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**Implementation of a Quality Improvement (QI) Intervention to Increase Influenza
Vaccination Uptake in a Pediatric Primary Care Setting**

by


Lisa C. Gaines

Paper submitted in partial fulfillment of the
requirements for the degree of

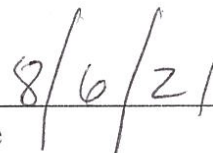
Doctor of Nursing Practice

School of Nursing, University of Louisville

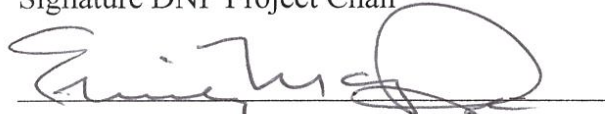
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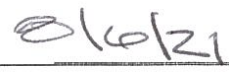
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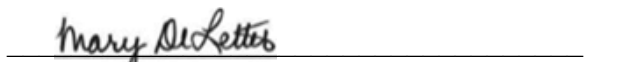
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Signature Program Director

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Abstract

Background: Internal and external evidence demonstrates that there is a suboptimal uptake of influenza vaccination (flu vaccine) in all settings, despite national objectives to achieve 80%-90% immunization rates across all populations. In 2002, the Advisory Committee on Immunization Practices (ACIP) issued a recommendation that all children 6 months of age and older be immunized annually with the influenza vaccine. Despite these recommendations, influenza vaccination is not required for school entry in the Commonwealth of Kentucky and immunization rates continue to fall below local, state, and national targets. Being considered an optional vaccine leaves the decision to vaccinate (or not) up to the discretion of the parent(s). Many parents choose not to vaccinate their child(ren) with the flu vaccine, leaving those children vulnerable to infection during flu season (approximately October – May).

Setting: This project will take place at a private pediatric practice located in Louisville, KY. This practice currently has three providers: one physician (MD) and two physician assistants (PA). The target population will be all pediatric patients eligible to receive influenza vaccination (6 months – 17 years of age) that present to the clinic during the QI project period. All interventions will take place within the current flu season, a designated time block between October and May.

Purpose: The purpose of this quality improvement (QI) project is to increase influenza vaccination uptake among all pediatric patients eligible to receive the vaccine. Measures to enhance uptake will include: providing all parents with an educational piece addressing influenza infection and vaccination, addressing erroneous attitudes and beliefs surrounding the vaccine, and targeted provider communication to vaccine-hesitant parents.

Methods: This 6-week quality improvement (QI) project is separated into a 3-week pre-intervention period and a 3-week intervention period. Upon checking into the clinic, patients will

be screened for flu vaccine eligibility and given an educational pamphlet regarding influenza infection and vaccination. Vaccine-eligible patients will be prompted for intent to vaccinate during current visit, tracked during the visit, and marked for further intervention by providers (during intervention period). Vaccination rates will be recorded and compared between pre-intervention period (does not include provider-prompted intervention) and intervention period.

Measures: Outcomes measured in this project will include number of patients that received the flu vaccine (subdivided by intent to vaccinate at check-in) during intervention and pre-intervention periods. Statistics will be tracked as an aggregate and also by provider.

Keywords

Quality improvement, intervention, flu, influenza vaccination, uptake, ACIP

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Background

What many individuals refer to as “the flu” is a highly-contagious respiratory virus that infects the nose, throat and (sometimes) lungs. (CDC, 2019a). The viruses that cause the “flu” are influenza viruses, and there are two primary types (A and B) that are responsible for the annual flu epidemics (CDC, 2019b). Disease severity can vary greatly following infection. As such, influenza continues to be a significant cause of morbidity and mortality each year in the United States (CDC, 2018). As an example, for the 2017-2018 Influenza season beginning in November 2017, the CDC estimated that there were 48.8 million people infected with influenza (11.5 million of which were children), 959,000 people hospitalized due to influenza infection, and 79,400 influenza-related deaths (CDC, 2018). Rates of hospitalization are typically higher among very young (< 2 years) and very old (≥ 65 years) patients. In 2017-2018, the rates of influenza-related hospitalizations were at the highest rates recorded since hospital-based surveillance expanded to record data on all age groups (CDC, 2018). Furthermore, the 2017-2018 influenza season represented the highest disease burden of influenza in the United States since the 2009 H1N1 pandemic, where an estimated 60 million were infected (CDC, 2018).

Administration of the flu vaccine is the most effective way to prevent morbidity and mortality related to influenza (CDC, 2019c). This is especially true amongst groups that are classified as “high risk” by the Advisory Committee on Immunization Practices (ACIP), a subcommittee of the CDC responsible for issuing recommendations on all U.S.-licensed vaccines approved for use by the Food and Drug Administration (FDA) in the United States (CDC, 2019c). Higher risk populations are more likely to suffer from medical complications if infected with severe influenza (CDC, 2019c). As a result, ACIP has stated that vaccination among high-risk populations is “particularly important” (CDC, 2019c). The most recent ACIP guidelines

identify the following groups as high risk (CDC, 2019c): Children aged 6 – 59 months, all persons ≥ 50 years, adults and children who have chronic pulmonary (including asthma), cardiovascular, renal, hepatic, neurologic, hematologic, or metabolic disorders (including diabetes mellitus), immunocompromised persons, women who are or will become pregnant during influenza season, children and adolescents who may be at risk for Reye’s syndrome following influenza infection, residents of nursing homes/long term care facilities, American Indians/Alaska natives, and individuals who are morbidly obese ($BMI \geq 40$). These groups are also fairly consistent with the groups considered a priority to receive an annual influenza vaccination by the World Health Organization (WHO) (Chinnis, Sterrett, Deas, Smith & Conner, 2017). While high risk groups remain a priority, annual influenza vaccination is recommended to *all* individuals aged 6 months or older who do not possess a contraindication to being vaccinated (CDC, 2019c).

The annual economic cost of seasonal influenza in the United States is estimated to be \$87.1 billion, \$10.4 billion of which represent direct medical costs (CDC, 2013). While there is a significant economic, safety, and disease burden impact associated with influenza, vaccination coverage remains “suboptimal” nationwide (CDC, 2013). Healthy People 2020 – an evidence-based, 10-year setting of national objectives aimed at improving the health of all Americans (ODPHP, 2019a) - set the following goals as national objectives by 2020: (1) Increase the rate of influenza vaccination among children and non-institutionalized adults (18-64) to 80%; (2) Increase the rate of influenza vaccination among “high-risk” and institutionalized persons to 90%, and; (3) Increase the rate of influenza vaccination amongst health care personnel to 90% (ODPHP, 2019b)

Despite these national objectives, vaccination coverage during the 2017-2018 Influenza season was far below these targets. Nationally, coverage amongst children 6 months – 17 years was 62.6%, a 4.7 percentage point increase from the previous season (CDC, 2019d). Among adults, the coverage rate is significantly lower at 45.3%, an 8.2 percentage point increase from the previous season (CDC, 2019d). Wide variation in coverage was observed between states (from 33.9% - 81%), with Kentucky weighing in around the national average at 64.8% for children and 45.4% for adults (CDC, 2019d). To increase these rates, the CDC strongly suggests that health care providers (HCPs) take an active role in increasing these rates by offering influenza vaccination at routine visits and hospitalizations (CDC, 2019d).

In the Commonwealth of Kentucky, influenza vaccination is not required for school entry. Not being required for school entry is one local barrier to achieving optimal influenza vaccination rates. Being considered an optional vaccine leaves the decision to vaccinate (or not) to the discretion of the parent(s). Many parents choose not to vaccinate their child(ren) with the flu vaccine, leaving those children vulnerable to infection during flu season (approximately October – May). Other identified barriers to flu vaccination include specific attitudes and beliefs surrounding influenza and/or the vaccine.

Rationale

Given internal and external barriers to influenza vaccination well-established in literature, this quality improvement (QI) project seeks to identify influenza vaccine-hesitant parents, provide them with education surrounding influenza infection and the benefits of vaccination, as well as prompt providers to initiate further discussion exploring attitudes and beliefs that are contributing to vaccine hesitancy.

There has been a significant amount of research suggesting there are specific attitudes and barriers uniquely associated with the influenza vaccine (Rogers, Bahr & Benjamin, 2018). This was confirmed after conducting a Needs Assessment at the QI project setting prior to project inception. As a pediatric primary care practice, immunizations are a key component of the services that are offered. During well child visits, parents are educated about the importance of receiving all vaccines recommended by the ACIP, regardless of requirements for school entry. Education efforts can range from very successful (parent opting in to all recommended vaccines) to less successful (parent opting only to receive vaccines that are required for school entry). One of the vaccinations with the highest declination rate is the annual Influenza vaccine.

When conducting interviews with the key stakeholders involved in patient care (the three providers currently on staff - one MDs and two PAs) about the specific reasons of flu vaccine declination, the most common responses included: (1) “I don’t believe in the flu vaccine”; (2) “The only time I ever got the flu shot was the only time I ever got the flu”; (3) “I never get the flu shot and I never get sick”; and (4) “I heard that getting the flu shot causes the flu.” A review of the literature revealed many of the same attitudes associated with influenza vaccination. Specific barriers identified ranged from misconceptions about the flu vaccine and associated side effects to beliefs questioning the efficacy of the vaccination to lack of receiving a recommendation from the health care provider (HCP) during a visit.

The National Flu Survey (NFS), one data source utilized by the CDC to determine influenza vaccination coverage, measured that 86.8% of adults rated the influenza vaccine as very or somewhat effective, but only 47% believed that their chance or risk for getting ill with influenza if unvaccinated was high (CDC, 2013). 29.6% of adults surveyed worried about getting influenza from the influenza vaccine (CDC, 2013). And surprisingly, 47.5% of health care

personnel surveyed shared this belief (CDC, 2013). This may be one of the first barriers to increasing immunization rates – if a significant number of health care personnel believe the vaccination may cause influenza infection, they may not recommend the vaccine to patients. One study suggests this may be the case – among adults surveyed by the NFS that had a physician visit during the influenza season, only 43.8% reported that their HCP recommended an influenza vaccination (CDC, 2013).

Purpose

The purpose of this quality improvement project is to increase influenza vaccination uptake among all pediatric patients eligible to receive the vaccine. Internal and external evidence documents suboptimal influenza vaccine uptake nationwide, despite Healthy People 2020 targets of 80-90% coverage. Influenza vaccination is not required for school entry in the Commonwealth of Kentucky, leaving the decision to vaccinate to the discretion of the parent. Not mandating this vaccine has presented a barrier to achieving optimal vaccination rates at the clinical practice setting of this project. Additionally, specific parental attitudes and beliefs about influenza and/or the flu vaccine have further contributed to suboptimal uptake. Measures to increase flu vaccine uptake will include: 1) Identifying parental attitude about influenza vaccination upon sign-in to clinic; 2) Presenting materials to educate parents/patients about influenza infection and the flu vaccine; 3) Providing targeted, provider-led communication intervention to vaccine-hesitant parents; and 4) Maximizing influenza vaccination rate to all eligible patients. One of the key findings for this intervention will be to evaluate the efficacy in changing parental attitudes following provider-directed intervention to vaccine-hesitant parents.

Setting

The project will take place at a private, pediatric primary care clinic located in Louisville,

KY that was first established in 1984. There are currently three providers on staff: one physician (MD) and two physician assistants (PAs). The population that this practice serves are individuals from 0 to 21 years of age. The target population for this project will be pediatric patients eligible to receive the flu vaccine (6 months – 17 years of age) that present to the clinic during flu season. Participants included in this project are: parents of patients, patients, front office staff members, clinical staff members, providers and management personnel.

Ethics

This proposal was submitted to the University of Louisville IRB for approval prior to implementation. The project was reviewed on February 1, 2021 and approved to move forward February 2, 2021. Additionally, this project received approval for implementation from the Chief Medical Officer (CMO) and Practice Manager of the pediatric primary care clinic.

Conceptual Framework

The Health Belief Model was utilized to guide this quality improvement project and corresponding intervention. First proposed in the 1950s, the Health Belief Model seeks to understand health-seeking behaviors (Grim & Hertz, 2017). Specifically, it aims to evaluate what factors motivate (or do not motivate) individuals to make decisions related to their health. This model theorizes those decisions are made based on the following constructs: 1) Perceived susceptibility; 2) Perceived severity; 3) Perceived benefits; and 4) Perceived barriers (Grim & Hertz, 2017). Placing these constructs in the context of this quality improvement intervention, relevant questions to address regarding acceptance/decline of the flu vaccine may include: 1) Does the parent believe their child is at risk of contracting influenza?; 2) Does the parent believe that influenza is a severe illness?; 3) Does the parent believe that the flu vaccine will be beneficial to their child?; and 4) Are there any attitudes or beliefs in place that make the parent

less likely to immunize? This quality improvement project will seek to explore these attitudes and beliefs through the multiple touchpoints of the intervention, then provide education and targeted communication to encourage health promotion and disease prevention.

Literature Review

A review of the literature revealed numerous studies aimed at increasing influenza vaccination uptake in pediatric populations. While there was a great deal of variation in interventions and techniques employed, every study asserted that influenza vaccination uptake was suboptimal in their pediatric population of interest. For this synthesis, a literature review was conducted for articles and studies between 2010 and 2020. The databases surveyed included all of those associated with the University of Louisville Health Sciences Libraries, including, but not limited to: PubMed, CINAHL, the Cochrane Library, and MEDLINE via Ovid. The search was limited by the following search terms: ti:("influenza vaccination" OR "influenza immunization") AND kf:("pediatric" OR "children") AND kw:("high risk") AND kf:("Intervention"). The initial search yielded 34 studies. After further limiting the search to full-text articles written in English and published within the last ten years, there were 18 articles remaining. After reviewing the abstracts of the 18 studies, 13 were eventually excluded, leaving five studies for synthesis.

Of the five articles synthesized, two were systematic reviews (Aigbogun, Hawker, & Stewart, 2015; Cooper & Walton-Moss, 2013), one was a randomized-controlled trial (RCT) (Dombowski, Harrington, Dong, & Clark, 2012), one was an experimental study (Grivas, et al., 2017), and one was a before-and-after observational study (Patwardhan, Kelleher, & Cunningham). Of note is that three of the five studies were published more than five years ago. A search of the literature with parameters given in this section, but restricted to publish dates

within five years, did not yield an adequate number of studies to conduct a synthesis of the literature. For this reason, the publishing date range was expanded to the last ten years. Also important to note is that this literature synthesis was focused on pediatric patients that were considered “high risk.” The specific populations addressed within these studies included the following: children with asthma, cancer, rheumatic disease, and other chronic conditions.

There were five topics consistently addressed in each of the studies included in this synthesis: (1) There is a higher associated risk of morbidity and mortality in high-risk pediatric patients who are infected with influenza; (2) There is a suboptimal influenza vaccination rate among the high-risk pediatric patient population; (3) There are specific interventions targeted at high-risk pediatric populations that can increase influenza vaccination uptake; (4) Following targeted interventions towards high-risk pediatric patients, there was a heterogeneity study outcomes; and (5) There is further research needed in this area to identify “best practice” interventions that will result in statistically significant improvements in influenza vaccine uptake among the high-risk pediatric population.

The literature unanimously reported that there is a higher risk of morbidity and mortality related to influenza infection for children with high-risk conditions (HRCs). While the spectrum of high-risk conditions varied among children, all studies established higher rates of acute sickness and death related to influenza infection when compared to “healthy” children. The literature synthesized was also unanimous in demonstrating suboptimal rates of influenza vaccination among this population of children. Reported influenza vaccination rates for children with HRCs fell short of reported study targets, as well as national and international goals (e.g. as set forth by the CDC or WHO).

There were a variety of interventions that were studied in the literature synthesized. There were single- and multi-component interventions studied, with a heterogeneity of outcomes reported. There were several single-component interventions (reminder notices, recall notices, and EHR prompts) that yielded statistically significant increases in influenza vaccination uptake, although study methodologies differed (Aigbogun et al., 2015; Cooper & Walton-Moss, 2013; Dombowski et al., 2012; Grivas et al., 2017; Patwardhan et al., 2011). Similarly, there were some multi-component strategies that also demonstrated statistically significant increases in uptake (Aigbogun et al., 2015). However, there were also single- and multi-component strategies (Aigbogun et al., 2015) that did not yield statistically significant increases in uptake and/or had conflicting outcomes. The heterogeneity of study outcomes does not allow for generalizing of results.

A consistent assessment by all authors included in this synthesis is that there is more research needed in the area of increasing influenza vaccination rates among children with HRCs to determine the most effective methods and modalities. Among this population and subject matter, there are a very small amount of systematic reviews that have been published and no meta-analyses that could be found during the literature search. Reference to the heterogeneity of study designs was frequently cited as a reason meta-analysis could not be performed, and that results from systematic reviews be generalized with caution. A review of future research recommendations by authors at the conclusion of their studies yielded several common observations. A synthesis of this information included the following future research suggestions going forward: (a) determining if adding a telephone reminder with a reminder letter further increases influenza vaccination rates, (b) direct comparison of single intervention methods to assess most effective modality, (c) standardizing and comparing multi-component strategies to

identify incremental benefits of individual components, (d) more research studies that take place over multiple influenza seasons, (e) more studies that directly coincide with the availability of the influenza vaccine at the beginning of flu season, and (f) data collection of parental knowledge and attitudes in conjunction with influenza vaccine interventions.

Intervention

This quality improvement (QI) project was a multi-focal intervention intended to increase influenza vaccination uptake among all patients that present to the pediatric primary care clinic within influenza season. Personnel involved in interventions included front office staff members and three providers (one MD and two PAs). Interventions took place over a three-week period of time (intervention period), immediately preceded by a three-week period in which baseline data was collected (pre-intervention period). Front office staff members were responsible for informing parents that the flu vaccine was available, prompting and documenting a decision to vaccinate at current visit, as well as disseminating educational materials regarding influenza infection and the vaccine. Providers were responsible for providing targeted education to vaccine-hesitant parents.

Implementation Timeline

IRB approval was obtained February 2, 2021. The three-week pre-intervention period began on the agreed upon date as permitted by the CMO and Practice Manager of the pediatric clinic following IRB approval. The three-week pre-intervention period commenced on March 5, 2021. Subsequently, the three-week intervention period immediately followed the baseline (pre-intervention) period, beginning on March 29, 2021. The total study length amounted to six weeks. At the conclusion of the study, data was analyzed and results disseminated to the pediatric primary care clinic and DNP project committee.

Feasibility & Sustainability

This QI project required involvement by staff members over the course of six weeks. Staff members involved included three front office personnel and three providers. Staff members were compensated as normal during these time periods. Project training for all stakeholders took place during a mandatory staff meeting prior to the implementation of the baseline period.

Budget

This QI project had no cost to the intervention site. Stakeholders were compensated for their regular duties by the pediatric primary care clinic and agreed to participate in this project with no additional remuneration. No grants or additional funding was applied for or was received in relation to implementation of this project. The graduate student investigator was responsible for providing training and education in preparation for this project without compensation. No study participant will be provided compensation.

Methods

On Day 1 of baseline data collection period (pre-intervention period), providers will be given a questionnaire to complete to assess knowledge and attitudes related to influenza vaccination. Parents were prompted at check in that the flu vaccine was now available, given an educational piece (*Flu: A Guide for Parents*, a brochure published by the CDC), then asked about intent to vaccinate at the current visit. Dependent on parent response, superbills were subsequently flagged with the red, yellow, green or purple stickers. Parents who responded affirmatively to vaccination at the current visit had a green sticker affixed to the patient's superbill. Parents who declined vaccination had a red sticker affixed to the superbill. Parents who were undecided about vaccination had a yellow sticker affixed to the patient's superbill. If the parent indicated the child had already received their influenza vaccination for the current flu

season, a purple sticker was affixed. At the conclusion of the visit, it was documented if the patient received the influenza vaccination. During the baseline period, no further interventions took place.

On Day 1 of the intervention period, parents of all vaccine-eligible patients that presented to the clinic for an appointment were given the same brochure offered during the baseline period, as well as being informed that the flu vaccine was in stock and available. When prompted as to parental intent to vaccinate at the current visit (consistent with pre-intervention period), superbills were again affixed with stickers to indicate their response. Red, yellow, green and purple stickers were again utilized for this process.

During the intervention period, the color of the sticker affixed to the superbill prompted the subsequent, provider-directed intervention. If a yellow or red sticker was present on the superbill (indicating unsure about vaccination or declination, respectively), the provider: (1) Explored specific reasons of vaccine hesitancy; (2) Provided targeted education that addressed concerns; (3) Reassured the parent regarding the safety and efficacy of the influenza vaccine; and (4) Re-offered vaccination. All questions addressed and guidance provided throughout the visit were based on best practice guidelines as published by the American Academy of Pediatrics (AAP) and ACIP.

Measurement

On Day 1 of the pre-intervention period, a survey was distributed to the health care providers to assess knowledge, beliefs and attitudes surrounding influenza vaccination. Specific items explored included: influenza vaccination status, personal motivations to vaccinate (or not), beliefs about who should drive influenza vaccination decisions in practice, why immunizing health care workers is encouraged, methods of communicating with patients about importance of

receiving influenza vaccination, awareness of current ACIP guidelines, and barriers currently face in practice to influenza vaccination. These specific topics were chosen to assess if providers' personal knowledge, beliefs and attitudes affected influenza vaccination uptake during this QI project. The survey distributed was modeled from a similar instrument utilized in Saudi Arabia for a multi-center, cross-sectional study (Alshammari et. al, 2019). The author was contacted prior to the implementation of this project for permission to use and adapt the instrument for the purposes of this study. Permission was granted November 27, 2020.

During both the pre-intervention and intervention periods, the following data was collected and recorded: (1) Total # superbills with a purple sticker; (2) Total # superbills with a green sticker that *received* flu vaccination; (3) Total # superbills with a green sticker that *did not receive* flu vaccination; (4) Total # superbills with a yellow sticker that *received* flu vaccination; (5) Total # superbills with a yellow sticker that *did not receive* flu vaccination; (6) Total # superbills with a red sticker that *received* flu vaccination; (7) Total # superbills with a red sticker that *did not receive* flu vaccination; and (8) Provider. All superbills also had the following non-identifiable demographic data extracted and recorded: age, gender (or gender identification), and race. Patient ID numbers were also collected for data verification purposes only. Data recorded was kept on a spreadsheet in a secure drive on a HIPAA-compliant, secure, private server. Access to this data was restricted to front office team members that participated in data collection.

At the conclusion of the QI project, a hand-review of Superbills was conducted to verify that information that had been collected and recorded in spreadsheet form was consistent with the information/sticker present on the physical superbill. Validation of data was matched by Patient ID number.

Data Analysis

Data analysis was performed via utilization of IBM SPSS Version 28.0.0.0. Variables included on the spreadsheet of data included: Patient ID number, age (years), sex, race, date of visit, sticker color assigned, and provider. All variables were nominal in nature, with the exception of age, which was designated as a scale variable. Descriptive statistics were employed to summarize data, calculate frequencies and explore possible relationships between the data.

Results

Healthcare Providers Survey

The three providers (one MD and two PAs) that completed this survey were all female. When asked if routinely vaccinated against influenza, 100% (n = 3) of responses were affirmative. When prompted to reasons behind vaccination, 33% (n = 1) associated with the statement that it was “required by my place of employment.” 67% (n = 2) associated with the following statements driving their decision to vaccinate: “Influenza is a serious illness”; “The vaccine is effective”; “The vaccine is required at my place of employment”; “By getting vaccinated, I am protecting myself”; “By getting vaccinated, I protect family members and others close to me”; and “I follow the recommendations of the Centers for Disease Control and Prevention (CDC).”

When asked about belief that the influenza vaccine was effective in preventing the flu, 67% (n = 2) indicated “No,” while 33% (n = 1) selected “Yes.” When asked if administering the influenza vaccine should be part of their medical practice, 67% (n = 2) indicated “Yes,” while 33% (n = 1) provider indicated “It should be at the discretion of the health care professional.” All respondents (100%) indicated that they were aware of the current published recommendations of the ACIP/CDC surrounding influenza vaccination.

In practice, providers were asked how they currently communicated the importance of getting the influenza vaccine to patients. 100% (n = 3) selected that this was done “during office visits.” 33% (n = 1) indicated that she also reaches out to patients via “telephone calls” and encourages specific “vaccination days.” 0% (n = 0) indicated that they utilized any of the other methods proposed, such as: poster/brochure, e-mail reminders, or text reminders. Current barriers to vaccination cited by providers included: 1) Patient/parent vaccine safety concerns (100% of providers agreed with this statement, n = 3); 2) Patient attitudes towards vaccination (100% of providers agreed with this statement, n = 3); and 3) Availability (67% of providers agreed with this statement, n = 2).

Pre-Intervention Period

During the three-week pre-intervention baseline period that began March 5, 2021, 323 patients presented to the clinic (n=323). 51.7% patients were male (n = 167) and 48.3% patients were female (n = 156). The patient profile by race was: 84.2% Black (n = 272), 8.0% White (n = 26), 7.1% Multi-racial (n = 23), and 0.6% Asian (n = 2). The breakdown of visits by provider was the following: Provider 1 – 35.3% patients (n = 114); Provider 2 – 24.1% patients (n = 78); Provider 3 – 37.2% patients (n = 120); and Nurse Visit Only – 3.4% patients (n = 11). Mean patient age was 7.2 years.

Of the 323 patients prompted to vaccinate at the current visit, 63.5% (n = 205) declined and had a red sticker affixed to the superbill, 20.1% (n = 65) intended to vaccinate and had a green sticker affixed to the superbill, 14.6% (n = 47) had already been vaccinated and had a purple sticker affixed to the superbill, and 1.9% (n = 6) were unsure about vaccination and had a yellow sticker affixed to the superbill. Of the 65 patients that indicated an intent to vaccinate at the current visit, 93.8% (n = 61) received the vaccination. Of the six patients that were unsure

about vaccination, 0% received the flu vaccine at that visit. Overall vaccination rate for the pre-intervention period was 18.9% (n = 61/323).

During the pre-intervention period, Provider 1 saw 114 patients, Provider 2 saw 78 patients, Provider 3 saw 120 patients, and 11 patients were considered Nurse Visits. When assessing vaccination percentage by provider, the following results were observed: Provider 1 had an overall vaccination rate of 20.2% (n=23); Provider 2 had an overall vaccination rate of 18.0% (n=14); Provider 3 had an overall vaccination rate of 18.3%; and patients presenting to the clinic without seeing a provider (Nurse) had an overall vaccination rate of 18.2% (n=2).

Intervention Period

During the three-week intervention period that began March 29, 2021, 314 patients presented to the clinic (n=314). 48.7% of patients were male (n = 153) and 51.3% of patients were female (n = 161). The patient profile by race was: 93.3% Black (n = 293), 3.8% White (n = 12), and 2.5% Multi-racial (n = 8). The breakdown of visits by provider was the following: Provider 1 – 32.5% of patients (n = 102); Provider 2 – 26.8% of patients (n = 84); Provider 3 – 39.2% of patients (n = 123); and Nurse Visit Only – 1.6% of patients (n = 5). Mean patient age was 7.2 years.

Of the 314 patients prompted to vaccinate at the current visit, 72.0% (n = 226) declined and had a red sticker affixed to the superbill, 13.1% (n = 41) intended to vaccinate and had a green sticker affixed to the superbill, 13.7% (n = 43) had already been vaccinated and had a purple sticker affixed to the superbill, and 1.9% (n = 4) were unsure about vaccination and had a yellow sticker affixed to the superbill. Of the 41 patients that indicated an intent to vaccinate at the current visit, 100% (n = 41) received the vaccination. Of the four patients that were unsure about vaccination, 0% received the flu vaccine at that visit. There were two additional

immunizations given to patients that initially declined the vaccine (red sticker), bringing the total number of vaccinations administered to 43. One patient was seen by Provider 1 and the other patient was seen by Provider 2. Overall vaccination rate during the intervention period was 13.7% (n = 43/314).

During the intervention period, Provider 1 saw 102 patients, Provider 2 saw 84 patients, Provider 3 saw 123 patients, and 5 patients were considered Nurse Visits. When assessing vaccination percentage by provider, the following results were observed: Provider 1 had an overall vaccination rate of 14.7% (n=15); Provider 2 had an overall vaccination rate of 8.3% (n=7); Provider 3 had an overall vaccination rate of 16.3% (n=20); and patients presenting to the clinic without seeing a provider (Nurse) had an overall vaccination rate of 20.0% (n=1).

Discussion

During this QI project, overall vaccination rates declined from 18.9% pre-intervention to 13.7% during the intervention period, representing a 27.5% decrease (Tables 1 & 2, Figure 1). Tables 1 and 2, as well as Figure 1 also depicts individual changes in vaccination rates by Provider, as well as the aggregate of the clinic as a whole pre- vs. post-intervention. Provider 1 demonstrated a vaccinate rate decline from 20.2% to 14.7%; Provider 2 demonstrated a decline from 18.0% to 8.3% (the largest decline observed among individual providers); Provider 3 demonstrated a decline from 18.3% to 16.3%; and Nurse Visits represented the only overall increase in vaccination rates from 18.2% to 20.0%.

While the percentage of patients that presented with purple stickers (indicating that patients already vaccinated) did not demonstrate a similarly remarkable change (14.6% pre-intervention vs. 13.7% during the intervention period - a 6.2% decrease, depicted in Figures 2 and 3), it is of note that this QI project was conducted late into the traditional influenza season.

Typically, influenza activity peaks during the months of December and February; however, this QI project was initiated on March 5, 2021 and concluded April 19, 2021. Additionally, the emergence of COVID-19 in the United States in early 2019 significantly decreased the number of patients that presented to the pediatric clinic that was the site of interest for this project. While conducting this QI project, the State of Kentucky and the United States was under a mandatory face mask mandate, as well as direction to not travel to any unnecessary venues. Children in public institutions were restricted to virtual learning from August 2020 to May 2021, with no plans of resuming in-person schooling until August 2021. Of equal significance is that the pediatric clinic that served as the site of this project reported a significant decline in patient volume of up to 70%. Whether this significantly impacted the patients that presented to the clinic during the course of this project – and, more importantly, their attitudes, knowledge and beliefs regarding influenza vaccination – remains a point of interest and an important consideration in the interpretation of these results.

While overall vaccination rates declined for the clinic pre- vs. post-intervention, the data is encouraging in the area of comparing vaccination rates among those that intended to vaccinate at first presentation to the clinic. During the pre-intervention period, 65 parents intended to vaccinate their child (indicated by a green sticker); however, four changed their mind and only 61 vaccinations were given (93.8%, depicted in Table 4 and Figure 4). Post-intervention, 41 parents intended to vaccinate their child, and 43 vaccinations were given. This represents 100% (n=41) of the parents that indicated the intent to vaccinate, as well as two additional parents that who initially declined vaccination. This brings the overall vaccination rate (vs. expected) during the intervention period to 104.9% (n=43/41), an 11.8% increase over the pre-intervention period. This increase is suggestive that provider-directed intervention can be effective in two ways: (1)

Decreasing the probability that a parent will change their mind prior to the conclusion of the visit, and (2) Reassuring vaccine-hesitant parents to the extent that they are more amenable to receiving the influenza vaccination.

As research continues in the area of aiming to increase vaccination uptake, it will be of significant interest if certain methodologies emerge as more successful than others in conversion of vaccine-hesitant patients/parents. A significant opportunity in the area of this research is connecting providers' knowledge, beliefs and attitudes surrounding the influenza vaccine to success level of interventions. In this QI project, there could be no direct association with provider attitudes and outcomes; however, it was noted that the providers that disclosed they did not believe that the influenza vaccine was effective in preventing the flu started with lower baseline vaccination rates. This could be indicative that they were less likely to introduce the topic during the visit when not prompted to do so; but again, more research during a more appropriate time during influenza season would provide more clarity on this hypothesis. Additionally, as COVID-19 restrictions relax, children return to in-person learning, parents return to physical locations of employment, it will be interesting to measure if receptiveness to influenza vaccination increases or decreases.

Dissemination

The final manuscript of findings was submitted to the chief medical officer and practice manager of the pediatric primary care clinic. The name of the practice will not be identified in any manuscript, unless expressed permission is obtained to do so. Results of the quality improvement (QI) intervention was shared with all staff members of the clinic. Results will also be presented at the University of Louisville School of Nursing poster presentation day scheduled for August 6, 2021, as well as any professional conference if selected for presentation.

References

- Aigbogun, N., Hawker, J., & Stewart, A. (2015). Interventions to increase influenza vaccination rates in children with high-risk conditions - a systematic review. *Vaccine*, 33, pp. 759-770.
- Alshammari, T.M., Yusuff, K.B., Aziz, M.M. *et al.* Healthcare professionals' knowledge, attitude and acceptance of influenza vaccination in Saudi Arabia: a multicenter cross-sectional study. *BMC Health Serv Res* 19, 229 (2019). <https://doi.org/10.1186/s12913-019-4054-9>
- Centers for Disease Control and Prevention (CDC). (2013). Surveillance of Influenza Vaccination Coverage – United States, 2007-2008 through 2011-12 Influenza Seasons. *Morbidity and Mortality Weekly Report (MMWR)*, 62(4:1-28).
- Centers for Disease Control and Prevention (CDC). (2018). Estimated Influenza Illnesses, Medical visits, Hospitalizations, and Deaths in the United States — 2017–2018 influenza season. <https://www.cdc.gov/flu/about/burden/2017-2018.htm>.
- Centers for Disease Control and Prevention (CDC). (2019a). Key Facts About Influenza (Flu). <https://www.cdc.gov/flu/about/keyfacts.htm>.
- Centers for Disease Control and Prevention (CDC). (2019b). About Flu. <https://www.cdc.gov/flu/about/index.html>.

Centers for Disease Control and Prevention (CDC). (2019c). Prevention and Control of Seasonal Influenza with Vaccines: Recommendations of the Advisory Committee on Immunization Practices (ACIP) — United States, 2019–20 Influenza Season.

<https://www.cdc.gov/mmwr/volumes/68/rr/rr6803a1.htm>.

Centers for Disease Control and Prevention (CDC). (2019d). Flu Vaccination Coverage, United States, 2018–19 Influenza Season. <https://www.cdc.gov/flu/fluview/coverage-1819estimates.htm>.

Centers for Disease Control and Prevention (CDC). (2013). Surveillance of Influenza Vaccination Coverage - United States, 2007-2008 through 2011-12 Influenza Seasons. *Morbidity and Mortality Weekly Report (MMWR)*, 1-28.

Cooper, S., & Walton-Moss, B. (2013). Using reminder/recall systems to improve influenza immunization rates in children with asthma. *Journal of Pediatric Health Care*, 27(5): 327-333.

Dombowski, K., Harrington, L., Dong, S., & Clark, S. (2012). Seasonal influenza vaccination reminders for children with high-risk conditions - a registry-based randomized trial. *American Journal of Preventive Medicine*, 42(1): 71-75.

Grim, M., & Hertz, B. (2017). Theory in Health Promotion Programs. In C. Fertman, & D. Allensworth, *Health Promotion Programs (2nd ed.)* (pp. 53-81). San Francisco: Jossey-Bass.

Grivas, P., Devata, S., Khoriant, R., Boonstra, P., Ruch, J., McDonnell, K., . . . Worden, F. (2017). Low-cost intervention to increase influenza vaccination rate at a comprehensive cancer center. *Journal of Cancer Education*, 32: 871-877.

Office of Disease Prevention and Health Promotion (ODPHP). (2019a). About Healthy People.

<https://www.healthypeople.gov/2020/About-Healthy-People>.

Office of Disease Prevention and Health Promotion (ODPHP). (2019b). Immunization and

Infectious Disease. <https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives>.

Patwardhan, A., Kelleher, K., & Cunningham, D. (n.d.). The use of a mandatory best practice reminder in the electronic record improves influenza vaccination rate in a pediatric rheumatology clinic. *Clinical Governance: An International Journal*, 16(4): 308-319.

Petek, D., & Kamnik-Jug, K. (2018). Motivators and barriers to vaccination of health professionals against seasonal influenza in primary healthcare. *BMC Health Services*, 18: 853.

Rogers, C., Bahr, K., & Benjamin, S. (2018). Attitudes and barriers associated with seasonal influenza vaccination uptake among public health students; a cross-sectional study. *BMC Public Health*, 18: 1131-1138.

Appendix A: Provider Questionnaire

Implementation of a Quality Improvement (QI) Intervention to Increase Influenza Vaccination Uptake in a Pediatric Primary Care Setting

Thank you for your participation in this study. The aim of this questionnaire is to study the knowledge, attitudes and beliefs associated with seasonal influenza vaccination. Please be advised that all information gathered will be handled confidentially and used for research purposes only.

General Information

1. **Gender:** Male Female
2. **Professional Title:**
 Physician Nurse Practitioner Physician Assistant
3. **Years Experience:** _____
4. **Specialty:**
 Pediatrics Family Medicine Other _____

Knowledge, Beliefs & Attitudes

5. **Do you routinely get vaccinated against influenza?** Yes No
6. **Is influenza vaccination required by your place of employment?** Yes No
7. **Would you elect to receive influenza vaccination if not required to do so (if yes, please go to Question 9)?**
 Yes No

8. **Check which statements pertain to why you would not elect to receive the influenza vaccination if not required (check all that apply):**

- The vaccine may make you sick
- The flu vaccine doesn't work
- I've never had the flu, so vaccination is not necessary
- I do all the right things...I wash my hands and cover my mouth when I cough

- It should be my choice
- I've had the flu before, it's no big deal
- I don't like needles
- I don't believe the vaccine is 100% safe
- The flu/flu vaccine is part of a government conspiracy
- The flu is not that serious
- The vaccine is more dangerous than the virus
- I'm young and healthy
- It's too late; flu season is already here
- Other (please specify) _____

9. Do you think the influenza vaccine is effective in preventing the flu?

- Yes No

10. Do you think administering the influenza vaccine should be part of your medical practice?

- Yes No

11. Why are flu vaccines for health care workers encouraged? (Check all that apply)

- Because healthcare workers can get exposed to the flu by sick patients
- Because sick patients are exposed to the flu by healthcare workers
- To minimize sick days and loss of productivity
- To set an example to other healthcare workers
- Protect from patient liability
- Because the flu vaccine is recommended by the Advisory Committee on Immunization Practices (ACIP)/Centers for Disease Control and Prevention (CDC)

12. How do you communicate the importance of getting the influenza vaccine to your patients? (Check all that apply)

- Recommendation to vaccinate during office visits
- Offer vaccination during office visits
- Telephone calls
- Poster or brochure
- Vaccine reminders by email/text

- Other (please specify) _____

13. In your opinion, what are some of the barriers that prevent your practice from providing the influenza vaccine to all eligible patients?

- Vaccine safety concerns (yours)
- Vaccine safety concerns (patients)
- Vaccine efficacy concerns (yours)
- Vaccine efficacy concerns (patients)
- Vaccine not required by patient’s school
- Belief that flu vaccine should be patient’s choice
- Cost/reimbursement issues
- Staff capacity (limited number of staff)
- Staff capacity (training and readiness)
- Availability
- Ancillary supplies (gloves, needles/syringes, etc)
- Other (please specify) _____

14. Are you aware of the published guidelines by ACIP/CDC for influenza immunization?

Yes No

15. Please place a check mark in the appropriate column (Correct, Incorrect or Not Sure) regarding influenza.

Statement	Correct	Incorrect	Not sure
Health care professionals (HCPs) are less susceptible to influenza infections than other people			
Influenza is transmitted primarily by coughing and sneezing			
Influenza is more serious than the “common cold”			
Signs and symptoms of influenza include fever, headache, sore throat, cough, nasal congestion, aches and pains			
HCPs can spread influenza even when asymptomatic			
People infected with influenza can transmit the infection only after symptoms appear			
Influenza vaccination may not work if the vaccine contains the wrong mix of viruses			
Influenza vaccination does not work in some individuals, even if right mix of viruses are present			

Symptoms typically appear 8 to 10 days after a person is exposed to influenza			
HCPs should have choice to not vaccinate against influenza in practice environment			
All annual flu shots protect against H1N1 influenza strain			
There are some components of the flu vaccine that do not change from year to year			

Thank you very much for your participation in this quality improvement project

Appendix B: Patient Brochure

(Front)

If Your Child Is Sick

What can I do if my child gets sick?

Talk to your doctor early if you are worried about your child's illness.

Make sure your child gets plenty of rest and drinks enough fluids.

If your child is 5 years or older and does not have long-term health problems and gets flu symptoms, including a fever and/or cough, consult your doctor as needed.

Children younger than 5 years – especially those younger than 2 years – and children with certain long-term health problems (including asthma, diabetes and disorders of the brain or nervous system), are at high risk of serious flu complications. Call your doctor or take your child to the doctor right away if they develop flu symptoms.

What if my child seems very sick?

Even healthy children can get very sick from flu. If your child is experiencing the following emergency warning signs, you should go to the emergency room:

- Fast breathing or trouble breathing
- Bluish lips or face
- Ribs pulling in with each breath
- Chest pain
- Severe muscle pain (child refuses to walk)
- Dehydration (no urine for 8 hours, dry mouth, no tears when crying)
- Not alert or interacting when awake
- Seizures
- Fever above 104°F
- In children less than 12 weeks, any fever
- Fever or cough that improve but then return or worsen

- Worsening of chronic medical conditions

This list is not all inclusive. Please consult your medical provider for any other symptom that is severe or concerning.

How long can a sick person spread flu to others?

People with flu may be able to infect others from 1 day before getting sick to up to 5 to 7 days after. Severely ill people or young children may be able to spread the flu longer, especially if they still have symptoms.

Can my child go to school, day care, or camp if he or she is sick?

No. Your child should stay home to rest and to avoid spreading flu to other children or caregivers.

When can my child go back to school after having flu?

Keep your child home from school, day care, or camp for at least 24 hours after their fever is gone. (The fever should be gone without the use of a fever-reducing medicine.) A fever is defined as 100°F (37.8°C)* or higher.

*Many authorities use either 100 (37.8 degrees Celsius) or 100.4 F (38.0 degrees Celsius) as a cut-off for fever; but this number can vary depending on factors such as the method of measurement and the age of the person.

For more information, visit www.cdc.gov/flu/protect/children.htm or call 800-CDC-INFO



Flu Information



Flu:

A Guide for Parents

Influenza (flu) is a contagious respiratory illness caused by influenza viruses that infect the nose, throat and lungs. Flu is different from a cold, and usually comes on suddenly. Each year flu viruses cause millions of illnesses, hundreds of thousands of hospital stays and thousands or tens of thousands of deaths in the United States.

Flu can be very dangerous for children. CDC estimates that since 2010, between 6,000 and 26,000 children younger than 5 years have been hospitalized each year in the United States because of influenza. The flu vaccine is safe and helps protect children from flu.



U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

(Back)

How serious is flu?

While flu illness can vary from mild to severe, children often need medical care because of flu. Children younger than 5 years and children of any age with certain long-term health problems are at high risk of flu complications like pneumonia, bronchitis, sinus and ear infections. Some health problems that are known to make children more vulnerable to flu include asthma, diabetes and disorders of the brain or nervous system.

How does flu spread?

Flu viruses are thought to spread mainly by droplets made when someone with flu coughs, sneezes or talks. These droplets can land in the mouths or noses of people nearby. A person also can get flu by touching something that has flu virus on it and then touching their mouth, eyes, or nose.

What are flu symptoms?

Flu symptoms can include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills, feeling tired and sometimes vomiting and diarrhea (more common in children than adults). Some people with the flu will not have a fever.

Protect your child**How can I protect my child from flu?**

The first and best way to protect against flu is to get a yearly flu vaccine for yourself and your child.

- Flu vaccination is recommended for everyone 6 months and older every year. Flu shots and nasal spray flu vaccines are both options for vaccination.
- It's especially important that young children and children with certain long-term health problems get vaccinated.
- Caregivers of children at high risk of flu complications should get a flu vaccine. (Babies younger than 6 months are at high risk for serious flu complications, but too young to get

a flu vaccine.)

- Pregnant women should get a flu vaccine to protect themselves and their baby from flu. Flu vaccination during pregnancy protects babies from flu for several months after birth.

Flu viruses are constantly changing and so flu vaccines are updated often to protect against the flu viruses that research indicates are most likely to cause illness during the upcoming flu season.

Are flu vaccines safe?

Flu vaccines are made using strict safety and production measures. Millions of people have safely received flu vaccines for decades. Flu shots and nasal spray flu vaccines are both options for vaccination. Different types of flu vaccines are licensed for different ages. Each person should get one that is appropriate for their age. CDC and the American Academy of Pediatrics recommend an annual flu vaccine for all children 6 months and older.

What are the benefits of getting a flu vaccine?

- A flu vaccine can keep you and your child from getting sick.** When vaccine viruses and circulating viruses are matched, flu vaccination has been shown to reduce the risk of getting sick with flu by about 40 to 60 percent.
- Flu vaccines can keep your child from being hospitalized from flu.** A recent study showed that flu vaccine reduced children's risk of flu-related pediatric intensive care unit admission by 74%.
- Flu vaccine can be life saving in children.** A study using data from recent flu seasons found that flu vaccine reduced the risk of flu-associated death by half among children with

high risk medical conditions and by nearly two-thirds among healthy children.

- Flu vaccination also may make your illness milder if you do get sick.**
- Getting yourself and your child vaccinated also can protect others** who may be more vulnerable to serious flu illness, like babies and young children, older people, and people with certain long-term health problems.

Is there a medicine to treat flu?

Yes. Antiviral drugs are prescription medicines that can be used to treat flu illness. They can shorten your illness and make it milder, and they can prevent serious complications that could result in a hospital stay. Antivirals work best when started during the first 2 days of illness. Antiviral drugs are recommended to treat flu in people who are very sick (for example, people who are in the hospital) or people who are at high risk of serious flu complications. Antivirals can be given to children and pregnant women.

What are some other ways I can protect my child against flu?

- In addition to getting a flu vaccine, you and your child should take everyday actions to help prevent the spread of germs.
- Stay away from people who are sick; cover your cough and sneezes; wash your hands often with soap and water; do not touch your eyes, nose, and mouth; and clean and disinfect surfaces and objects that may be contaminated with flu viruses.

These everyday actions are a good way to reduce your chances of getting sick and prevent the spread of germs to others if you do get sick. However, a yearly flu vaccine is the best protection against flu illness.



Appendix C: Tables 1 - 4

Table 1.

Vaccinations - Pre-Intervention Period (3.5.21 - 3.27.21)					
	<i>Yes</i>	<i>No</i>	<i>Total</i>	<i>%</i>	<i>Pt Vol %</i>
<i>Provider 1</i>	23	91	114	20.2%	35.29%
<i>Provider 2</i>	14	64	78	17.9%	24.15%
<i>Provider 3</i>	22	98	120	18.3%	37.15%
<i>Nurse</i>	2	9	11	18.2%	3.41%
<i>TOTAL</i>	61	262	323	18.9%	100.00%

Table 2.

Vaccinations - Intervention Period (3.29.21 - 4.19.21)					
	<i>Yes</i>	<i>No</i>	<i>Total</i>	<i>%</i>	<i>Pt Vol %</i>
<i>Provider 1</i>	15	87	102	14.7%	32.48%
<i>Provider 2</i>	7	77	84	8.3%	26.75%
<i>Provider 3</i>	20	103	123	16.3%	39.17%
<i>Nurse</i>	1	4	5	20.0%	1.59%
<i>TOTAL</i>	43	271	314	13.7%	100.00%

Table 3.

Vaccination Rates by Provider			
	<i>Pre-Intervention</i>	<i>Intervention Period</i>	<i>% Change</i>
<i>Provider 1</i>	20.2%	14.7%	-27.1%
<i>Provider 2</i>	17.9%	8.3%	-53.6%
<i>Provider 3</i>	18.3%	16.3%	-11.3%
<i>Nurse</i>	18.2%	20.0%	10.0%
<i>TOTAL</i>	18.9%	13.7%	-27.5%

Table 4.

Intent to Vaccinate vs. Vaccination Rates			
	<i>Intent to Vaccinate</i>	<i>Vaccinated</i>	<i>% of Intent to Vaccinate</i>
<i>Pre-Intervention</i>	65	61	93.8%
<i>Intervention Period</i>	41	43	104.9%
<i>Variance %</i>	-36.9%	-29.5%	11.8%

Appendix D: Figures 1 – 4

Figure 1.

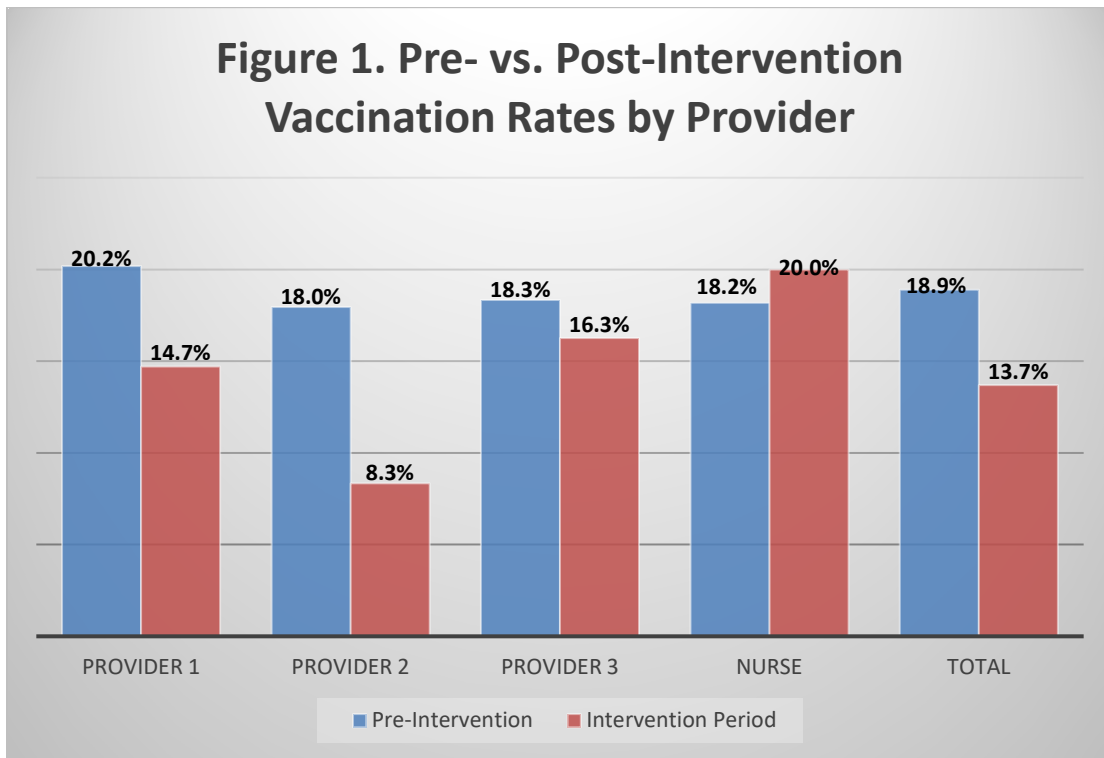


Figure 2.

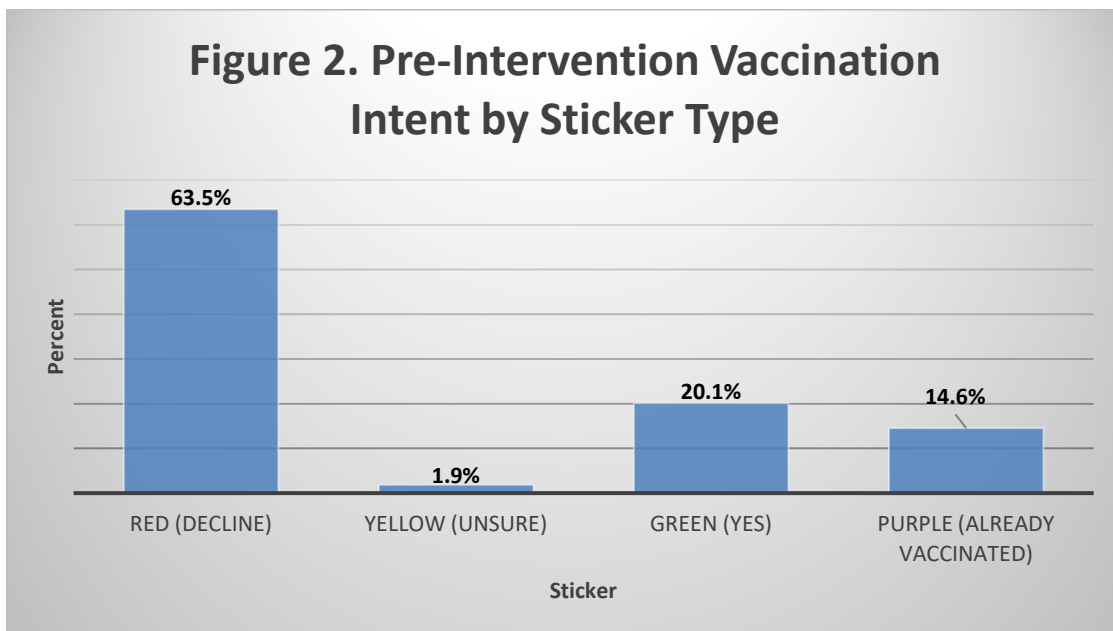


Figure 3.

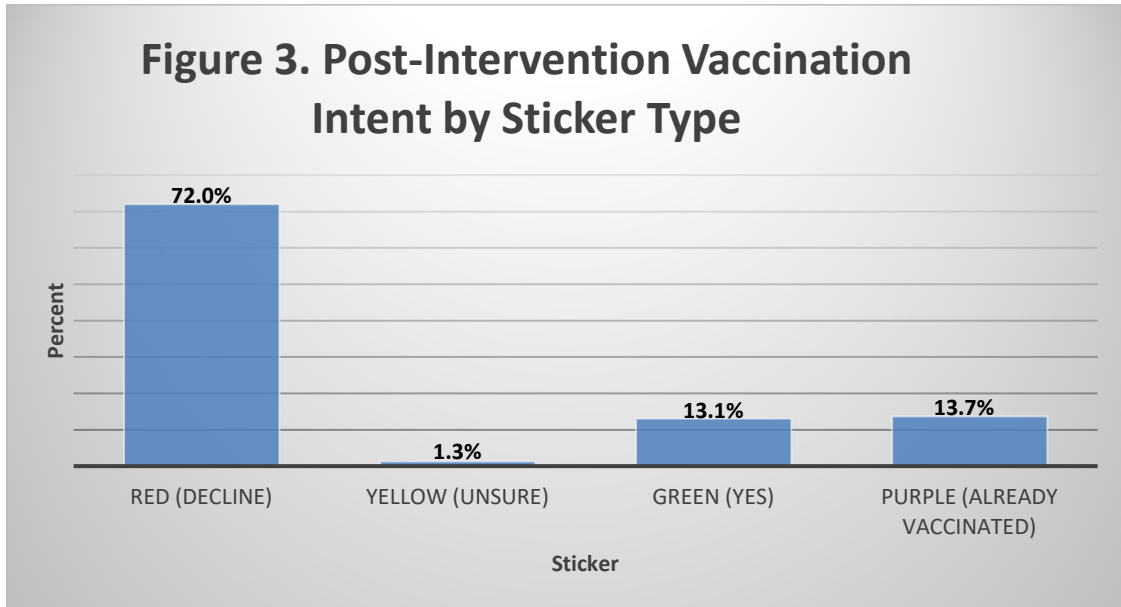


Figure 4.

