Comparison of the Seasonal Influenza Vaccination amidst the 2020 COVID-19 Pandemic within Six Regional Community Pharmacies of a Large Pharmacy Chain

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Key Points

- What was already known:
  - The influenza vaccine is recommended for all persons age 6 months and older.
  - Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) originated in China and has quickly spread worldwide through direct person to person contact resulting in a pandemic.
  - The CDC has issued interim guidance on administering influenza vaccines amidst the COVID-19 pandemic, which a large chain pharmacy has adopted.
- What this study adds:
  - This study shows the impact that social distancing, apprehension towards person-to-person contact, and a novel virus has had on influenza vaccination rates with a 7.6% increase in influenza vaccination rates from the previous year.
  - This research provides the framework for future studies to investigate the impact of SARS-CoV-2 on vaccination rates and on the COVID-19 vaccination.

Abstract

Background*: The CDC has issued interim guidance on administering influenza vaccines amidst the COVID-19 pandemic including providing specific appointment times. A large chain pharmacy has adopted this guidance and is encouraging patients to make appointments rather than a walk-in visit for the influenza vaccination to help avoid large crowds.*

Objective(s)*: This study aims to determine the impact of the COVID-19 pandemic on influenza vaccination rates (2019 versus 2020 season) and patient appointments versus walk-in visits. The second goal of this study is to evaluate patient satisfaction with the influenza vaccination process.*

Methods*: Influenza vaccine data was collected from the chain pharmacy online database from the first week in September to the last week in December during 2019 to 2020 and from 2020 to 2021. The second part of this study included a voluntary survey to be completed by the patient regarding satisfaction and thoughts about the 2020-2021 influenza vaccination process.*

Results*: The six stores identified showed an overall 7.6% increase in influenza vaccination rates from the 2019-2020 season to the 2020-2021 season (p-value= 0.73). There were a total of 15 survey respondents amongst the stores of which 100% of the patients were at least slightly comfortable with the vaccination process and very satisfied overall.*

Conclusion*: The six pharmacy locations within a large chain revealed that COVID-19 had a positive impact on influenza vaccination rates. Although these results were not statistically significant, this study sets the framework for future vaccination studies.*

Key Words: Influenza, vaccination, vaccine, COVID-19, pandemic, pharmacy, community pharmacy, retail

Background

Influenza vaccines have existed since the 1940's when large studies began on the first influenza virus vaccines which were grown within fertilized chicken eggs. These studies provided initial evidence that inactivated influenza vaccines could yield effective protection against flu epidemics.[1] The influenza vaccine has evolved throughout the years including various formulations such as the intranasal, live attenuated influenza vaccine (FluMist Quadrivalent-AstraZeneca) to formulations specifically manufactured without eggs as seen with the influenza vaccine (Flucelvax-Seqirus). [2] From 2020 to 2021, the large pharmacy chain locations utilized influenza vaccine (Fluzone Quadrivalent High Dose-Sanofi Pasteur), influenza vaccine (Flublok Quadrivalent- Sanofi Pasteur), and influenza vaccine (Flulaval Quadrivalent-GlaxoSmithKline) to immunize the patients that they serve.[3,4]

Using the appropriately indicated influenza vaccine formulation, the Centers for Disease Control and Prevention (CDC) recommends all persons aged six months or older receive an influenza vaccination.[2] Studies prior to the 2020-2021 influenza season have been inconclusive on the timing of vaccine administration and the potential waning effects of vaccination towards the end of the standard influenza season. However, it is recommended for vaccination to occur annually prior to the end of October. High dose influenza vaccination has been shown to be superior to standard dose influenza vaccination in persons over the age of 65. A high dose

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formulation is recommended in the elderly patient population due to increased risk for hospitalization, severe illness, and death.[5] Persons aged 9 to 64 are recommended to receive the standard dose influenza vaccine.[6]

This CDC recommendation creates a large opportunity for community pharmacists to administer influenza vaccines to the majority of the population. This study focused on the mid-Ohio valley region (West Virginia and Ohio), so the vaccine guidance discussed will focus on states within this region. In Ohio, pharmacists may administer any CDC recommended vaccine, including the influenza vaccine, to persons aged 7 and older without a prescription with informed parental consent in those under age 18. This differs slightly in the state of West Virginia, as persons must be 18 and older to receive an influenza vaccine without a prescription and between ages 11 and 18 with a prescription. During the COVID-19 pandemic, the Public Readiness Emergency Preparedness (PREP) Act allowed pharmacists nationwide to administer any CDC recommended vaccination without a prescription to those ages 3 through 18, when specific requirements were met.[7]Previous policy changes, which grant pharmacists the ability to more readily administer vaccines, were associated with nationwide long-term immunization rate increases of 2.2% to 7.6% in the number of adults aged 25 to 59 years receiving influenza immunization.[8] Pharmacists have proven to be a useful resource for the community and are more accessible than other healthcare providers. One 2016 study found that 82% of patients are not up to date with their vaccinations and could utilize pharmacy involvement.[9]

With the 2020-2021 influenza season the COVID-19 pandemic presented a new barrier to influenza vaccination. Prior to 2020, studies have identified barriers to vaccine administration as being utility, past behavior, knowledge, and experience. Other barriers to consider include physical determinants such as BMI, physical activity, and sociodemographic factors such as living arrangements and age.[10]

The 2020-2021 pandemic was a result of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was traced back to December 2019 in Wuhan, Hubei, China. As of June 2021, more than 175 million cases have been reported across 188 countries and territories, resulting in more than 3.75 million deaths. The most common symptoms of this illness are fever, cough, fatigue, ageusia, anosmia, and dyspnea. These symptoms may be mild, but can progress to septic shock, clotting disorders, and death. The virus is spread through three primary ways including inhalation of respiratory droplets, the deposition of particles in the mouth, nose, or eye, and by touching mucous membranes with hands that have been contaminated with virus-containing respiratory fluids or surfaces.[11,12]

Data from the 2009-2010 H1N1 pandemic may serve as a guide for the COVID-19 pandemic. This data from the H1N1 pandemic indicates that patients received the seasonal influenza vaccination more frequently than the previous year, prior to the pandemic. Rates were reported in 2008-2009 as 22.1% for persons aged 18-49 without high-risk conditions and 28.4% in 2009-2010. For those aged 18-64, influenza vaccination rates were 42.3% from 2008-2009 and 45% for 2009-2010. Coverage for persons aged 65 and older was similar between the two years with 67.1% and 69.6% respectively, statistical significance not reported.[13,14] These numbers may serve as a prediction for COVID-19 pandemic effects on influenza vaccination rates.

The World Health Organization (WHO) issued a public guidance to frequently wash hands, maintain a distance of six feet or greater from others, self-quarantine, and to wear a face covering such as a scarf or face mask while in any public area to decrease the spread of this highly contagious virus.[15] The West Virginia and Ohio governors issued statewide mandates to require face coverings in all public areas and placed limitations on social group gatherings.[16,17] The coronavirus pandemic has posed an additional barrier to vaccination as more persons chose to stay indoors and forego routine health screenings and medication retrieval. Non-influenza childhood vaccinations have decreased nationwide by a cumulative rate of 3.5 million doses since the national emergency was declared on March 13, 2020.[18] It has been proposed that mass influenza vaccination may significantly alleviate pressure on healthcare facilities with the timing of the coronavirus pandemic and influenza season coinciding.[19]

The CDC has issued interim guidance on administering influenza vaccines amidst the pandemic.[20] Some of the items include the offering of specific appointment times, limiting the overall number of patients at any given time, setting up a unidirectional flow through the site, arranging a separate vaccination area or separate hours for persons at increased risk, and selecting a space large enough to ensure a minimum distance of 6 feet between patients in line or in vaccination waiting and observation areas. The CDC has also promoted influenza vaccination for the 2020-2021 season by releasing a digital education campaign to the general public, as well as those at an increased risk of complications from influenza and COVID-19.[20] Included in this campaign were special educational efforts regarding the importance of flu vaccination aimed to inform the general population, those with underlying health conditions, and African American and Hispanic audiences. Lastly, updates to vaccination websites that highlight the safety precautions being implemented in healthcare facilities during the pandemic were developed for the general public and providers alike.[20]

The large pharmacy chain regions implemented measures to help avoid close contact with individuals. This included providing a QR code that patients were able to scan allowing them the ability to fill out the vaccine consent form online prior to arrival for a vaccine appointment and allotting adequate spacing of people at least six feet apart in the waiting area.

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Furthermore, pharmacists were required to wear a face shield and mask while administering vaccinations. This study aimed to identify the effect of the COVID-19 pandemic on influenza vaccination rates, vaccine appointments, and overall patient safety/satisfaction with the process.

Objectives

The primary objective of this study was to determine the impact of the COVID-19 pandemic as a factor on influenza vaccination rates in comparison to the previous year, (2019-2020 versus 2020-2021 season) and to compare the number of scheduled patient appointments versus walk-ins.

The secondary objective of this study was to evaluate patient satisfaction with the 2020-2021 influenza vaccination season process.

Methods

Design: This study was a systematic review acknowledged by the West Virginia University Institutional Review Board.

Patient Selection: Participants were included in this study if they received an influenza vaccine through any of the six regional pharmacy chain locations, including any off-site clinics that were conducted. These six stores are located in the Mid-Ohio Valley and include stores from both Ohio and West Virginia chosen due to proximity of home store location. There were no exclusion criteria for the primary outcome. Patients were excluded from the survey component of the study if they were under the age of 18.

Influenza vaccine data was collected from the online large pharmacy chain database from the first week in September and the last week in December 2019-2020 (September 1st, 2019 to January 5th, 2020) and from the same weeks of the 2020 to 2021 influenza vaccination season (August 29th, 2020 to January 1st, 2021). These weeks were numbered from week 1 to week 12. The data from the 2020 to 2021 influenza vaccination season also included whether or not the appointment was conducted via a scheduled appointment or as a walk-in. The previous season was compared to the most current season as a percent increase or percent decrease. The calculation is shown below:

Percent Increase: [(2020-2021 influenza vaccinations- 2019-2020 influenza vaccinations)/ 2020-2021 influenza vaccinations] x 100

This study also included a voluntary survey to be completed by the patient. A member of the research team visited each of the six of the large pharmacy chain locations within the Mid-Ohio Valley area including stores 1 (West Virginia), 2 (West Virginia), 3 (Ohio), 4 (Ohio), 5 (West Virginia), and 6 (Ohio). The researcher instructed each of the staff members and pharmacist in charge (PIC) about how to follow the written dialogue prompt outlining how to scan the QR code or type in the URL to access the survey at the point of sale when speaking with patients. Each store was provided with 500 paper copies containing a survey link and QR code to be attached to the patient's influenza receipt at the register. The survey is attached below (Attachment A). The results of the survey were collected via Qualtrics and added to an Excel Spreadsheet.

Results

Primary Outcome:

The six stores identified showed an overall 7.6% increase in influenza vaccination rates from the 2019-2020 season to the 2020-2021 season (p-value= 0.73). The biggest average percentage increase occurred during Week 1 with an average 299.64% increase. During Week 9, the largest percentage decrease was observed with an average of -55.76% in influenza vaccinations between the six locations. The overall average percent change for the stores respectively were Store 1: 22.78% increase (p=0.21), Store 2: 16.74% increase (p=0.62), Store 3: 15% increase (p=0.69), Store 4: 2.11% increase (p=0.87), Store 5: 1.25% increase (p=0.56), and Store 6: 38.94% decrease (p=0.32) as shown by Figure 1. Between the six stores, an average of 79.67% of patients walked in to receive their vaccination and an average of 20.33% of patients made vaccination appointments (p=0.0055) as shown in Table 1.

Secondary Outcome:

The key results of the survey are summarized in Table 2. There were a total of 15 survey respondents amongst all of the stores representing < 1% of the total vaccine recipients. Results revealed that 100% of the patients were at least slightly comfortable with the vaccination process and very satisfied overall. The majority of responders were between ages 18-49 with 60% of them being female. Half of the responders receiving their flu shot with the large pharmacy chain the previous year. There were no recommendations made regarding improvement for future vaccinations.

Discussion

This is the first study of its kind to analyze how the recent COVID-19 pandemic has impacted influenza vaccination rates at pharmacies within a large pharmacy chain. Patients were encouraged to stay home, but also to maintain a healthy lifestyle and practice preventative measures to decrease the potential for contracting COVID-19. It was hypothesized that the COVID-19 pandemic would lead to an increase in influenza vaccination rates. The overall 7.6% increase in influenza vaccination rates at the study locations did not appear to be statistically significant with a p-value of 0.72. There were many potential factors that contributed to this increase in influenza vaccination rates and to the lack of statistical significance, which will be discussed below.

One strength of this study was the inclusion of all patients who received an influenza vaccination within the study locations. This allowed for a larger sample size to compare the two influenza vaccination seasons. Furthermore, this more accurately represented the patient populations in the Mid-Ohio Valley area. One area for future research may involve conducting a retrospective analysis to compare patient

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demographics in regards to age, sex, and the location of the patient's home.

This would also help determine if the increase was in part due to the expansion of pharmacists' ability to vaccinate younger patients in both states where the studied pharmacies were located. The 7.6% increase in influenza vaccination rates is comparable to the 4.8% increase in influenza vaccination rates observed during the 2008-2009 H1N1 pandemic. This suggests that patients may be more likely to exercise precautionary measures amidst a global pandemic, such as receiving an influenza vaccination.

Despite the overall increase, there was a large percentage decrease in Store 6 in influenza vaccination rates. This store location differs from the others in that it is located within a hospital and not within a typical store chain location. During the previous influenza season, many hospital employees would receive their influenza vaccine through this regional pharmacy, but many received them through the hospital during the 2020-2021 influenza vaccine season. Additionally, off-site pharmacy influenza vaccination clinics were halted throughout the 2020-2021 influenza vaccination season to ensure provider and patient safety. This halt led to an overall substantial decrease in patient vaccination opportunities particularly at this site. Overall, the number of hospital employees and patients visiting this location drastically decreased due to work from home capabilities for hospital employees and decreased hospital inpatient census with limitations on non-urgent medical procedures.

One limitation of this study was the large variance in the percentage change from each week. This change was particularly evident in the beginning and towards the end of the influenza vaccination season. The majority of pharmacies had an overall increase in the earlier weeks and overall decrease in the final weeks of data collection. This early increase and late decline could be due to the guidance to get an influenza vaccination earlier in the season due to fear of running out of vaccines towards the end of the vaccination season. The influenza vaccine (Fluzone High Dose-Sanofi Pasteur) was in short supply at locations within the Mid-Ohio Valley prior to the end of the influenza vaccine season. This decreased availability led to some elderly individuals receiving their influenza vaccination at an alternative vaccination location.

Historically, patients would walk into a regional pharmacy within this chain to receive their vaccines without an appointment. Despite advertisement and company-wide encouragement, the majority of patients still chose to walk-in rather than make a vaccination appointment. The lack of appointment utilization may be due to many of the patients not being able to navigate the online appointment process, as well as some patients remaining uninformed about this option. Requiring an appointment for vaccination is an area of future research to allow pharmacies to adequately staff and prepare for the number of patients.

The survey revealed that patients overall were comfortable with coming into the pharmacy during a pandemic to receive the vaccine despite the recommendation for individuals to practice precaution with sanitization and to limit public outings. The large portion of younger respondents could be attributed to the electronic format for which the vaccine survey was filled out. The QR code and website may be more difficult for the elderly population to navigate, decreasing their ability to participate. There are multiple reasons that may have been attributed to lack of overall respondents including decreased survey flyer distribution within the pharmacy. This decrease in flyer distribution was observed at Store 5, as the influenza season continued. It is assumed that this also occurred at the other store locations. This reduction in the number of flyers received may also be due to patients not paying close attention to paperwork when receiving the vaccine and associates not effectively communicating the survey availability to the patient.

Further research is needed in the survey area and could include this upcoming 2021-2022 influenza season as COVID-19 related restrictions are being lifted, researching patients receiving the vaccine categorizing by demographics (age, gender, and ethnicity), and including a larger store sample size. Research could also be targeted towards the influenza vaccination rates with the COVID-19 vaccine now widely available. Future investigation may include distributing the vaccine survey electronically while the patients wait to receive the influenza vaccination.

Since the beginning of known civilization, there have been approximately seventeen pandemics that have impacted history.[21] When a pandemic arises, much is unknown and every facet of life becomes uncharted territory. Thus, when a pandemic such as the COVID-19 arises, there is great need for timely research and developments which can lead to positive health outcomes for all mankind. A study such as this paves the way for expansion of knowledge regarding vaccine hesitancy and vaccine administration amidst society modernization.

Conclusion

The six pharmacy locations within a large chain revealed that COVID-19 demonstrated an increase in influenza vaccinations. Although these results were not statistically significant, this study set the framework for future vaccination studies. These future studies may include conducting a similar study involving COVID-19 vaccinations during this upcoming influenza season, or, breaking down those who received the influenza vaccine by demographics. The voluntary survey revealed that respondents were comfortable with coming into the pharmacy to receive the vaccine during a pandemic. There remains a large opportunity to investigate how this pandemic has affected other pharmacy opportunities.

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Conflicts of Interest: There are no conflicts of interest to disclose.

Institutional Review Board: Comparison of the Seasonal Influenza Vaccination amidst the 2020 COVID-19 Pandemic within six Regional Community Pharmacies of a Large Pharmacy Chain was reviewed by the Human Subjects Office / Institutional Review Board at West Virginia University, which determined the project did not meet the regulatory definition of human subjects research and did not require approval by the IRB. This study is acknowledged by the West Virginia University IRB. The determination letter may be supplied if needed.

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Submission Declaration: The work described in this manuscript has not been published previously (except in the form of an abstract and published lecture), is not under consideration for publication elsewhere, its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder.

Previous Presentation: Virtual Poster Presentation, American Pharmacists Association (APhA) Annual Meeting, March 2021.

Data Transparency: Requests for data from the 2020 National Pharmacist Workforce Survey should be directed to the Principal Investigator, Haley Pressley, PGY1 WVU School of Pharmacy Community-based Pharmacy resident, 401 Matthew St, Marietta OH 45750, Email: haley.pressley27@gmail.com

Credit Author Contributions:
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Betsy Elswick: Writing, Reviewing and Editing, Supervision
Gretchen Garofoli: Reviewing and Editing, Supervision

The opinions expressed in this paper are those of the author(s).

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Figure 1a. These figures illustrate the percentage change (increase/decrease) from the 2019-2020 to the 2020-2021 influenza vaccination seasons separated by store

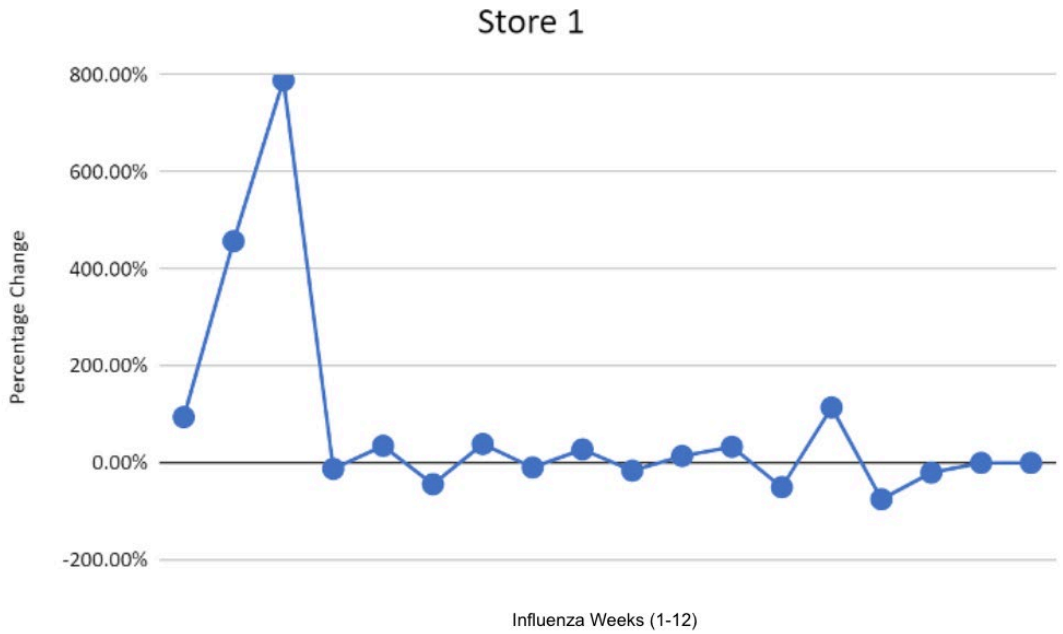

Figure 1b.

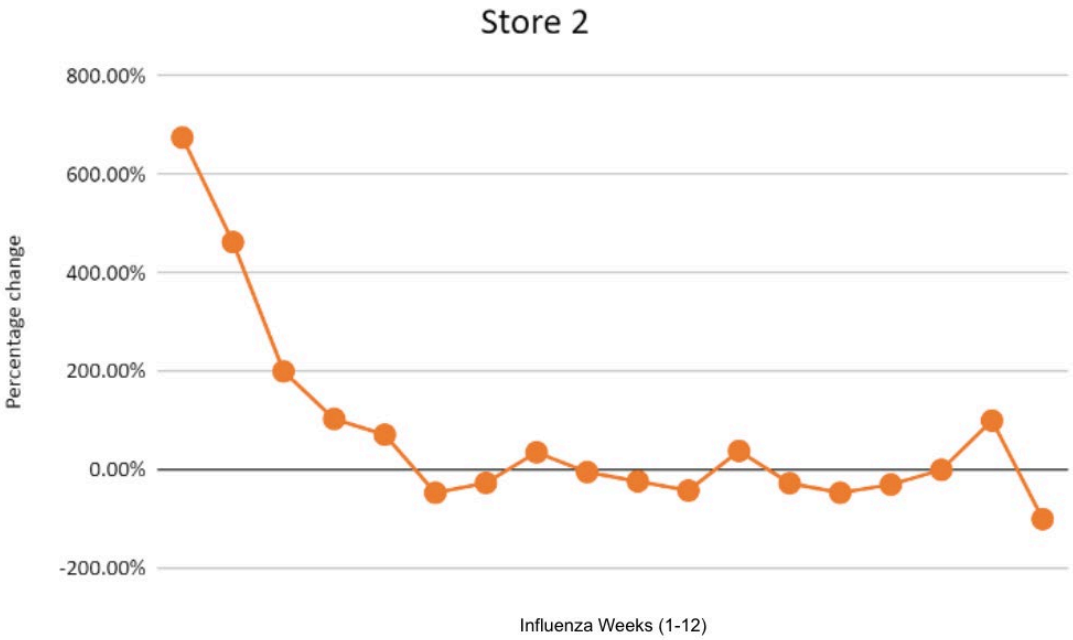

Figure 1c.

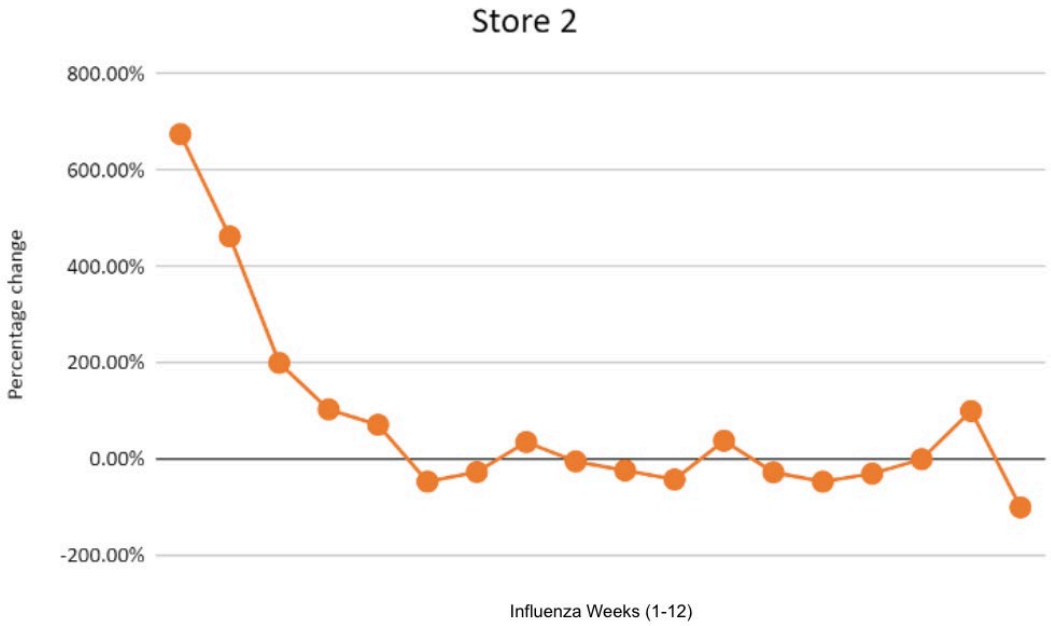

Figure 1d.

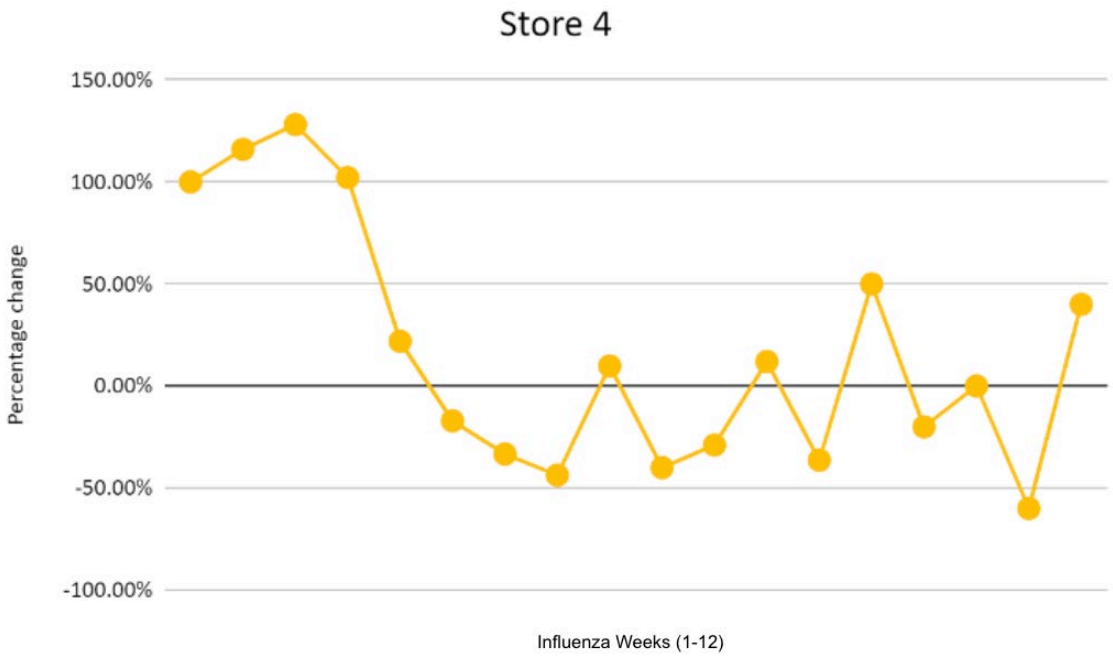

Figure 1e.

Figure 1f.

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Figure 1g.

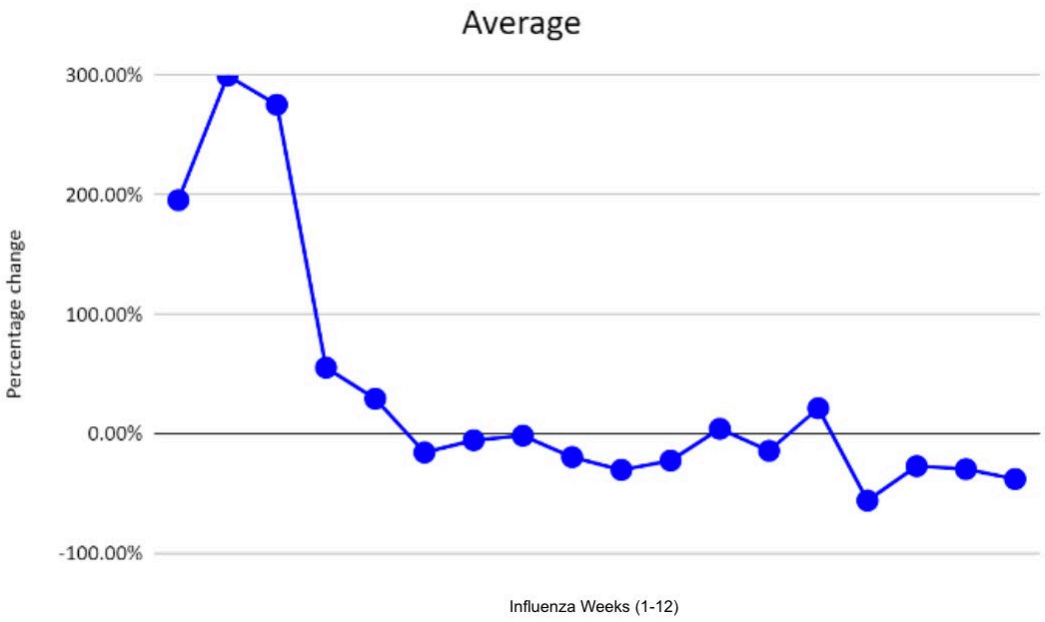
Average
300.00%
200.00%
100.00%
0.00%
-100.00%
Percentage change
Influenza Weeks (1-12)

Table 1: Nature of Influenza Vaccination (Walk-in vs. Appointment) in each Store

	Walk-in	Appointment
Store 1	88%	12%
Store 2	73%	27%
Store 3	82%	18%
Store 4	81%	19%
Store 5	82%	18%
Store 6	72%	28%

Figure 2. This figure shows the average percent change separated by store from the 2019-2020 to the 2020-2021 influenza vaccination seasons

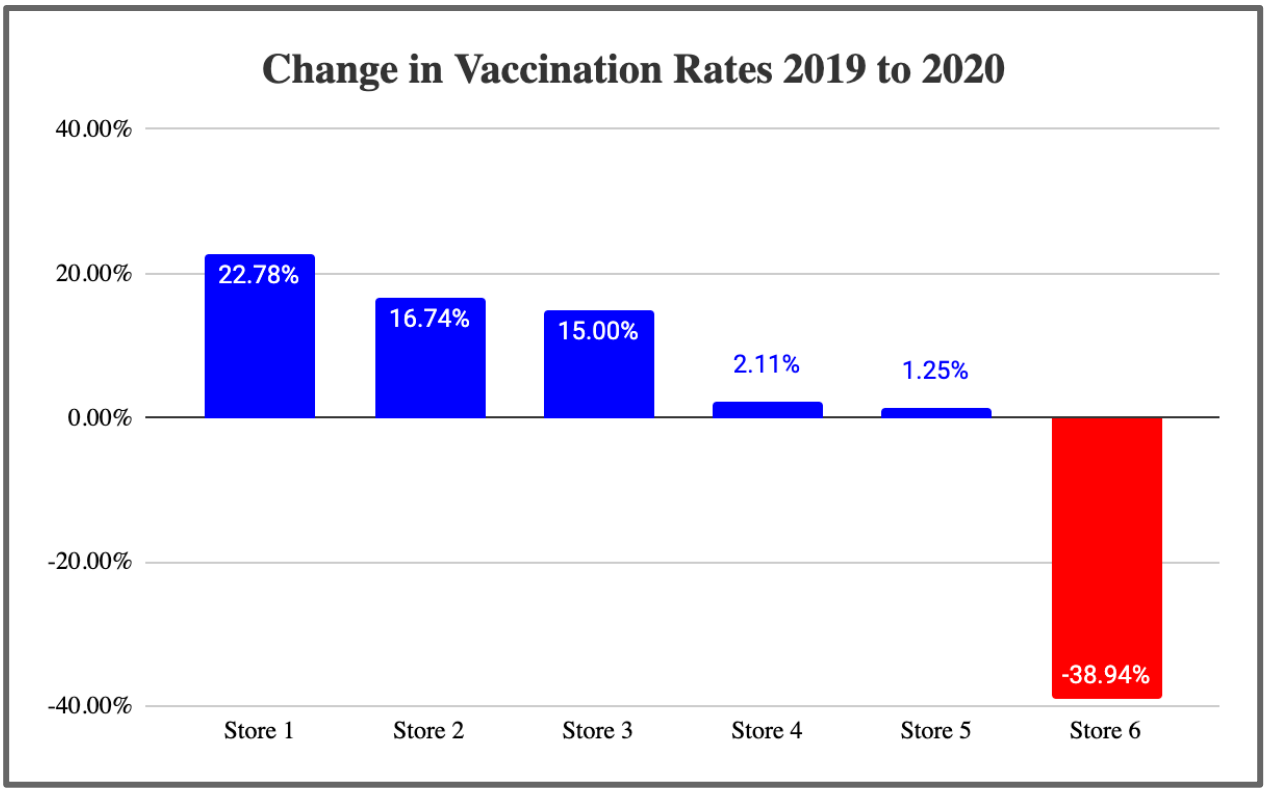

Table 2: Influenza Vaccination Voluntary Survey Results (n=15)

Q7: Nature of Vaccine?	By appointment: 4 (27%)	Walk-in: 11 (73%)		
Q8: Satisfaction?	Very Satisfied: 15 (100%)			
Q9: Registration process?	Much Better: 3 (20%)	Slightly Better: 4 (27%)	Neutral: 5 (33%)	No Response: 3 (20%)
Q10: Comfortability?	Very Comfortable: 12 (80%)	Slightly Comfortable: 3 (20%)		
Q11: Likeliness to receive from Kroger again scale 1-10?	10: 13 (86%)	8: 1 (7%)	No Response: 1 (7%)	

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Attachment A:

Influenza Research Survey

1. Did you receive your flu shot with Kroger last year (2019)?
    a. Yes
    b. No
2. If no to previous question, where did you receive your 2019 flu vaccine?
    a. Retail pharmacy
    b. Independently owned Pharmacy
    c. Physician/Provider office
    d. Health Department
    e. I did not receive the 2019 flu vaccine
    f. Other, Please Specify
    g. N/A (I received my vaccine at Kroger)
3. In what age range do you fall?
    a. 65 years of age or older
    b. 50-64 years of age
    c. 18-49 years of age
    d. prefer not to answer
4. Which ethnicity/race do you identify most closely with, select all that apply:
    a. American Indian or Alaska Native
    b. Asian
    c. Black or African American
    d. Hispanic or Latino
    e. Native Hawaiian or Pacific Islander
    f. White
    g. Prefer not to Answer
5. Which gender do you most closely identify with?
    a. Male
    b. Female
    c. Prefer not to Answer

The following questions will pertain to this year's seasonal influenza vaccine:

6. At which Kroger location did you receive your vaccine?
    a. 2007 7Th St. Parkersburg, WV 26101
    b. 930 Division St. Parkersburg, WV 26101
    c. 1008 Washington Blvd, Belpre, OH 45714
    d. 40 Acme St. Marietta, OH 45750
    e. 401 Matthew St. Marietta, OH 45750
    f. 106 McGraw St. Ripley, WV 25271
7. How did you arrange to receive your vaccine?
    a. By appointment
    b. Walk-in
    c. Flu shot clinic
    d. Other, Please Specify:
8. How satisfied were you with the overall experience?
    a. Very satisfied
    b. Slightly satisfied
    c. Neutral
    d. Slightly unsatisfied
    e. Very unsatisfied
9. How did your vaccine registration process (through the phone QR code) compare to previous flu vaccinations?
    a. Much better
    b. Slightly better
    c. Neutral
    d. Slightly worse
    e. Much worse

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10. How comfortable were you with coming into the pharmacy during the pandemic?
    a. Very comfortable
    b. Slightly comfortable
    c. Neutral
    d. Slightly uncomfortable
    e. Very uncomfortable
11. How likely are you to receive a vaccine from us again? scale 1-10
12. Do you have any recommendations or comments to help us improve the vaccination process?

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