action Coalition, 2014).

Thimerosal is a mercury-based preservative used in vaccines to keep them free from contamination of bacteria or fungi (CDC, 2013b). Also, the mercury compound used in thimerosal is ethylmercury, which is chemically different from the environmental pollutant methylmercury (Immunization Action Coalition, 2014). One of the key differences between these two types of mercury is that ethylmercury is rapidly excreted from the body. Further, the amount of ethylmercury in a thimerosal-preserved vaccine is not enough to cause symptoms of mercury poisoning (Immunization Action Coalition, 2014).

As for the side effects of the vaccine, the CDC reports that the most common side effects of the vaccine are soreness, redness or swelling at the injection site, and these usually last less than 2 days (CDC, 2017c).

College students are also under the misconception that they are not at risk for contracting influenza because they are young and healthy. However, influenza viruses

can circulate rapidly on college campuses because of the environment, which includes common living spaces, classrooms, shared restrooms, and through social activities (National Foundation for Infectious Diseases, 2016). So, although college students may be able to fight off and recover from the illness more quickly than older adults, they are at an increased risk of actually contracting influenza (Agarwal, 2014).

With all this in mind, it is now evident that there is a need for heightened awareness and education about the flu and flu vaccine, especially among college students. It is an epidemic experienced yearly by Americans, and though the CDC offers a safe means of protection, less than half the population becomes vaccinated. It is probable that a huge upswing in the number of people who get vaccinated each year would cause a great decline in the number of people who contract influenza and relieve the healthcare system from a yearly burden. However, in order for this to happen, researchers first need to discover how to increase the percentage of the population that gets the vaccine each year.

Thesis Statement

The goal of this research is to determine whether or not receiving the facts and correcting misconceptions about the flu and flu vaccination would significantly increase the likelihood that college students who had not received the flu vaccine this year would receive next year's vaccination. The null hypothesis is that education will have no effect on the likelihood of students becoming vaccinated, while the alternate hypothesis is that education will persuade students to become vaccinated.

Methodology

To explore this question, the researcher developed a questionnaire to gather demographic information, to determine the number of students who had and had not received the 2017-2018 flu vaccine, and to assess their attitudes and knowledge about the vaccine. The research was performed with a one-group, quasi-experimental design with a stratified random sample. This research is quasi-experimental because the researcher cannot completely control all the variables (Grove, Gray & Burns, 2015), such as who will self-select into the research. The sample was randomized because any student with access to a Middle Tennessee State University (MTSU) student Facebook group could access the survey, no matter the gender, age, race/ethnicity or major. The sample was stratified because it specifically targeted young adults aged 18-26 who attend MTSU. It was necessary for the sample to be stratified out from the whole population of adults because the researcher wanted to determine the influence of education specifically on college students. MTSU students were chosen as a convenience sample.

The questionnaire was developed on SurveyMonkey in order to be easily distributed to students via the MTSU student groups on Facebook after receiving IRB approval. A copy of the IRB approval notice is included in Appendix B. A one-sample design was used because the researcher wanted to determine the influence of education on college students who had not received the 2017-2018 flu vaccine, so the control and experimental groups consisted of the same participants. Students who had already received the 2017-2018 vaccination answered a short series of questions about why they chose to receive it, and did not complete the intervention or post-test. Participants who

had not received the flu vaccine completed the pre-test, the intervention (reading a brief leaflet about the flu and flu vaccine), and the post-test.

The participants were also informed in the research flyer that there would be a brief educational piece that they would be required to read. A copy of the research flyer is included in Appendix C. Upon opening the survey, each participant first read the informed consent, which explained the expected harms of participating in the survey, that their answers would be confidential, that they could withdraw at any time without any penalty except that their answers would be taken out of the data set. A copy of the informed consent is included in Appendix D. They then confirmed that they consented to participate, and that they were over the age of 18. Next, each participant answered 4 demographic questions: age, gender, ethnicity, and college of major. Then they were asked if they had received the flu 2017-2018 flu vaccine, and the answer to this question determined what other parts of the survey the student would be asked to complete.

The students who had received the vaccine were asked to select why they had received it, and then to answer where they received their information about the flu and flu vaccine. These students were then taken to a de-briefing page where it was explained that the research was being conducted to assess the effects of education on students' decision to receive the flu vaccine. It was explained to these students that because they had already received the flu vaccine, they were not linked to the education that the researcher was developed. They were given the researcher's email so that they could ask for the education if they wanted it. A copy of the survey for the students who were already vaccinated is included in Appendix E.

The students who had not received the 2017-2018 vaccine were asked why they had not, and also where they got their information. Then they were asked to rate how likely they were to receive the next year's flu vaccine on a sliding scale of 0-100. The students were then taken to the educational pamphlet, which they were asked to read. Afterwards, the students were asked the likelihood that they would receive next year's flu vaccine on the same sliding scale, followed by asking for their reasons to or not to receive it. These students were then taken to a de-briefing explaining that the purpose of the research was to assess the influence of education on their decision to get the flu vaccine. A copy of the survey for non-vaccinated students, including the educational leaflet and its references, is included in Appendix F.

Results

171 students completed the survey, and the results and following discussion are based on the answers of these 171 students.

The majority of students who completed the survey were in the 18-20 age range (62%), followed by the 21-23 age range (28.1%), and then the 24-36 age range (9.9%). Most of the respondents were female (80.1%), then male (18.1%), with the options for transgender female, transgender male, and other equally making up the last 1.8%. The majority of research participants identified as white (80.7%), followed by African American (9.9%), Hispanic (4.1%), Asian/Pacific Islander (1.2%), and Middle Eastern (0.6%). Most of the students who took the survey are majoring in the College of Behavioral and Health Sciences (28.7%), followed by the College of Basic and Applied Sciences (25.1%), the College of Media and Entertainment (14.6%), the College of Liberal Arts (12.3%), the Jennings A. Jones College of Business (8.8%), the College of Education (7.0%), and the University College (3.5%).

Of the 171 students who participated in the survey, 120 (70.2%) reported that they had not received the 2017-2018 vaccine (N), while 51 (29.8%) reported that they had been vaccinated (V).

Shown right in Figure I.

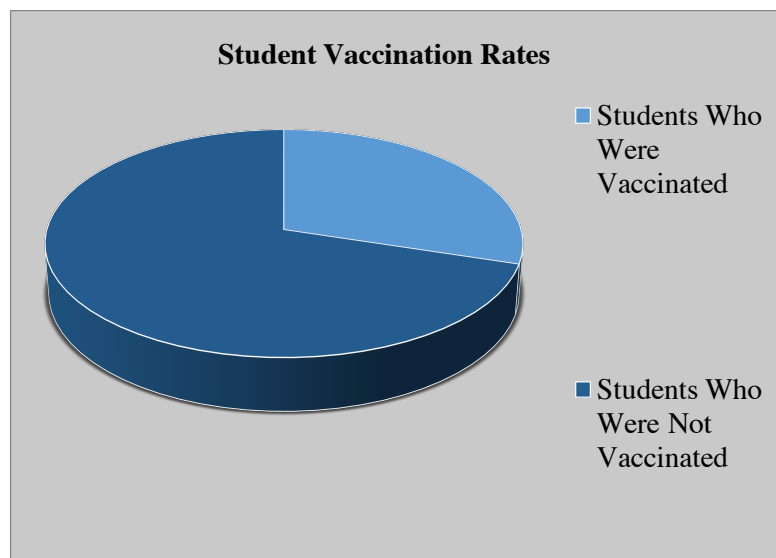


Figure 1: Compares the percentage of students who were not vaccinated before the survey to those who were vaccinated before the survey.

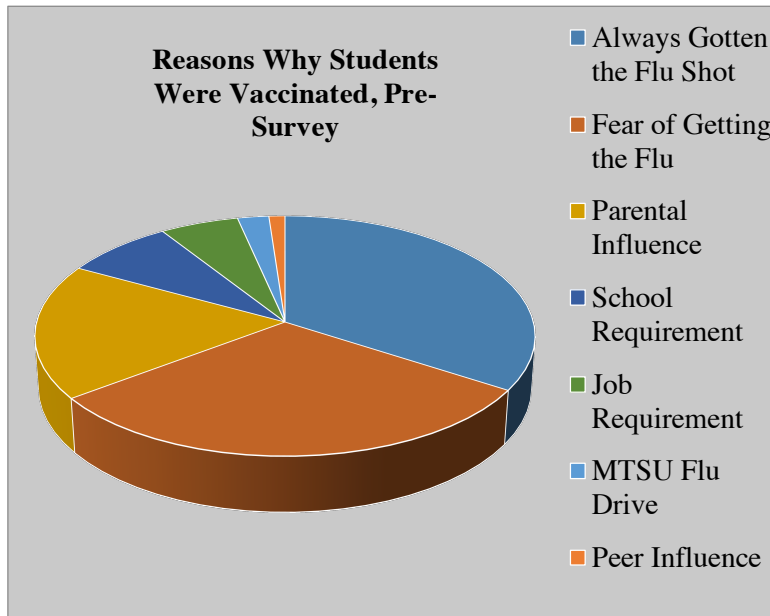


Figure 2: Shows the percentage of students who chose each reason as a reason that they had received the flu vaccine.

For the 51 students who received the 2017-218 flu vaccine, the reasons are as follows: they have always gotten it (58.8%); fear of getting the flu (52.9%); parental influence (31.4%); school requirement (13.7%); job requirement (9.8%);

MTSU flu drive (3.9%); and peer influence (2%). No student reported receiving the vaccine due to military requirement. Shown in Figure II above.

These are the sources of information about the flu and flu vaccine reported by students who received the flu vaccine: primary care provider (PCP) (66.7%); friends and family who work in healthcare (39.2%); other (21.6%); CDC (15.7%); Mayo Clinic (15.7%); research (14%); friends and family who do not work in healthcare (13.7%); WebMD (9.8%); online news (7.8%); other Internet source (5.9%); and TV news (5.9%).

For the 120 students who did not receive the 2017-2018 vaccine, the reasons are:

they have never received the flu shot (38.3%); they do not trust the vaccine (33.3%); they believe they may get the flu from the vaccine (27.5%); they do not like shots

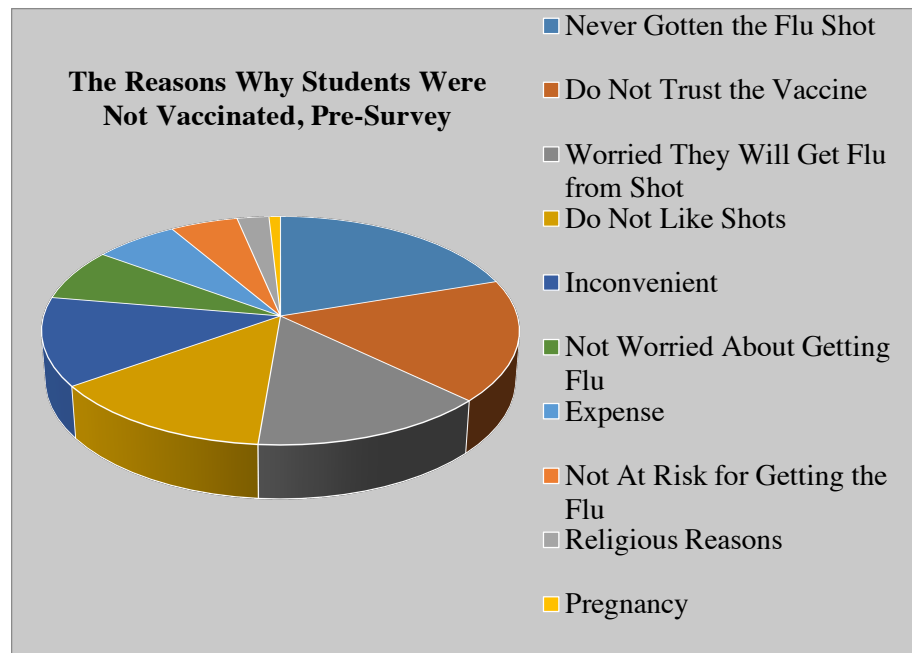


Figure 3: Shows the percentage of students who chose each reason as a reason that they had not received the flu vaccine.

(26.7%); inconvenience (24.2%); they are not worried about getting the flu because “it’s not that bad” (14.2%); expense (12.5%); believe they are not at risk (10.0%); religious reasons (4.7%); and pregnancy (1.7%). Shown in Figure III above.

These students received information about the flu and flu vaccine from: friends and family who work in healthcare (41.7%); PCP (39.2%); friends and family who do not work in healthcare (31.7%); research (26.1%); TV news (20.8%); online news (19.2%); CDC (17.5%); Mayo Clinic (15.0%); other Internet source (14.2%); WebMD (10.8%); and other (10.8%).

After reading the information about the flu and flu vaccination, the reasons that students would not become vaccinated are as follows: they do not trust the vaccine

(30.0%); they have never gotten the flu shot (26.7%); they do not like shots (25.0%);

inconvenience

(20.8%); they

believe they might

get the flu from

the vaccine

(17.5%); they are

not worried about

getting the flu

because “it’s not

that bad” (12.5%);

believe the

vaccination is dangerous (11.7%); expense (9.2%); believe they are not at risk (4.2%);

religious beliefs (3.3%); and pregnancy (0.8%). Shown in Figure IV above.

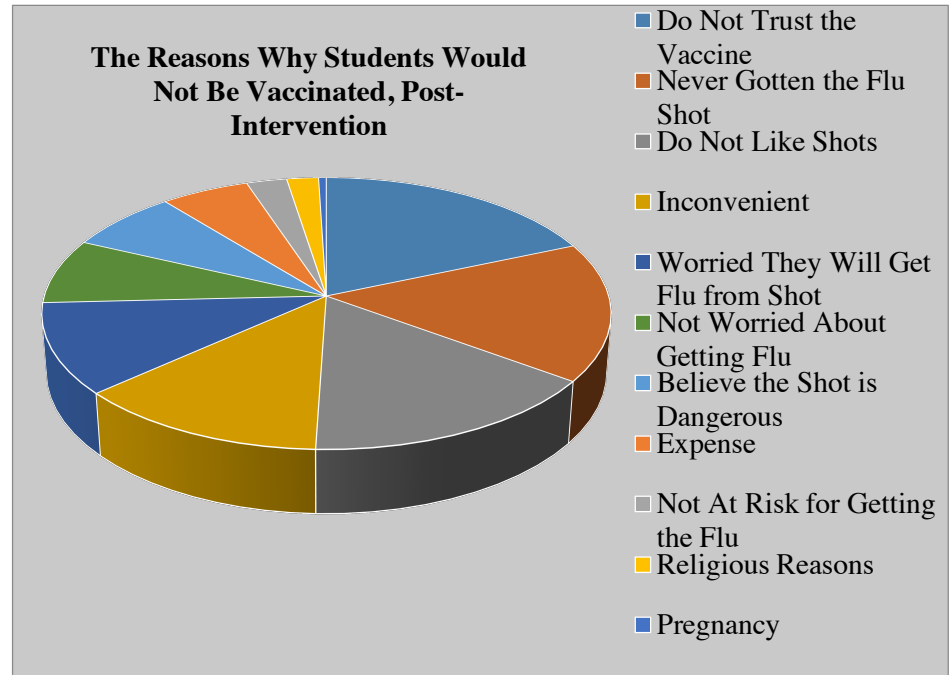


Figure 4: Shows the percentage of students who chose each reason as a reason why they would not get next year’s flu vaccine after completing the intervention.

In addition, after reading the education, students responded that they understand the vaccine better now (15.0%) and now had more information (15.0%). 9.2% of students stated that they had planned on getting the vaccine before participating in the survey.

Table 1: Comparing the Likelihood of Non-Vaccinated Students Receiving the 2018-2019 Flu Vaccine, Pre- and Post-Intervention

	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before Education	20.7000	31.09449	2.83853
	After Education	26.0583	33.17114	3.02810

A paired samples T-test was conducted to compare the likelihood that students who had not received this

year's flu vaccine would receive next year's flu vaccine before and after education. There was a significant difference in the scores before education ($M = 20.7, SD = 31.09$) and after education ($M = 26.06, SD = 33.17$) conditions; $t(4) = -4.125, p = 0.001$. These results suggest that receiving information about the flu and flu vaccine increase the likelihood of these students being vaccinated for the next flu season.

Table 2: A Paired Samples t-Test Comparing the Students' Scale Values Pre- and Post-Intervention

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Compares the Values that Students Input on the Sliding Scales before and After Education	-5.35833	14.22910	1.29893	-7.93035	-2.78632	-4.125	119	.000

Discussion

In this survey, the number of MTSU students who reported receiving the 2017-2018 flu vaccine was 29.8%, substantially below the ACHA's goal of 43.9% for the year 2020. This project was conducted to help determine how to increase this percentage, and found that the biggest influence on whether or not college students receive the flu vaccine is their habit, or what they always or never do. For N students, 38.3% responded they have never had it. For V students, 58.8% said that it is what they have always done. Additionally, 31.4% of the students who received the flu vaccine responded that parental influence was a factor in their decision, which may have been a reason why 58.8% of these students said they have always gotten it. Nevertheless, this 58.8% who received the flu vaccine because they always have is important because it shows how important the habits of college students are as they make their decisions, and it may lend a clue as to where to focus vaccination education efforts. To increase the percentage of college students who become vaccinated, it may prove to be effective to begin campaigning for student flu vaccination in high schools, and to publicize the benefits of the yearly flu vaccine for children to parents.

One of the results that pleased this researcher most was to find was that in the students who had not received the 2017-2018 flu vaccine, the percentage for each reason not to receive next year's vaccine decreased, indicating effective education. The most dramatic decrease was by 11.5%, and this was for those who selected never having received the vaccine before as a reason to not get it (38.3% before education (B) and 26.7% afterwards (A)). This decrease caused "I don't trust the vaccine" to move up to the number one reason, which 30.0% of students still selected after education (a 3.3%

decrease from B). The next biggest decrease was in students who believed they might get the flu from the flu vaccine, which decreased by 10.0% (B: 27.5%, A: 17.5%). Another significant decrease was in the students who believed they were not at risk for getting the flu; this reason decreased by 5.8% (B: 10.0%, A: 4.2%). The facts that you cannot get the flu from the flu vaccine and that college students are actually at an increased risk of getting the flu were emphasized by the researcher in the education, so this decrease is a good sign that educating college students could increase the percentage of students who receive the flu vaccine.

A statistic that this researcher did not expect was the percentage of students who stated they received their information about the flu and flu vaccine from their PCP. Of the students who did receive the vaccine, 66.7% selected this option, and so did 39.2% of those who were not vaccinated for a total of 47% (81) of all participants.

Another interesting statistic to note about information sources is that in students who did not receive the flu vaccine, percentages were higher in 8 out of the 11 answer choices, indicating that these students may receive information from a wider variety of sources than those who did receive the flu vaccine. However, while 12.1% more of N students said they received their information from research, the percentage of N students who received information from other reputable sources (Mayo Clinic, CDC, and PCP) decreased (with the exception of the CDC, which V= 15.7 and N= 17.5%).

The percentage of N who received information from their PCP was 27.5% less than those who were vaccinated (V= 66.7%, N= 39.2%), and the percentage who received information from Mayo Clinic decreased by 0.7% (V= 15.7%, N= 15.0%). N students were also more likely to receive information from less-reputable sources. So

while N students may receive information from more sources, it may not be the best information. For N students, there was a 14.9% differential in TV news (V= 5.9%, N= 20.8%); an 11.4% differential in those who received information from online news (V= 7.8%, N= 19.2%); an 8.3% differential in other Internet source (V= 5.9%, N= 14.2%), and a 1.0% increase in WebMD (V= 9.8%, N= 10.8%). N students were also more likely to receive information from their friends and family, whether they worked in healthcare or not (N= 41.7%, V= 39.2% for friends and family in healthcare; N= 31.7%, V= 13.7% for friends and family not in healthcare). These differences in where N and V students receive their information is important, because their knowledge influences their decision to receive the flu vaccine or not.

The use of these less reputable sources is largely increased in those who did not receive the flu vaccine, leading this researcher to hypothesize that receiving education and the facts about the flu vaccine would increase the percentage of college students who are vaccinated. It is possible that the use of less reputable sources could be due to the fact that it is mostly younger college students who completed this survey, who may not have had exposure to any research classes where they would be taught about reliable sources. Teaching college and younger students about reputable sources may also help to increase the percentage who are vaccinated because they would be receiving better and more accurate information.

Limitations

There were a few limitations to this research: the sample size, the inability to enforce participation in the education, and that the education did not address every possible reason that a student would choose not to get vaccinated.

The major limitation to this research was the small sample size. The survey link was posted in Facebook groups where it could be seen by thousands of MTSU students and was left open for 10 days. At this point, the researcher closed the survey because students had stopped participating.

Another limitation in the research design is that there is nothing to make sure the students read and understood the education. The average length of time students spent taking the survey was 3 minutes and 8 seconds, which is what led the researcher to wonder how much attention participants were paying to the education. If the participants did not truly read the education, then the supposed significant effect of the education is nullified. The survey format was changed from in-person to online because of a time constraint; however, because the survey split into different questions based on whether or not they had already received the flu vaccine, it was probably easier for students to take online rather than on paper.

Another limitation was that the education that the researcher developed did not address every possible reason that the student may choose to not get the vaccine. The researcher did this to keep the education portion at a reasonable length, so that students would not just scroll past it. The education focused on emphasizing what the flu is, that college students are at risk, how the vaccine works to prevent the flu, that the vaccine

cannot cause the flu, and is not dangerous. Some students responded that they did not get the vaccine because of pregnancy, cost and convenience, and these reasons were not addressed. The researcher focused on these points because of the finding in Benjamin and Bahr's 2016 study, which found that the 3 highest reasons college students do not get the flu shot are that they think they will get the flu from it, they believe the vaccination is dangerous, and they believe they are not at risk for getting the flu. The researcher did provide education on every possible reason not to get the flu shot, instead focusing on the major reasons.

This researcher has no conflicts of interest.

Recommendations

To address the issue of the small sample size, next time this researcher would increase traffic to the survey by “bumping” the post with the link to the top of the Facebook groups. The researcher would also post the link in other forums beside Facebook, advertise with posters on campus, and send the survey link to MTSU students through their MTSU email. There was a great number of students who took the survey right away, but the numbers dwindled as the post became buried on the Facebook groups. Keeping the link visible, as well as getting it in front of more eyes using different forums and advertising, would help to increase the sample size in the future.

In the future, this researcher would test the influence of a different kind of education tool on students’ beliefs and decisions. Not everyone learns best by reading, and it may be easier to engage college students with a video or speaker presentation. If the education were easier to understand, it would be more effective and possibly cause a greater increase in the likelihood of the N students receiving next year’s flu vaccine.

Future research should include information in the education about the safety of the vaccine in pregnancy, the cost of the flu vaccine, insurances that will cover it, and a list of walk-in clinics or pharmacies where the flu vaccine can be quickly. Including these points in flu vaccine education may help to further increase the percentage of students who will get vaccinated.

Conclusion

The results of this research show that education and correcting the myths surrounding the flu vaccination may be an effective way to increase the percentage of college students who receive the flu vaccination. However, it would be necessary to perform the intervention on a large sample size in order to get a truer indication of the effectiveness of education. Presenting the education in a more engaging way than reading may also prove to increase the effectiveness, as students could be more likely to pay attention and learn.

One key finding in this study is that whether students were vaccinated or not, they did what they have always done. This means that to increase the percentage of college students who become vaccinated, the percentage of children who are vaccinated must increase. This could mean starting to campaign for the flu vaccination at high schools, where teenagers are beginning to make their own decisions. Encouraging and educating parents to get their children vaccinated yearly against the flu at a young age would also likely increase the percentage of college students who choose to be vaccinated.

Another interesting result was that 47% reported receiving information about the flu vaccine from their PCP. Capitalizing on this, while also teaching high school and college students about reputable sources and bias in media would, ensure that young adults have better information from which to make their decisions. This could help increase the percentage of V students, as the students who report receiving the flu vaccine also report receiving information from more reliable sources.

Influenza is a serious disease that can cause school districts to close, hospitalizations, and death. Americans experience an epidemic of the flu every year, and receiving the flu vaccine is the best protection (CDC, 2018b). Despite this, college students, who are at an increased risk of contracting the virus because of their environment, are highly under-vaccinated. If college students were not passionate about education, they would not be college students, and this study shows that education is a statistically significant way to increase the percentage of college students who say they will receive next year's flu vaccine. College students attend school to gain an education that will prepare them to have a successful career, but it is also important that these young adults gain an education that will prepare them to make the best health decisions for the rest of their lives.

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Appendices

Appendix A: Glossary of Terms

Epidemic- a widespread occurrence of an infectious disease in a community at a particular time

Healthy Campus 2020- provides 10-year national objectives for improving the health of all students, staff, and faculty on campuses nationwide

Outpatient- a patient who receives medical treatment without being admitted to a hospital

Pandemic- (of a disease) prevalent over a whole country or the world

Primary care provider- in insurance parlance, a physician who is chosen by or assigned to a patient and both provides primary care and acts as a gatekeeper to control access to other medical services

Side effect- a secondary, typically undesirable effect of a drug or medical treatment

Vaccination- treatment with a vaccine to produce immunity against a disease; inoculation

Virus- an infective agent that is only able to multiply within the living cells of a host

Appendix B: Copy of IRB Approval Form

IRB
INSTITUTIONAL REVIEW BOARD
 Office of Research Compliance,
 010A Sam Ingram Building,
 2269 Middle Tennessee Blvd
 Murfreesboro, TN 37129



IRBN001 - EXPEDITED PROTOCOL APPROVAL NOTICE

Wednesday, January 03, 2018

Principal Investigator	Abigail Young (Student)
Faculty Advisor	Barbara Lancaster
Co-Investigators	NONE
Investigator Email(s)	<i>aky2h@mtmail.mtsu.edu; barbara.lancaster@mtsu.edu</i>
Department	Nursing
Protocol Title	<i>The shot college students don't like: The flu vaccine</i>
Protocol ID	18-2092
Funding	NONE

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the **EXPEDITED** mechanism under 45 CFR 46.110 and 21 CFR 56.110 within category (7) *Research on individual or group characteristics or behavior*. A summary of the IRB action and other particulars in regard to this protocol application are tabulated below:

IRB Action	APPROVED for one year from the date of this notification
Date of expiration	1/31/2019
Participant Size	10,000 (TEN THOUSAND)
Participant Pool	General adult (18 years or older)
Exceptions	1. Online consent is permitted. 2. The study can be conducted via online methods.
Restrictions	1. Mandatory active informed consent; the PI must provide a copy of the informed consent signed by the PI/FA to each participant. 2. The online link for the study: https://www.surveymonkey.com/r/G7W6GM8
Comments	NONE

This protocol can be continued for up to THREE years (**1/31/2021**) by obtaining a continuation approval prior to **1/31/2019**. Refer to the following schedule to plan your annual project reports and be aware that you may not receive a separate reminder to complete your continuing reviews. Failure in obtaining an approval for continuation will automatically result in cancellation of this protocol. Moreover, the completion of this study **MUST** be notified to the Office of Compliance by filing a final report in order to close-out the protocol.

Appendix C: Copy of IRB Approved Research Flyer

Research Participants Needed

Study Title: **The Shot College Student's Don't Like: The Flu Vaccine**
Protocol ID: 18-2092 Approval: 01/03.2018 Expiration: 01/31/2021

Study Description & Purpose

The study contains a brief survey before and after a short educational pamphlet, and will take 15 minutes or less to complete. This research is being done to investigate the knowledge and attitudes of college-aged students about the flu vaccine. This study also aims to look at how their knowledge, attitudes and other factors such as social influence or work impact the young adult's decision to receive the vaccine.

Target Population

This study is looking to include any and all students who are between the ages of 18-26.

Risk & Benefits

The time to complete the survey will be approximately 15 minutes.

Additional Information

Participation will require you to be at a computer for approximately 10-15 minutes while completing the survey. You must be able to sit and be able to read in English. You must be between 18-26 years old. You will not receive any benefit except volunteering for a research project and contributing to a knowledge base. There is no funding for this project. There is an information section (about 1.5 pages) included within that you would need to read for the research.

If you wish to participate in this project, click on the associated link.

Contact Information

Abbie Young, Student of the School of Nursing and Honors College
Phone: 937-509-6675 Email: aky2h@mtmail.mtsu.edu
Dr. Barbara Lancaster, Faculty Advisor from the School of Nursing
Phone: 615-898-5843 Email: Barbara.Lancaster@mtsu.edu

If you wish to receive information on the results of the survey, please contact the above individuals by email!

Institutional Review Board, Middle Tennessee State University
2269 Middle Tennessee Blvd, Room 010A, Murfreesboro, TN 37132
Tel 615 494 8918 | Email: irb_information@mtsu.edu | www.mtsu.edu/irb

Appendix D: Copy of Informed Consent

Middle Tennessee State University Institutional Review Board Informed Consent Document for Research

Principal Investigator: Abigail Young
Study Title: Let's Talk About Shots: The Flu Vaccine
Institution: Middle Tennessee State University

The following information is provided to inform you about the research project and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this study and the information given below. You will be given an opportunity to ask questions, and your questions will be answered. Also, you will be given a copy of this consent form.

Your participation in this research study is voluntary. You are also free to withdraw from this study at any time. In the event new information becomes available that may affect the risks or benefits associated with this research study or your willingness to participate in it, you will be notified so that you can make an informed decision whether or not to continue your participation in this study.

For additional information about giving consent or your rights as a participant in this study, please feel free to contact the MTSU Office of Compliance at (615) 494-8918.

1. Purpose of the study:

You are being asked to participate in a research study because the researcher is trying to assess the attitudes and knowledge of college students aged 18-26 about the influenza virus and flu vaccine, as well as where they get their information from.

2. Description of procedures to be followed and approximate duration of the study:

Within this survey, there will be a series of questions that may be different depending on how the questions are answered (those who have already received the flu shot will not have as many to answer). Those who have not received the flu vaccine will answer a few preliminary questions, receive some information and then answer two more questions. It is expected that this research will take less than 15 minutes to complete.

3. Expected costs:

There are no costs to participating in the research, other than a short amount of time.

4. Description of the discomforts, inconveniences, and/or risks that can be reasonably expected as a result of participation in this study:

No discomforts, inconveniences or risks can be reasonably expected as a result in participation of this study.

5. Anticipated benefits from this study:

a) The potential benefits to science and humankind that may result from this study are a better understanding of how young adults make the decision to receive or not to receive the influenza vaccine.

b) The potential benefits to you from this study are a better understanding of the influenza virus and vaccination, as well as satisfaction from helping a fellow student complete research.

6. Alternative treatments available:

There are no treatments involved in this research.

7. Compensation for participation:

No monetary compensation.

8. Circumstances under which the Principal Investigator may withdraw you from study participation:

Your answers may be invalidated and withdrawn from the study if the survey questions are not answered wholly or according to the instructions within the survey packet. If there is any confusion on which questions to answer while completing the survey, please receive clarification from the Principal Investigator.

9. What happens if you choose to withdraw from study participation:

If you choose to withdraw from study participation, your packet and answers will be withdrawn from the data set, and your information securely destroyed.

10. Contact Information.

If you should have any questions about this research study or possible injury, please feel free to contact Abigail Young at 937-509-6675 or my Faculty Advisor, Dr. Barbara Lancaster at Barbara.Lancaster@mtsu.edu.

11. Confidentiality. All efforts, within reason, will be made to keep the personal information in your research record private but total privacy cannot be promised. Your information may be shared with MTSU or the government, such as the Middle Tennessee State University Institutional Review Board, Federal Government Office for Human Research Protections, if you or someone else is in danger or if we are required to do so by law.

12. STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY

I have read this informed consent document and the material contained in it has been explained to me verbally. I understand each part of the document, all my questions have been answered, and I freely and voluntarily consent to participate in this study.

By clicking on the survey link, you agree to answer all questions and completely. You understand that participation is voluntary and you may withdraw at any time with no consequences, and that any information will be kept confidential. You agree that you have been given the primary researcher's contact information in case of any questions.

Appendix E: Survey for the Vaccinated Students

1. Do you consent to participate in this research project?
 - a. Yes, I consent to participate.
 - b. No, I do not consent to participate.

2. What is your sex?
 - a. Male
 - b. Female
 - c. Transgender Male
 - d. Transgender Female
 - e. Other

3. What is your age?
 - a. 18-20
 - b. 21-23
 - c. 24-26

4. What is your ethnicity? Select all that apply.
 - a. White/Caucasian
 - b. African American
 - c. Asian/Pacific Islander
 - d. Native American
 - e. Indian American
 - f. Middle Eastern
 - g. Hispanic
 - h. Other

5. Which college is your major a part of?
 - a. College of Basic and Applied Sciences
 - b. College of Behavioral and Health Sciences
 - c. Jennings A. Jones College of Business
 - d. College of Education
 - e. College of Liberal Arts
 - f. College of Media and Entertainment
 - g. University College

6. Have you received this year's flu vaccine already?
 - a. Yes

- b. No
7. Why have you received this year's flu vaccine? Select all that apply.
- a. Job requirement
 - b. School requirement
 - c. Military requirement
 - d. Fear of getting the flu
 - e. Parental influence
 - f. Peer influence
 - g. MTSU flu drives
 - h. I've always gotten the flu vaccine
8. Where do you get your knowledge about the flu vaccination from? Select all that apply.
- a. An online news source
 - b. Watching the news on TV
 - c. The CDC website
 - d. The Mayo Clinic website
 - e. WebMD
 - f. Other Internet source
 - g. My primary healthcare provider (doctor, nurse practitioner, physician's assistant)
 - h. Family and/or friends who work in healthcare
 - i. Family and/or friends who do not work in healthcare
 - j. Research articles
 - k. Other

The purpose of this research is determine whether or not correct information about the flu vaccine will persuade college students to become vaccinated. Because you have already received the flu vaccination, you were not taken to the education page to receive information about the flu shot. However, if you would like this information, feel free to email me at aky2h@mtmail.mtsu.edu!

Thank you so much for your time! Have an awesome winter break!

Appendix F: Survey for the Non-Vaccinated Students

1. What is your sex?
 - a. Male
 - b. Female
 - c. Transgender Male
 - d. Transgender Female
 - e. Other

2. What is your age?
 - a. 18-20
 - b. 21-23
 - c. 24-26

3. What is your ethnicity? Select all that apply.
 - a. White/Caucasian
 - b. African American
 - c. Asian/Pacific Islander
 - d. Native American
 - e. Indian American
 - f. Middle Eastern
 - g. Hispanic
 - h. Other

4. Which college is your major a part of?
 - a. College of Basic and Applied Sciences
 - b. College of Behavioral and Health Sciences
 - c. Jennings A. Jones College of Business
 - d. College of Education
 - e. College of Liberal Arts
 - f. College of Media and Entertainment
 - g. University College

5. Have you received this year's flu vaccine already?
 - a. Yes
 - b. No

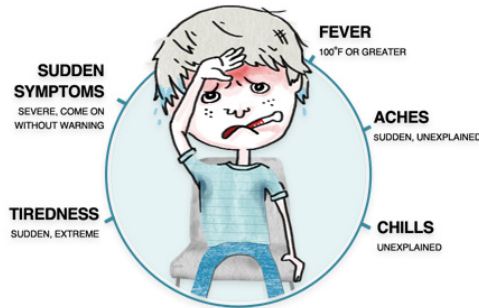
6. What is the likelihood you are going to receive the flu vaccine?
 - a. Sliding scale where student could select any number from 0-100

7. Why have you not received this year's flu vaccine? Select all that apply.
- a. I don't trust the vaccination
 - b. I don't like shots
 - c. I believe vaccinations are dangerous
 - d. I may get the flu from the vaccine
 - e. I'm not at risk for getting the flu
 - f. I don't think the flu is anything to worry about; it's not that bad
 - g. It's inconvenient
 - h. It's too expensive
 - i. I've never gotten the flu shot
 - j. Religious beliefs
 - k. Pregnancy
8. Where do you get your knowledge about the flu vaccination from? Select all that apply.
- a. An online news source
 - b. Watching the news on TV
 - c. The CDC website
 - d. The Mayo Clinic website
 - e. WebMD
 - f. Other Internet source
 - g. My primary healthcare provider (doctor, nurse practitioner, physician's assistant)
 - h. Family and/or friends who work in healthcare
 - i. Family and/or friends who do not work in healthcare
 - j. Research articles
 - k. Other

Let's Talk about Shots: The Flu Vaccine

What is the Flu?

Influenza is a “highly contagious respiratory illness”¹ caused by an influenza



virus. It is called the flu for short, and commonly confused with gastroenteritis, the stomach flu². Symptoms of influenza include a cough, sore throat, runny nose, chills, fever and muscle aches¹, whereas the stomach flu causes gastrointestinal symptoms such as diarrhea,

abdominal cramps and nausea and vomiting².

Complications from Influenza

The influenza virus can cause complications ranging from missing class and having to stay in the hospital to contracting pneumonia and death. In the spring of 2010, American College Health Association reported that 18% of college students claimed that cold/flu/sore throat adversely affected their academic performance. “Millions of Americans (about 5% to 20% of U.S. population) contract influenza each year... More than 200,000 people are hospitalized each year for flu-related complications”¹.



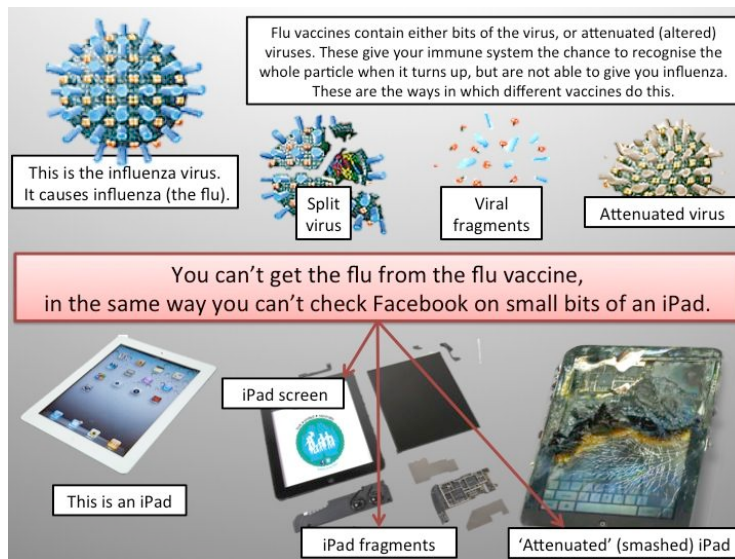
College Students and Risk of Influenza

Many young adults believe they're not at risk for contracting the illness because they're young and healthy. However, illnesses spread more rapidly when more people are inside enclosed spaces, and being in college increases young adults' risk of coming into

contact with illness because they have “constant exposure in close quarters like common living spaces, classrooms, shared restrooms[,] and through social activities”³

How Does the Flu Vaccine Work?

The flu shot is an inactivated vaccine, which means that the virus inside of it is incapable of reproducing itself⁴. Inactivated viruses contain a small part of the virus, such



as a protein⁴, which teaches the body how to fight against it. Every time your body encounters a germ, such as a bacteria or virus, it mounts an immune response in which it learns how to destroy the infection. It also commits this information to memory so that the next time it encounters the same germ it

can destroy it more quickly. The first time the body encounters the germ, it can take several days for it to learn how to fight it⁵. So a vaccine is a small, weakened portion of the virus that allows the body to learn how to defeat it before that person is ever truly exposed to the full disease.

The CDC states that the flu vaccine works best in healthy adults⁶. Currently, the CDC reports that flu vaccination can reduce the risk of influenza by 50%-60% when the flu vaccine is well-matched⁶.

But Can't the Flu Shot Give You the Flu?

The most common misconception about the flu vaccine is that it can cause the flu, but because flu vaccine contains the inactivated virus, it cannot cause the flu⁷. “The most

common side effects from the influenza are soreness, redness, tenderness or swelling where the shot was given”⁸, and these symptoms usually last less than two days⁸. When people get the flu after receiving the flu vaccine it is (a) because the influenza strain that is encountered may be different than the strain that is in the vaccine, or (b) that person came in contact with influenza either shortly before or shortly after receiving the vaccine⁸, before immunity had time to build.

Again, the flu vaccine cannot cause influenza because it is an inactivated virus. Even if a person does contract the flu after getting vaccinated, the CDC states that the person’s illness may be milder, reducing the risk of hospital admission and other complications⁶.

Aren’t Vaccinations Dangerous?

A common rumor is that flu vaccines, and vaccinations in general, are harmful or dangerous because of a preservative in the vaccine called thimerosal. This rumor began when a British doctor named Andrew Wakefield published a paper that led people to

believe that the measles, mumps and rubella (MMR) vaccine caused autism because of the thimerosal in the vaccine⁹. However, his results could never be duplicated in the numerous studies that followed. Later, the journal that originally published Wakefield’s paper retracted it “on the grounds

THE LINK IS BUSTED

In a huge Australian meta-analysis with 1.3 MILLION subjects, researchers looked for any possible link between vaccination and autism or autism spectrum disorder.

The results:

- **NO LINK BETWEEN VACCINATION AND AUTISM**
(OR: 0.99; 95%CI: 0.92 to 1.06)
- **NO LINK BETWEEN VACCINATION AND ASD**
(OR: 0.91; 95%CI: 0.68 to 1.20)
- **NO LINK BETWEEN AUTISM/ASD AND MMR**
(OR: 0.84; 95%CI: 0.70 to 1.01)
- **NO LINK BETWEEN AUTISM/ASD AND THIMEROSAL**
(OR: 1.00; 95%CI: 0.77 to 1.31)
- **NO LINK BETWEEN AUTISM/ASD AND MERCURY**
(OR: 1.00; 95%CI: 0.93 to 1.07)

Source: <http://tinyurl.com/NoLinkToAutism>

that it was a product of dishonest and irresponsible research”⁹, and Wakefield’s license to practice medicine was also revoked by the British authorities⁹.

Thimerosal is a mercury-based preservative used in vaccines to keep them free from contamination of bacteria or fungi¹⁰ and the CDC also write that “there [is] no evidence that thimerosal in vaccinations [is] dangerous”¹⁰.

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9. After reading about the flu and the flu vaccine, what is the likelihood that you will get the flu vaccine?
- a. Sliding scale where student could select any number from 0-100
10. Why? Select all that apply.
- a. I don't trust the vaccination
 - b. I don't like shots
 - c. I believe vaccinations are dangerous
 - d. I may get the flu from the vaccine
 - e. I'm not at risk for getting the flu
 - f. I don't think the flu is anything to worry about; it's not that bad
 - g. It's inconvenient
 - h. It's too expensive
 - i. I've never gotten the flu shot
 - j. Religious beliefs
 - k. Pregnancy
 - l. I have a better understanding of how vaccines work
 - m. I don't want to get the flu
 - n. I was planning on getting the vaccine before this survey
 - o. I know more about the flu now