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EFFECT OF EDUCATION ABOUT PEDIATRIC IMMUNIZATION SCHEDULE AND VACCINE ADMINISTRATION ON FAMILY MEDICINE CLINIC PROVIDERS AND CLINICAL STAFF KNOWLEDGE AND CONFIDENCE

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EFFECT OF EDUCATION ABOUT PEDIATRIC IMMUNIZATION SCHEDULE
AND VACCINE ADMINISTRATION ON FAMILY MEDICINE CLINIC
PROVIDERS AND CLINICAL STAFF KNOWLEDGE AND CONFIDENCE

A Scholarly Project Submitted to the Graduate School
in Partial Fulfillment of the Requirements
for the Degree of
Doctor of Nursing Practice

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Pittsburg, Kansas

October 2019

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To my parents, you have shown me how to work hard. You support me, in word and deed. I love you.

EFFECT OF EDUCATION ABOUT PEDIATRIC IMMUNIZATION SCHEDULE AND VACCINE ADMINISTRATION ON FAMILY MEDICINE CLINIC PROVIDERS AND CLINICAL STAFF KNOWLEDGE AND CONFIDENCE

An Abstract of the Project by
John Matthew Derfelt, MSN, FNP-C

Significance: In this original research, the purpose of this project is to compare and promote increased pediatric immunization knowledge among healthcare providers and clinic staff of a family medicine clinic. In turn, there is greater compliance with the Centers for Disease Control and Prevention's (CDC) recommended immunization schedule and adherence to vaccinations against the 17 vaccine-preventable diseases.

Methods: This exploratory pilot case study surveyed 34 individuals by using an educational tool with information regarding the current CDC-recommended pediatric vaccination schedule. Prior to reviewing the educational material, the participant tested their baseline knowledge about vaccination scheduling and immunization administration. After reviewing the educational tool, a posttest was given with a survey of the participant's perceived improvement of knowledge and application.

Results: Our results suggest that vaccine education for all clinical staff results in improvement of schedule knowledge, vaccine administration knowledge, and vaccine-specific knowledge.

Discussion: Overall, the project indicates need for recurrent familiarization of providers and clinical staff with the CDC-recommended pediatric immunization scheduling. The test results indicates benefit from the resources provided and exhibits an increased confidence, as declared subjectively.

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Chapter I

INTRODUCTION

Description of the Clinical Problem/Issue

Missed opportunities for vaccinations occur regularly. The World Health Organization defines missed opportunities for vaccinations as, “any contact with health services by an individual who is eligible for vaccination which does not result in the person receiving one or more of the vaccine doses for which he or she is eligible” (WHO, 2018, para. 2).

Jaca, Mathebula, Iweze, Pienaar, & Wiysonge (2018) report on surveys that discuss an average of one-third of children, who visit health facilities in low and middle-income countries, miss opportunities to receive the vaccine doses that they need. This accounts for 19.5 million children who fail to receive the basic set of routinely-scheduled vaccinations (Jaca, Mathebula, Iweze, Pienaar, & Wiysonge, 2018). In the United States, the numbers are assumed statistically similar.

There is a severe misunderstanding for patients and family members regarding the safety and efficacy of vaccine administration. This is exhibited by the number of immunization visits that are missed, social media posts for and against vaccinations, and the decline of adherence to the recommended schedule of immunizations against the 17 vaccine-preventable diseases (Kroger, Duchin, & Vazquez, 2017). But, the lack of

knowledge extends beyond the patient and is also noted at the staff and provider level.

When one considers the need for routine administration of vaccinations, in both the family medicine and pediatric clinic setting, knowledge deficit is not an excuse for poor administration practices and promotions.

The primary advocate and end-user for vaccination administration is the nursing staff/medical assistant and provider. With respect to immunization knowledge, the level of understanding is reflective of the training received on this subject matter (Buxton et al., 2013). Without adequate staff and provider knowledge, a problem arises in the practice setting. A greater gap in understanding is noted when a staff- and provider-related knowledge deficit, pertaining to vaccinations, is present. While the Centers for Disease Control and Prevention (CDC) provides a thorough schedule for addressing the late administration of immunizations and special circumstances, based upon disease processes, it is hypothesized that staff members do not understand the narrative associated with immunization tables.

Family practice providers are expected to be experts of many different subjects. Immunization practice is considered preventative in nature and beneficial, if widely observed. However, if the provider is not adept at understanding and promoting the immunization schedule, as prescribed by the CDC, there can be no observed benefit (CDC, 2017). Clinic staff and providers are encouraged to participate in the interpretation of the current data related to vaccination schedules and benefits and risks related to individual immunizations. However, if health care workers do not understand the schedules or recommendations regarding administration, vital immunizations can be missed.

Patients and family members are not without responsibility in regard to this subject. One should be well informed prior to receiving a prescribed medication. Despite the number of resources available, further information can be found on the CDC website.

Even with adequate educational resources and well-trained staff, there will still remain individuals who disagree with the facts, suppose conspiracy of government agencies, or mistrust health care providers and decline administration.

Significance

The observance of the CDC-recommended vaccination schedule is proven to reduce significant statistics of morbidity and mortality by reducing the number of incidences of vaccine-preventable diseases. When parents are unclear of recommended vaccination schedule, the result is reduced compliance (Kagone et al., 2018). In contrast, Dorell, Yankey, Kennedy, and Stokley (2012) report that a greater percentage of parents state that they choose to vaccinate their children based upon the patient education efforts and recommendations of their care provider. Of greater impact is the knowledge that fewer than 5% cited their providers as the primary reason for not receiving vaccination (Dorell, Yankey, Kennedy, & Stokley, 2012).

Shibli, Shemer, Lerner-Geva, and Rishpon (2017) focus in on the pediatric specialty when they discuss pediatric healthcare providers' role in influencing parents' decisions about whether to vaccinate their children. Of significance is the conclusion that there is correlation between the place of work of the healthcare provider and the recommendations for administration that is provided to the patients' parents (Shibli, Shemer, Lerner-Geva, and Rishpon, 2017). Logically, the provider who works in

pediatrics is likely to be more familiar with the CDC-recommended vaccination schedule for pediatrics than the average family medicine healthcare provider.

Specific Aims/Purpose

This research exams they hypothesis of whether adequate education of clinic providers and clinical staff with reinforcement of concepts addressed in the literature will reduce missed opportunities for vaccinations. This will, in turn, improve clinic statistics for immunization compliance. Additionally, safety is observed by promoting proper administration of the medications at the right time to the right patient.

Objectives

1. The provider and clinical staff will exhibit greater understanding of the vaccination schedule through utilization of the resource tools afforded by the CDC.
2. The provider and clinical staff will increase their understanding of how to interpret a patient's immunization record and determine need for vaccination at the time of the visit.
3. The provider and clinical staff will observe better workflow when encountering pediatric patients who present for well child check or routine vaccination, as recommended by the CDC.
4. The provider and clinical staff will understand aseptic technique for administration of the vaccination, considering right patient, right drug, right dose, right site, and right time.
5. The provider and clinical staff will appropriately document vaccination administration for patient's record and future compliance.

Theoretical Framework

Patricia Benner wrote her middle-range theory, “From Novice to Expert,” in 1982 (Davis, & Maisano, 2016). She developed this theory based upon observation of nurses with differing levels of comfort in caring for patients, knowledge regarding process and procedure, and ability to address higher acuity of patients. Davis and Maisano (2016) refers to Benner’s theory, which utilized the Dreyfus Model of Skill Acquisition and applied it to nursing. With the tool, she evaluated the performance of workers at different stages in nursing. Benner’s theory draws one to conclude that nurses progress through five levels of proficiency in their career: novice, advanced beginner, competent, proficient, and expert (Davis, & Maisano, 2016).

The major assumptions and theoretical statements in Benner’s theory are observed through each level of proficiency. The primary assumption, described as Benner’s conceptualization, is that nurse’s gain knowledge based upon their experience (Nursing Theories 2011). Benner (1982) states that the nurse, through the stages of their career, moves from relying upon the didactic principles of nursing to trusting their experience as a nurse.

The assumptions and statements that would apply to this DNP project are with regard to experience with vaccination recommendations and administration protocols. Benner (1982) states, “Beginners have no experience with the situations in which they are expected to perform tasks.” Whereas, at the other end of the spectrum, the expert will rely upon experience and intuition to accomplish a task (Benner, 1982). As one encounters pediatric patients at various levels of immunization status, knowledge base and comfort increases. Eventually, the expert nurse will either memorize the schedule, apply

appropriate knowledge in abnormal situations, or comfortably know where to find the necessary information.

Key Variables:

1. Provider and clinical staff knowledge of current CDC guidelines for vaccination schedule and administration;
2. Parental understanding of patient's needs for vaccination against the 17 vaccine preventable diseases;
3. Patient health history and potential morbidities that could delay vaccine administration;
4. Previous missed opportunities for vaccination.

Project (Practice) Question(s)/Hypotheses

The main project question is the following: In the pediatric population, is the vaccination schedule more accurately understood\implemented in pediatric practice compared to family practice? This question is utilized when searching for guidelines already in existence. From this question is derived a hypothesis: For the pediatric population, the vaccination schedule is more accurately understood\implemented in pediatric practice compared to family practice. Therefore, provider and clinical staff education about the CDC-recommended pediatric immunization schedule and proper administration of the vaccines will improve parental compliance and reduce missed opportunities for vaccinations.

Research Questions

1. Does the participant perceive a knowledge deficit regarding vaccination scheduling and administration of immunizations?

2. Is the participant aware of the CDC-recommended resources for age-appropriate vaccination schedules?
3. Is the participant familiar with current combination vaccinations and when it is appropriate to utilize them?
4. What is the participant's greatest challenge with regard to vaccination scheduling and administration?
5. After receiving brochure education, does the participant perceive decreased anxiety and greater knowledge regarding CDC-recommended vaccination scheduling and administration?

Definition of Key Terms/Variables

Vaccine – “a substance used to stimulate the production of antibodies and provide immunity against one or several diseases, prepared from the causative agent of a disease.” (Oxford University Press, 2018, para. 1).

Immunization record – The recording of “the action of making a person or animal immune to infection, typically by inoculation” (Oxford University Press, 2018, para. 1).

Provider – An individual who provides healthcare through decision making, after evaluation and treatment considerations.

Missed opportunity for vaccination – A vaccination is withheld, for any number of reasons, when it is appropriate to offer the inoculation, per recommended schedule (Jones, Spain, Wright, & Gren, 2015).

Table I.

Logic Model

Name of Project:					
Provider and clinical staff education about the CDC-recommended pediatric immunization schedule and proper administration of the vaccines					
Problem:					
There is a high rate of missed opportunities for vaccinations due to provider and clinical staff knowledge-deficit and anxiety about the vaccination schedule.					
Situation:					
Family medicine clinic staff are less familiar with the CDC-recommended vaccination schedule, catch-up schedule, and combination medication special instructions than pediatric clinic staff. Familiarity with the schedule is expected to improve with exposure, resulting in fewer missed opportunities for vaccinations.					
Inputs	Outputs		Outcomes		
	Activities	Participants	Short term	Mid term	Long term
Human resources: Provider and clinical staff Office supplies: Paper for brochures, well-designed pretest and posttest Field resources: Access to clinic	Educational booklet placement Pretest and posttest Raffle prize for participation	Clinical staff and providers	Providers and clinical staff acknowledge the resources that are available to assist with proper scheduling of immunization visits	Providers and clinical staff address immunization status with each patient who presents for well-child-checks	Zero missed opportunities for vaccinations
Assumptions			External Factors		
1. Clinic administrators allow for display of educational brochure 2. Provider and clinical staff participation is significant enough to conclude successfully 3. Provider and clinical staff are aware of knowledge deficit and eager to remedy			1. The clinic is busy 2. Influences are unpredictable 3. The Clinic leadership allows for participation in the education and testing		
Evaluation Plan:					
Provider and clinical staff survey of adequate address of their needs with regard to immunization knowledge and application.					

Summary

Systematic determination for need of vaccination and proper application, administration, and technique is vital to the health of children and adolescents. Many studies focused on the address of individual vaccinations, such as the human papilloma virus, measles, mumps, rubella, or even the tetanus, diphtheria, and acellular pertussis vaccinations. However, in the family medicine clinic, the provider and staff have the potential to see all age groups, from birth to end-of-life. Noted, the family medicine clinic may not encounter a child or adolescent frequently. This project aims to determine the importance of proper education and administration of the CDC-recommended vaccination schedule and recommendations.

In contrast, providers and staff of the pediatric clinic encounter patients daily who require well child checks and administration of recommended vaccinations, per CDC schedule and guidelines. With repetition comes expertise. This project emphasizes the importance of continued education for providers and staff, as indicated by pretest and posttesting, before and after educational information through brochure distribution. The goal of the educational information is to encourage awareness of shortcomings and encourage self-improvement and ultimately safe maintenance of the pediatric patient's vaccination needs.

Chapter II

LITERATURE REVIEW

A review of the literature was conducted to obtain the most recent information on vaccinations, knowledge and administration. This literature review search was accomplished using online databases and the Centers for Disease Control and Prevention (CDC) website. For the topic of vaccination knowledge, the CDC website and the Advisory Committee on Immunization Practices (ACIP) are the primary resources for best practice guidelines. The CDC recognizes the need for improvement in immunization levels in the United States, acknowledging reduction in vaccine preventable disease cases but warning of potential resurgence without adequate immunization statistics (CDC, 2019). In response, the CDC recommends strategies for providers to increase immunization levels in their practice.

Multiple studies identify guidelines, as they apply to current trends and issues related to vaccination administration. The ACIP, by protocol, considers practice guidelines three times a year for needed updates or changes (CDC, 2019). The literature revealed issues with vaccine administration related to multiple factors regarding vaccination knowledge, staff education, public perception, and clinical setting. The literature reviewed for this project was limited to the past eight years. The purpose of this literature review was to determine if present data exists regarding the topic of vaccination

safety with regard to knowledge and administration of vaccines, current guidelines, and determination of current tools for practice. This information was utilized to develop educational information for healthcare providers and clinic staff.

The databases that were utilized for this literature review were the CDC website, CINAHL Plus with full text, Pubmed, MEDLINE plus health information, and Sciencedirect. The initial keywords searched, and search phrases, were: “vaccine knowledge”, “vaccine safety”, “vaccine education”, “vaccination administration”, “staff vaccine knowledge”, “pediatric vaccine schedule”, “immunization knowledge”, “immunization administration”, and “primary care vaccine knowledge”. Criteria for narrowing the search results were:

- Article was published within the last eight years, except for one article that provided essential information regardless of timeframe
- Article was not vaccine specific, but covered the broad subject
- Article was in English language
- Article was available in entirety
- Article addresses the context of family medicine, pediatrics, or clinic staff

Upon completion of database search, 28 articles were chosen within the criteria.

Scope

The intent of this review of literature is to consider the CDC-recommended schedule for pediatric patients seeking immunization. The reason this is first considered is because of the perceived knowledge deficit that exists for healthcare providers and staff who work at family medicine clinics when confronted with patients at risk for missed opportunities for vaccination.

A general overview of the vaccine-preventable diseases, as a whole, is addressed. This is for the purpose of considering the entirety of age-related recommendations as they pertain to pediatric patients. The reason for the focus upon pediatric population is because of the greater number of required immunizations in comparison to the adult population. The schedule is also noted to speak to the need for catching up with immunization when late or multiple vaccines are missed.

Another area of focus for this project involves the subject of special instructions regarding immunizations when one considers the right site for the immunization and whether appropriate for the size of the patient that is receiving the medication. One must also understand the importance of the length of time between certain immunizations, especially with regard to the type of medication given. This mostly addresses single drug versus appropriateness for combination therapy. Equally as important, one must take into account the brand of immunization that is given and if it is safe to be given with other medications. Lastly, the project will address the knowledge of interactions between medications.

What Will Not Be Covered

For the sake of focus, this project is designed to examine and improve the family medicine provider's knowledge for accuracy of prescription and staff knowledge for evaluation of patient immunization status and administration of appropriately scheduled vaccines for the pediatric patient. As such, the full spectrum of the CDC recommendations for vaccinations, adult immunizations, and descriptions of brand name vaccinations currently on the market are not addressed in depth.

Hypothesis

The hypothesis for this project states: In medical personnel who care for the pediatric population, the vaccination schedule is more accurately understood\implemented in pediatric practice compared to family practice. Therefore, education about the CDC-recommended pediatric immunization schedule and proper administration of the vaccines will improve the rate of missed opportunities for vaccinations among medical providers and staff.

This hypothesis is utilized when searching for guidelines already in existence. Since the National Guideline Clearinghouse was defunded in June 2018, literature review provides the greatest number of resources on current evidence-based practice.

Regarding Current Guidelines

The National Center for Complimentary and Integrative Health (2017), part of the National Institute of Health, and under the U.S. Department of Health and Human Services, lists the guidelines that most closely pertain to the clinical issues of knowledge deficit about vaccination information management and immunization administration. This is accomplished through the link “recommendations on immunization.” This directs to the CDC (2018), “Administration Tools”, where “Vaccine Administration” can be selected.

With focus on administration practice of vaccinations, the strength of evidence and the variety and broad comparison of each vaccination requires further examination and narrowing of the hypothesis associated with the clinical practice guideline problem. Currently, most of the literature that is available confronts individual immunizations alone and does not consider the need for improved general knowledge regarding

vaccination scheduling and administration of the medications. For the same reason, the need for research and practice change is emphasized. Since the body of evidence is so great, staff members will require deeper understanding of administration protocols. The strength of the evidence supporting this practice change is strong.

Study Comparisons

As the primary resource for guidelines, the CDC website provides much of the supporting information needed for this study. The recommended schedule is fully accessible through the website with tabular information by age, medical condition, and instruction for catching up on missed opportunities (CDC, 2019a). One may also order free hard-copy resources of the same information at the website. From the CDC, one learns more about the ACIP (CDC, 2019b).

Upon further investigation, the literature revealed issues with vaccine administration related to multiple factors regarding vaccination knowledge, staff education, public perception, and clinical setting. Thematic organization of the literature allows the reader to more easily understand the issues surrounding these subjects.

Theme 1: Public Health Scenario

The first theme this noted in the literature is regarding the public health scenario as it pertains to immunization and vaccine compliance. Six articles were found with the subjects of school-based consideration of immunization through the facility nursing staff, pharmacist involvement, or public health-related criteria. One article focuses on school nurses in Missouri and discusses the impact of education and recordkeeping of immunizations for graduating students (Rhodes, Draper, Woolman, & Cox, 2017). The aspect of public health also involves pharmacists and public health nurses with emphasis

on knowledge about immunizations. Buxton, et al. (2013), compares immunization knowledge of public health nurses to physicians, utilizing survey response for data. The reason for selection of this article is to determine statistics of a general knowledge base with attention to only a small sample of healthcare providers.

Theme 2: Reasons for Missed Opportunities

The second theme of the literature helps to define the problem that is addressed in the primary care setting by reviewing reasons to miss opportunities for vaccination. Three articles were selected, with two of the them specifically focused upon missed opportunities for vaccinations, without emphasis on additional characteristics of immunizations, as the themes are reported in the other articles reviewed. Jaca et al (2018) performed a systematic review, paring 343 publications down to six evidenced-based practice articles. Two of the articles utilized in their study were assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) criteria for validating the information within (Jaca et al, 2018).

Theme 3: Parental and Patient Decision-making

The third theme is that of parental and patient decision-making about immunizations. Dorell, Yankey, Kennedy, and Stokley (2012) utilize the National Immunization Survey for Teens to discuss the factors that influence parent and adolescent decisions for immunization. This study evaluates the reasons for choosing to vaccinate, as determined from the surveys. Darden et al. (2018) utilize the same resource as Dorell et al. (2012), alluding to the importance of education in the decision to give or withhold the medications. An article that was published through the American Academy of Pediatrics (AAP) provides practical insight into improving immunization uptake and reducing

missed opportunities, citing seven major reasons for parental hesitancy or refusal to vaccinate their child (Bernstein & Bocchini, 2017).

Theme 4: Information Technology

The fourth theme is noted as involving information technology as it applies to systems and processes. For instance, Zweigoran et al (2017) report that an office system process as simple as standing orders can improve vaccination rates among the pediatric population. Another factor that is noted is that of patterns of office visits and encouragement to maintain appointments and scheduled follow-up visits (Rand & Goldstein, 2018). Most applicable to this project is the factor of health communication as it applies to the parent/provider relationship (Goldstein, MacDonald, Guirguis, & the SAGE Working Group on Vaccine Hesitancy, 2015).

Theme 5: Health Communication

The fifth theme builds upon the concept of health communication with promotion of parental education regarding vaccinations. Awadh et al (2014) recognize that parents' knowledge about immunizations as they pertain to their children can help predict rate of uptake for vaccines. In an exception to the inclusion criteria of time since publication, one article by Sabnis, Pomeranz, & Amateau (2003), emphasizes the effect of education on missed opportunities for vaccinations. More recently, Frew and Lutz (2017), performed a systematic review to determine effective interventions to improve pediatric vaccination rates. Of the 66 studies reviewed in their literature, 39 included randomized controlled trials with focus on testing interventions for parents, providers, and the public (Frew & Lutz, 2017).

Theme 6: Provider and Staff Education

Finally, the sixth theme pertains to education of the provider and staff as it relates to immunization uptake. Multiple articles acknowledge the importance of education the healthcare provider about vaccinations. “A well-educated workforce is one of the pillars of high-quality service provision” (Ellis, Roland, & Blair, 2013, p. 20). A systematic review by Herzog et al. (2013) provides 15 articles identified, from 2354 total, supporting improvement of healthcare workers’ knowledge, beliefs, and attitudes about vaccination. The subject of knowledge includes understanding the disease targeted for prevention and the vaccinations (Herzog et al., 2013). If the key to improving immunization numbers is parental consent, then providers should provide accurate and up-to-date information regarding vaccinations (Al-lela et al., 2014).

Gaps in the Literature

There is little to no literature to review with regard to preparation and administration of the vaccines for immunization. Standard application of the nursing principle of choosing the right medication and giving it to the right patient in the right route should apply.

Summary

The disparity between provider and staff knowledge of a primary care clinic and pediatric clinic is likely due to repetition and frequency of vaccination administration at pediatric clinics. This, however, does not excuse poor practice in the family practice clinic setting. If providers claim to care for patients of all ages, then there needs to be preparation to provide preventative measures as well as interventional needs. For this study, the vaccination schedule is the example of such preparation. If successfully implemented, this

clinical practice guideline will provide ease of recognition of immunization needs, increased percentage of patient coverage, and proper recording of administered vaccinations.

Chapter III

RESEARCH DESIGN AND DATA COLLECTION

This exploratory semi-experimental research addresses medical provider and clinic staff's self-awareness of the Centers for Disease Control and Prevention's (CDC) recommended immunization schedule and administration of vaccines and improving baseline knowledge through focused education.

Objectives

This research examined the practice setting of the clinical staff and providers' knowledge-deficit. It examined the CDC-recommended immunization schedule, vaccine-related special instructions, and administration. The CDC provides a thorough schedule to address late administration of recommended vaccinations, termed catch-up schedule, and special circumstances based upon disease processes. It is evident that staff members do not understand the narrative associated with immunization tables. Nurses and medical assistants are responsible for carrying out orders given and often will do so as a "nurse visit" whereas the provider will not encounter the patient. This research hypothesized that the problem is amenable in the local setting through specific education. There is a supposition that this is not an issue that applies to only the local clinic. Instead, local clinics represent the larger number of clinical personnel in many of them across the United States. Moreover, vaccinations are a public issue among parents. These facts

provide evidence of need for further research about vaccines, the recommended schedule, and proper administration of vaccinations.

The objectives of this project were as follows:

1. The provider and staff will exhibit greater understanding of the vaccination schedule through utilization of the resource tools afforded by the Centers for Disease Control and Prevention;
2. The provider and staff will increase their understanding of how to interpret a patient's immunization record and determine need for vaccination at the time of the visit;
3. The provider and staff will observe better workflow when encountering pediatric patients who present for well child check or routine vaccination, as recommended by the Centers for Disease Control and Prevention;
4. The provider and staff will understand aseptic technique for administration of the vaccination, considering right patient, right drug, right dose, right site, and right time;
5. The provider and staff will appropriately document vaccination administration for patient's record and future compliance.

Research Design

This study is a semi-experimental research designed to examine the effect of education on self-awareness of clinic providers and staff. The exploratory case study assessed the perceived benefit of the educational tool upon the knowledge and practice of the healthcare provider and clinical staff of the family medicine clinic. The pretest includes questions for the acquisition of demographic data, along with survey data, to

determine educational status and baseline knowledge level of the participant. In addition, the pretest measures the degree of benefit and anticipation of effect of the educational material on clinical practice.

The clinical staff and providers need to understand their own base knowledge of the vaccination schedule. Development of an educational brochure addressed the standard knowledge deficit. The goal of this method was to achieve a working knowledge of proper intervals, combination doses, and risks and hazards. There is exhibition of evidence, for grounded theory, through the plan of policy change upon receipt of data from this study, where data collected through posttest provides information for statistical analysis.

Improvement goals were set with consideration of improved compliance with the 2019 CDC vaccination schedule, due to staff and provider understanding and promotion. Goals are best accomplished when addressed through the efforts of a quality improvement team who understands the vision of the project, the structure of the program, a proposed time-frame, and a reassessment plan for evaluation of effectiveness (Terry, 2018).

For this project, the research addresses current knowledge through pretest of staff and providers at the family medicine clinic and the pediatric clinic. Comparison of data through pretest and posttest determines improvement. Standardization of educational material, with utilization of an original tool for a procedural approach to patient evaluation and care, comprises the brochure. The educational tool follows a pretest, by using an easy to understand informational brochure. The content of the brochure addresses the most common clinical presentations.

Sampling Frame

The sampling frame for this project is the family practice and pediatric clinic utilizing a sample of convenience. The sample represents individuals who have broader scope of schedule knowledge, compliance, and administration of vaccinations.

The primary clinical setting for this project implementation plan is a family practice clinic with an associated and busy extended hours clinic (Convenient Care/Urgent Care). The practice consists of physicians, nurse practitioners (NPs) and physician assistants (PA) who work primary care for the whole family. The NPs and PAs share time working in the convenient care. On average the primary care clinic provides care to 100-175 patients per day, with approximately 70-80 of those treated by the physicians. The convenient care averages between 25-50 patients per day. A large hospital system owns and operates the practice with a clinic manager overseeing daily operation. In the clinic, a formal way of incorporating evidence-based practice is through committee and administrative authorization.

In the family practice clinic, this research suggests that the most effective champions for adherence to CDC-recommended guidelines, are the physicians of the clinic. The physicians serve as collaborators for the NPs and PAs. The motivation for their advocacy is that all activity of the clinic reflects upon their particular medical practice, thus encouraging their desire for full compliance to evidence-based practice guidelines, such as the CDC immunization schedule.

In the United States, many states are adopting laws for independent practice for NPs. With understanding that the most operational target adopters are the providers of the clinic, NPs and PAs are the key to encouraging and enforcing implementation of the

practice guideline change. With the influence of the providers, there is expectation of the adoption of practice change by the nursing staff and medical assistants.

Incentive for Recruitment of Participants

The manager of each clinic gives consent for providing an educational brochure for provider and staff participation. Placing the brochure in a prominent location in the breakroom of the clinic with promise of raffle drawing for voluntary participation provides a greater motivation for participation.

This project employs non-random sampling of qualified staff with a sample size expected to equal the number of clinical staff members in the clinic (O'Mathuna & Fineout-Overholt, 2015). The estimated number of participating staff members is 20-25 from the family medicine clinic and 4-6 from the pediatric clinic.

A raffle drawing from the completed posttests received will serve as incentive for participation by the staff.

Inclusion & Exclusion Criteria

There is no limitation to inclusion criteria for this project because of education or experience level of the participant. The healthcare providers are physicians, NPs, and PAs. The clinical staff are Registered Nurses (RN), Licensed Practical Nurses (LPN), and Medical Assistants (MA). The participants are directly responsible for patient care, or decisions about patient care.

Exclusion of participants is determined by non-participation in patient care. This includes management, receptionists, financial advisors, and clinic volunteers.

Independent and Dependent Variables

The hypothesis for this project states: In medical personnel who care for the pediatric population, the vaccination schedule is more accurately understood\implemented in pediatric practice compared to family practice. Therefore, education about the CDC-recommended pediatric immunization schedule and proper administration of the vaccines will improve the rate of missed opportunities for vaccinations among medical providers and staff.

The independent variables for this project are participants' age, gender, educational level, licensure or certification status, past experience with immunization guidelines of the CDC-recommended immunization schedule, years in family practice or pediatric practice, current clinical responsibilities of vaccine administration, and the participant's primary location of practice. The definition of the pediatric population, as alluded to in the hypothesis, is ages 0-18 years. Family practice provides care for all ages of patients, to include the pediatric population. This study focuses upon the treatment of the pediatric population only.

Dependent variables create criteria for measurement at the conclusion of the project. The dependent variables for this project are participants' attitude about immunization visits, perceived knowledge level before and after the education, and reported improvement in anxiety regarding immunization practice and administration. Analysis of pre- and posttest data provides measurement of the dependent variables.

Research Questions

These questions represent an index of compliance to the CDC-recommended schedule of vaccinations and provider and staff knowledge. Based upon the criteria from

the review of literature, the research identifies three areas of focus for determination of immunization schedule knowledge, vaccine-specific knowledge, and vaccine administration knowledge. Current literature reveals a gap in research regarding overall compliance improvement tools. The research suggests that increasing knowledge in the stated areas of focus will improve vaccination administration compliance and therefore public health.

Immunization Schedule Knowledge

- 1) Do you ever reference the CDC-recommended immunization schedule?
- 2) Are you familiar with the CDCs ACIP ongoing review of immunization practices?
- 3) To your knowledge, does your clinic follow a standardized approach to encountering children for immunization scheduling and administration?
- 4) Do you know how to access and utilize the CDC vaccine catch up guide?
- 5) Is there an objective benefit to prescreening of the patient's vaccination record prior to the scheduled visit of the patient?
- 6) Do you have access to a personal reference tool to aid you in accuracy of determination of immunization needs for children?
- 7) Do you give a vaccine information statement (VIS) to every patient who receive a vaccination?

Administration Knowledge

- 8) Are you comfortable with your current knowledge regarding pediatric immunization records and vaccination administration?

- 9) Have you ever received formal training regarding vaccination knowledge and administration?
- 10) Have you ever made a vaccination error (to include missed opportunities for vaccination, wrong dose, early administration, etc...)?
- 11) If a patient's immunization history is incomplete or unknown, does the CDC advise administration of recommended vaccinations?
- 12) Do you know the minimum number of days before the recommended age that a dose may be given without requiring readministration?
- 13) Do you understand the benefit of everyone in your office using the same sites for each vaccination, utilizing a standardized anatomical map?
- 14) Did you know that it is not a federal law for a parent to sign a refusal form if they choose not to immunize their child, but a provider can require one for formal documentation and protection?

Vaccine-Specific Knowledge

- 15) Do you know which vaccines are "live attenuated" and how often (minimum interval) between administration of them?
- 16) Did you know that adolescents should be given the Tdap (not the Dtap) at age 11-12?
- 17) Do you know the rationale for the minimum interval between administration of live vaccines?
- 18) Are you now aware that administration of combined MMR and Varicella (MMRV) is not recommended in patients with a personal or immediate family

history of seizures, instead MMR and varicella should be administered separately?

19) Are you aware that the combined vaccination, Kinrix (DTaP and IPV) should not be given before age 4 years?

20) Do you know where to find a listing of the contraindications and precautions for each recommended vaccine?

Measurement

Numeric values assigned to yes and no answers on the pretest and posttest indicate improvement by calculating each participant's individual answers. The assignment of the number "1" for each "yes" answer and a "0" for every "no" answer provides data for statistical analysis. The comparison of pretest and posttest answers for each individual question informs the research of success or failure of the developed educational brochure. Value added from the pretest to posttest, indicates successful learning and accomplishment of project objectives.

A numeric value of 0-20 points represents the variance of index of compliance to the vaccination schedule. The questions emphasize focus on three areas of interest: immunization schedule knowledge, vaccine-specific knowledge, and administration knowledge. By creating subheadings from each focus area, the research adds reliability and validity of index. Statistically, the research can calculate a percentage of each yes/no answer for indication of need for improvement regarding a specific topic. The research can also determine statistical results of each subgroup or evaluate scores in totality. The educational brochure addresses topics from each dimension, based upon themes determined through literature review. Twenty questions are selected for assessment to

evaluate environmental readiness and determine provider and staff knowledge level. Face-to-face assessment, as needed, further enhances research of the staff perception regarding self-knowledge of vaccination administration and management and readiness to receive education (Registered Nurses Association of Ontario, 2012).

The mission and values of the larger institution, as adopted by the organization's staff members, indicate desire for improvement and quality patient care. The institution issues a quarterly incentive to providers to meet quality measures. In this way, the system most closely identifies with Rogers' *Stages of Change Theory*, with emphasis on compensation for willingness to adopt change.

Approval of Human Subjects

Data for this project is based upon voluntary participation and a self-reported survey of a sample of providers and clinical staff representing local and regional family medicine clinics who provide care to pediatric patients. For comparison, a small sample of pediatric clinic providers participate. The Institutional Review Board from Pittsburg State University approves of the study.

Data Analysis

The research performs analysis of survey data for demographic comparison regarding education level, years in practice, and perceived knowledge of immunization practice as recommended by the CDC for determination of project benefit.

1. What is the age of the provider/staff member?
2. What is the gender of the provider/staff member?
3. What is the education level of the provider/staff member?
4. What is the provider/staff member's licensure or certification status?

5. Does the provider/staff member have experience with immunization guidelines of the CDC-recommended immunization schedule?
6. How many years has the provider/staff member practiced in family medicine or pediatric care?

The pretest and posttest result data measures the conclusion of effectiveness through the educational tool and presumed benefit to the individual clinic and the healthcare system. Thus, promoting patient safety. Statistical analysis is accomplished through use of SPSS pc version 24.

Implementation Strategies

For adequate implementation of data results, each clinic must have individuals who will champion the cause for reduction of missed opportunities for vaccinations by promoting proper education and adoption of strategies.

To Targeted Adopters

With assessment already accomplished in clinic and verbalized consensus of providers regarding decreased knowledge and increased confusion about appropriate schedule of CDC-recommended vaccinations in the primary care clinic, there is little resistance to change from the providers. Information giving serves as accomplishment of the initial implementation of the proposed change. This is best accomplished through provider-specific meetings. Monthly provider meetings and monthly journal club meetings will set the stage for physician, nurse practitioner, and physician assistant education about the topic.

To Individual, Unit/Team, and Organization

Staff training will roll out with educational brochures distributed to the eligible clinical personnel. Pretest and Posttest helps to determine areas of need for remedial education, while also providing data for analysis. Managers benefit through noted need for additional staff training and observation of shortcomings.

Electronic Health Record will provide a platform for evaluation of effective record keeping. This will be the key for success of the implementation and is ultimately the reason for the practice change.

Chapter IV

EVALUATION RESULTS

Purpose

The purpose of this project addresses medical provider and clinic staff's self-awareness of the Centers for Disease Control and Prevention's (CDC) recommended immunization schedule for vaccine administration and improving baseline knowledge through focused education.

The hypothesis for this project states;

- 1) In medical personnel who care for the pediatric population, the vaccination schedule is more accurately understood\implemented in pediatric practice compared to family practice. Therefore, education about the CDC-recommended pediatric immunization schedule and proper administration of the vaccines will improve the rate of missed opportunities for vaccinations among medical providers and staff.

Conceptualization and Measurement

Through semi-experimental research design, as an exploratory pilot study and original research, we examined the effect of focusing upon specific vaccine education topics as they pertain to a perceived knowledge deficit and confidence level of clinic providers and staff. This exploratory case study assessed the perceived benefit of an

educational tool upon the knowledge and practice of the healthcare providers and clinical staff of the family medicine clinic. A pretest assessed the clinical staff and providers' self-awareness of baseline knowledge regarding the vaccination schedule, nuances of vaccine administration, and advanced knowledge regarding special considerations when administering specific vaccines of concern. A posttest measured the participants' perceived improvement over the pretest. The questions of the pre- and posttest focused upon these three dimensions of immunization knowledge: immunization schedule, administration, and vaccine-specific knowledge. The goal of this method was to achieve a working knowledge of proper intervals, combination doses, and risks and hazards.

The three dimensions of immunization knowledge were selected through the examination of literature review. The topic of vaccination safety exists with regard to knowledge and administration of vaccines, current guidelines, and determination of current tools for practice. This information was utilized to develop educational information for healthcare providers and clinic staff.

Of the articles reviewed, six themes were gathered:

1. The public health scenario as it pertains to immunization and vaccine compliance;
2. Review of reasons for missed opportunities for vaccinations;
3. Parental and patient decision making about immunizations;
4. Information technology as it applies to systems and processes;
5. Health communication with promotion of parental education regarding vaccinations;
6. Education of the providers and staff as it pertains to immunization uptake.

The three dimensions of immunization knowledge directly addressed the six themes by promoting observance of an evidence-based schedule, proper administration of the vaccines, and understanding the particulars of the medications.

A booklet accompanied the pre- and posttest with educational information derived from the CDC website and the Advisory Committee on Immunization Practice (ACIP). Participants were encouraged to review the information provided and then complete the posttest. Overall time commitment was estimated at 25 minutes.

The surveys were administered, to a sample of convenience in June through August 2019 with original distribution of 30 surveys to a family medicine clinic and a pediatric clinic. Permission to administer the surveys was obtained from practice managers at each clinic. We placed the surveys in the break room at each clinic. A self-addressed, stamped envelope was placed in each booklet with step-by-step instructions to complete the pretest, review the material, then take the posttest. Subsequently, participants were to place the survey in the envelope and drop them in the mail by July 7.

When no responses were received, we returned to the family medicine clinic and found that only one individual had completed the surveys, while the rest of the surveys were hidden by other literature from the clinic. We made the decision, at that time, to hand deliver surveys and request each individual to participate using the above instructions. We also extended the deadline for return to August 31.

Overall, the goal was 50 respondents, so we received permission to access two additional family practice clinics and one additional pediatrics clinic. Also, an online survey was developed using *www.surveymonkey.com*. After contacting administrators of the Missouri Chapter of 4-state APN and the Advanced Practice Nurses of the Ozarks

(APNO), we received permission to provide links for the survey and access to an electronic version of the educational book on their Facebook group and websites. We estimated that only four participants responded to the online request.

With responses short of the goal, we reduced our expectation to 30 respondents and contacted administrators at Northeastern Tribal Health System, Miami, Oklahoma, and received permission to administer the surveys to providers and staff. There were 12 participants who returned their surveys for a total of 34.

Description of Sample/Population

A snowball sampling technique was utilized where we received responses from 34 participants. The research allowed for analysis of survey data for demographic comparison regarding education level, years in practice, and perceived knowledge of immunization practice as recommended by the CDC for determination of project benefit. The following questions were utilized for compilation of demographic data.

1. What is the gender of the provider/staff member?
2. What is the age of the provider/staff member?
3. What is the education level of the provider/staff member?
4. What is the provider/staff member's licensure or certification status?
5. Does the provider/staff member have experience with immunization guidelines of the CDC-recommended immunization schedule?
6. How many years has the provider/staff member practiced in family medicine or pediatric care?

Table II.

Participant Demographics

								Totals
Gender	<i>Males</i>	<i>Females</i>	<i>No Answer</i>					
	0% (n = 0)	100% (n = 34)	0% (n = 0)					100% (n = 34)
Age	<i>21-30</i>	<i>31-40</i>	<i>41-50</i>	<i>51-60</i>	<i>61+</i>	<i>No Answer</i>		
	14.71% (n = 5)	29.41% (n = 10)	8.82% (n = 3)	17.65% (n = 6)	5.88% (n = 2)	23.53% (n = 8)		100% (n = 34)
Education	<i>On the Job Training</i>	<i>Technical School</i>	<i>Associates Degree</i>	<i>Bachelors Degree</i>	<i>Masters Degree</i>	<i>Doctorate</i>	<i>No Answer</i>	
	5.88% (n = 2)	29.41% (n = 10)	14.71% (n = 5)	5.88% (n = 2)	35.29% (n = 12)	5.88% (n = 2)	2.94% (n = 1)	99.99% (n = 34)
Licensure	<i>None</i>	<i>Medical Assistant</i>	<i>LPN</i>	<i>RN</i>	<i>NP or PA</i>	<i>Physician</i>		
	2.94% (n = 1)	11.76% (n = 4)	23.53% (n = 8)	17.65% (n = 6)	44.12% (n = 15)	0% (n = 0)		100% (n = 34)
Prior Experience	<i>Yes</i>	<i>No</i>	<i>No Answer</i>					
	94.11% (n = 32)	5.88% (n = 2)	0					99.99% (n = 34)
Years of Practice	<i>0-5</i>	<i>6-10</i>	<i>11-15</i>	<i>16 +</i>				
	52.94% (n = 18)	14.7% (n = 5)	17.65% (n = 6)	14.7% (n = 5)				99.99% (n = 34)

Of the surveys returned, 23.53% did not provide an age. The mean age for participants rounded up to 42 years of age, with 29.41 percent between the ages of 31-40. There were 35.29% of the participants educated with a master's degree, with over 52% having an average number of years in practice between 0-5 years.

Data Acquisition

Twenty questions were developed for assessment to evaluate environmental readiness and determine provider and staff knowledge level. The questions were based upon the themes detected upon literature review and standard daily patient encounters among Family Medicine and Pediatric Medicine, indicative of shortcomings related to the topic of pediatric immunization. The questions used for pretest and posttest allow for determination of improvement in immunization schedule knowledge, administration knowledge, and vaccine-specific knowledge.

Data Analysis

Numeric values assigned to yes and no answers on the pretests and posttests of the educational booklet (Appendix A) were used to determine if there was improvement between the two surveys. This was accomplished by calculating each participant's individual answers. The assignment of the number "1" for each "yes" answer and a "0" for every "no" answer provided data for statistical analysis. The comparison of pretest and posttest answers for each individual question informed the research of success of the developed educational booklet and also suggests benefit of future research on this subject matter and the effective reduction of missed opportunities for vaccinations (MOVs).

An increase in mean value of each dimension of the survey from the pretest to the posttest represents the variance of index of compliance to the vaccination schedule, administration knowledge, and vaccine-specific knowledge. The questions emphasize focus on the three dimensions of vaccination knowledge, based upon data derived from literature review, as described in chapter 2. By creating subheadings from each focus area, the research adds reliability and validity of index.

The percentage of each yes/no answer was calculated for indication of need for improvement regarding a specific topic. The research can also determine statistical results of each subgroup or evaluate scores in totality. The educational booklet addresses portions of each area of interest.

Table III.

Data Analysis

Pretest				Posttest					
Question	No %	Yes %	"N"	Question	No %	Yes %	"N"	Difference in "yes" response	Percent change
Immunization Schedule Knowledge									
1	5.9	94.1	34	1	2.9	97.1	34	3	3.19
2	26.5	73.5	34	2	2.9	97.1	34	23.6	32.11
3	8.8	91.2	34	3	2.9	97.1	34	5.9	6.47
4	11.8	88.2	34	4	0	100	34	11.8	13.38
5	5.9	94.1	34	5	2.9	97.1	34	3	3.19
6	2.9	97.1	34	6	5.9	97.1	34	0	0
7	17.6	82.4	34	7	5.9	94.1	34	11.7	14.20
Administration Knowledge									
8	32.4	67.6	34	8	14.7	85.3	34	17.7	26.18
9	41.2	58.8	34	9	35.3	64.7	34	5.9	10.03
10	44.1	55.9	34	10	38.2	61.8	34	5.9	10.55
11	20.6	79.4	34	11	11.8	88.2	34	8.8	11.08
12	52.9	47.1	34	12	0	100	34	52.9	112.31
13	14.7	85.3	34	13	2.9	97.1	34	11.8	13.83
14	50	50	34	14	5.9	94.1	34	44.1	88.2
Vaccine-Specific knowledge									
15	17.6	82.4	34	15	0	100	34	17.6	21.36
16	3.0	97.0	34	16	0	100	34	3	3.09
17	38.2	61.8	34	17	2.9	97.1	34	35.3	57.12
18	47.1	50	33	18	2.9	97.1	34	47.1	94.2
19	44.1	55.9	34	19	5.9	94.1	34	38.2	68.34
20	17.6	82.4	34	20	0	100	34	17.6	21.36

As previously stated in chapter 3, the dependent variables for this project are participants' attitude about immunization visits, perceived knowledge level before and after the education, and reported improvement in anxiety regarding immunization practice and administration. Analysis of pre- and posttest data provides measurement of the dependent variables.

A comparison of pretest and posttest results was compiled for each dimension which indicate improvement in knowledge of the selected criteria after review of educational information (Table IV). Pretest immunization schedule knowledge (Dimension 1 Pretest) showed mean knowledge of 6.0588 with posttest (Dimension 1 Posttest) results of 6.7363, a positive difference of 0.6765. Administrative knowledge appears to improve with educational information review from pretest knowledge (Dimension 2 Pretest) of 4.4412 to 5.9118 posttest (Dimension 2 Posttest), indicating an improvement of 1.4706. Vaccine-specific knowledge is most improved after educational information is provided. This is evidenced by pretest results (Dimension 3 Pretest) of 4.2647 improving to posttest results (Dimension 3 Posttest) of 5.8824, a positive difference of 1.6177.

Table IV.

Overall Effect of Vaccine Education

		Schedule Knowledge Pretest	Schedule Knowledge Posttest	Administration Knowledge Pretest	Administration Knowledge Posttest	Vaccine Specific Knowledge Pretest	Vaccine Specific Knowledge Posttest
N	Valid	34	34	34	34	34	34
	Missing	0	0	0	0	0	0
		7 Questions	7 Questions	7 Questions	7 Questions	6 Questions	6 Questions
Mean		6.0588	6.7353	4.4412	5.9118	4.2647	5.8824
Std. Deviation		1.30131	.56723	1.74410	1.05508	1.58227	.40934

Using the SPSS 24 software, value added from the pretest to posttest and reduction of standard deviation from pretest to posttest suggests successful learning and accomplishment of project objectives with indication of improvement of the participants knowledge about vaccination administration.

Summary

The purpose of this study was achieved by determination of benefit through results that suggest educational intervention increased provider and clinic staff knowledge about the CDC-recommended vaccination schedule, immunization administration, and vaccine-specific information. Survey results suggest positive correlation of specific education and improved confidence for the provider and staff with regard to these topics. Comparison of results from each individual question also exhibited a positive difference between pretest and posttest.

Chapter V

DISCUSSION

Relationship of Outcomes to Research

The purpose of this exploratory pilot study was to determine the benefit of focused education about three dimensions of vaccine administration. This original research studied dimensions which were decided to represent knowledge of the Centers for Disease Control and Prevention's (CDC) recommended immunization schedule, vaccine administration knowledge, and vaccine-specific knowledge. The education was given to healthcare providers and clinic staff in order to reduce the number of missed opportunities for vaccinations for pediatric patients.

With respect to the immunization schedule, respondents were surveyed with seven questions pertaining to their current use of the CDC schedule. They were asked about employer advocacy of the schedule, ease of access, and knowledge of interpretation of this data. This information reminds the participant of the ease of access to the schedule as well as encourage the use. The benefit of this educational information was indicated by a knowledge increases of 13.38% when advised of the available electronic resource. It was also found that the greatest knowledge improvement (32.11%) pertained to information about the quarterly meetings of the Advisory Committee on Immunization Practice (ACIP). Participants were informed of the regular meetings, supportive of

evidence-based research. The final question of this dimension was a reminder that a vaccine information statement (VIS) needs to be provided to every patient representative, thus promoting communication with their clients about the vaccine and benefits. These results for this question increased in positivity by 14.20%.

Administrative knowledge was assessed using questions about comfort in administration of immunizations and confidence in level of training previously provided compared to post educational brochure. Some administrative details such as site-specific administration and spacing between administration of vaccines were addressed, as well. The greatest increase of the entire study of 112.31% with respect to knowledge of administration specifics. This is followed by knowledge about the federal law regarding patient refusal forms at 88.2%. The results of this dimension indicate the need for greater education regarding the medico-legal aspect of vaccine administration.

The final dimension addressed by this study regarded vaccine-specific knowledge. The education information pertaining to this dimension mostly touched on combination medications, live versus “dead” virus administration, and age-specific considerations with certain vaccines. The final question, of the six associated with this dimension, was intended to direct the participant to resources for obtaining vaccine-specific information prior to administration of certain medications. These results indicate a moderate improvement, of greater than 21%, in four of the questions. There was severe increase in knowledge of 94.2% regarding the combination medication of MMR and varicella. This number is interesting because the adverse reaction associated with the combination medication can be extremely dangerous for patients.

The results of the study indicated improvement in knowledge and confidence by the participant with regard to these stated dimensions. Prior to implementation of the study, a literature review was accomplished and revealed that there is limited research on the effect of focused education for clinical staff on patient vaccination compliance. Through this project, it was discovered that healthcare providers are aware of knowledge deficits and evidently benefit from more focused education on the three dimensions described above. Initially, the research question was too broad and did not accomplish an interventional result. This required consideration of a more focused hypothesis.

The hypothesis for this project states: In medical personnel who care for the pediatric population, the vaccination schedule is more accurately understood\implemented in pediatric practice compared to family practice. Therefore, education about the CDC-recommended pediatric immunization schedule and proper administration of the vaccines will improve the rate of missed opportunities for vaccinations among medical providers and staff.

In order to answer the hypothesis, an education book was developed that contained information about the CDC-recommended immunization schedule. An online link to the schedule was provided and encouraged review of the information that it contains. The participant was directed to take note of the rationale for the development of the schedule by the Advisory Committee on Immunization Practice (ACIP). This was in order to understand the evidence-based decision making about the ACIP recommendations.

The educational material also instructed the participant about reasons for vaccine spacing, how to administer the medications, and what kind of vaccinations are available.

The booklet was developed to be conversational in nature and educational highlights were concise with links to online sources. For the last dimension regarding vaccine-specific knowledge, information about combination vaccines, areas of concern, potential side effects, and a link to additional information on the CDC organizational website an online link was provided.

The questions for the pretest and posttest reflected highlights of the educational information in the booklet. For validation of the hypothesis, the participants were asked to answer the questions on the pretest. Then, after reviewing the information in the educational booklet, they were requested to answer the same questions on the posttest. The hypothesis seems to have been confirmed by the improvement noted on the answers when comparing the pretest to the posttest. Comparison of the data from this project to historical data was not accomplished because no previous research on this specific topic is available.

It was unexpected that so few eligible providers and clinical staff responded to the call for participation in this survey. When two large organizations of Nurse Practitioners were contacted, only a small number responded to the request. This may have occurred because of difficulty using the social media platform that hosted the invitation and the link for the pretest and posttest.

What These Findings Mean

These results of this study suggest a positive correlation between focused education about vaccine knowledge and increased confidence of the provider and clinical staff when recommending and administering immunizations to children. This appears to support a hypothesis that providing recurrent vaccine education to staff will decrease

missed opportunities for vaccinations for children (Jaca, Methebula, Iweze, Pienaar, and Wiysonge, 2018).

Observations

This data supports the hypothesis that increasing education will reduce rates of missed opportunities for vaccination in children, based upon the understanding that improved knowledge will lead to better ability to inform patient representatives. Further study is recommended in order to determine statistical information about missed opportunities after the immunization education is given to providers and staff. This study shows that education improves knowledge, evidenced by improvement in mean scores on every question on the pretest compared to the posttest.

Theoretical Framework

With respect to Patricia Benner's middle-range theory, "From Novice to Expert," this project exhibits that providers and clinical staff can progress to a higher level of proficiency in immunizations through vaccine education (Davis, & Maisano, 2016). The major assumptions and theoretical statements in Benner's theory are observed through each level of proficiency.

The primary assumption, described as Benner's conceptualization, is that nurses gain knowledge based upon their experience (Nursing Theories 2011). Benner (1982) states that the nurse, through the stages of their career, moves from relying upon the didactic principles of nursing to trusting their experience as a nurse. This applies to the project with consideration of the CDC-recommended vaccination schedule, ACIP recommendations, and vaccine-specific education.

The research results indicate improvement in knowledge with education. As the theoretical framework supposes, the expert nurse will be expected to either memorize the schedule, apply appropriate knowledge in abnormal situations, or comfortably know where to find the necessary information. These results and the theory concur.

Logic Model

The results of this study support the logic model presented in chapter 1 of this project by indicating benefit conducive to the short-term outcomes of the project. This data suggests that improved confidence, after education, leads to the next step of improving communication with patients and parents of patients, thus improving parental knowledge in hopes of reducing missed opportunities for vaccinations.

The project results demonstrate the expected relationship between the concept of education and compliance, as developed in the logic model for this project. The ultimate goal is to fully reduce the number of missed opportunities for vaccinations by sharing knowledge gained through education specific to immunization schedule, administration, and medication specifics.

Table V.

Logic Model

Name of Project:					
Provider and clinical staff education about the CDC-recommended pediatric immunization schedule and proper administration of the vaccines					
Problem:					
There is a high rate of missed opportunities for vaccinations due to provider and clinical staff knowledge-deficit and anxiety about the vaccination schedule.					
Situation:					
Family medicine clinic staff are less familiar with the CDC-recommended vaccination schedule, catch-up schedule, and combination medication special instructions than pediatric clinic staff. Familiarity with the schedule is expected to improve with exposure, resulting in fewer missed opportunities for vaccinations.					
Inputs	Outputs		Outcomes		
	Activities	Participants	Short-term	Mid term	Long term
Human resources: Provider and clinical staff Office supplies: Paper for brochures, well-designed pretest and posttest Field resources: Access to clinic	Educational booklet placement Pretest and posttest Raffle prize for participation	Clinical staff and providers	Providers and clinical staff acknowledge the resources that are available to assist with proper scheduling of immunization visits	Providers and clinical staff address immunization status with each patient who presents for well-child-checks	Zero missed opportunities for vaccinations
Assumptions			External Factors		
1. Clinic administrators allow for display of educational brochure 2. Provider and clinical staff participation is significant enough to conclude successfully 3. Provider and clinical staff are aware of knowledge deficit and eager to remedy			1. The clinic is busy 2. Influences are unpredictable 3. The Clinic leadership allows for participation in the education and testing		
Evaluation Plan:					
Provider and clinical staff survey of adequate address of their needs with regard to immunization knowledge and application.					

Limitations

Most of the sampling was a sample of convenience through professional relationships. The clinics that were encountered are part of the same health system or in the same area of service in the area of Southwest Missouri and Northeast Oklahoma. Permission for use of the clinic staff as participants were obtained through professional relationship with the managers of the clinic. Participants were recruited through promise of a gift card raffle, based upon their voluntary submission of telephone contact information. The participants were promised anonymity, even with submission of their phone number for use with the raffle drawing. Additionally, a small non-random sampling was obtained through blanket recruitment of participants associated with the Advanced Practice Nurses of the Ozarks (APNO) and 4-States Advanced Practice Nurses (4-State APN) through their social media pages. A snowball sampling technique was observed, because of this manner of recruitment. This provided a natural bias, where participants helped to recruit other participants.

In hindsight, the demographic portion of the tool should have included questions about where the participant primarily worked, whether in pediatrics or family medicine. This knowledge would have more closely represented one aspect of the hypothesis regarding pediatric clinic staff knowledge versus family medicine staff knowledge. Also, the instrument was a factor in limiting the project, to a small degree, because on the hardcopy version of the tool the “NP/PA” designation was left off of the demographic section, requiring the participant to write it in. This error was corrected in the online version of the tool using *www.surveymonkey.com*. The impact of this error was minimal in relation to the sample size and participants.

The sample size was smaller than expected, with an initial goal of 50 participants. Limited response to our initial recruitment required additional measures for finding voluntary participants. In order to do so, leaders of APNO and 4-State APN agreed to disperse the educational booklets with the pretest and posttest, if an electronic version of the tests with material was provided. In answer, *www.surveymonkey.com* was utilized for the online version of the pretest and posttest. This increased our sample size by only 4 participants for a total of 22. Realizing that the sample was severely short of the goal of 50 participants, the minimum threshold of responses was changed to 30 surveys. It was decided to contact the Northeastern Tribal Health System in Miami, Oklahoma, for permission to include their providers and clinical staff in the project. They agreed and thus provided 12 more participants for a total of 34.

Implications for Future Projects and/or Research

The research indicates that the next step in knowledge development on this topic is to study the effect of increased education to the providers and staff on the decision of parents of pediatric patients about immunizations. If this were to occur, it is suggested to improve upon the design of this project by providing face-to-face or classroom education for the participants. Also, modification of the pretest and posttest questions would allow for subjective response to the perceived benefit of the educational material.

This study is reproducible and can be modified to reach a larger body of providers and staff. The replication of the project should be accomplished using a better control sample. The observance of the effect of the three dimensions of information are important for the understanding of the vaccination schedule, vaccine administration, and vaccine-

specific knowledge. Future research on this topic should examine these three dimensions as they pertain to evidence-based medicine.

Implications for Practice

The clinical significance of our findings is that, as hypothesized, better immunization education will lead to decreased numbers of missed opportunities for vaccinations and contribute to the eradication of vaccine preventable diseases. As a result of these findings, the research suggests that healthcare providers and clinical staff receive recurrent education at least yearly. Continuing education on overall immunization knowledge should occur and likely will decrease provider anxiety and increase confidence when communicating with parents and patient representatives about vaccine knowledge.

A further suggestion includes addressing the changes that need to occur in a place of family practice through selected guidelines that pertain to the knowledge deficit and inconsistent practice of staff (provider and staff) of a busy family practice clinic.

The following recommended bundle is practice-specific with consideration of applicable guidelines:

Table VI.

Practice Change Recommendations

Recommendation	Description	Definition
1. Check their calendar	1. Evaluate the patient's vaccination schedule	General Principles for Vaccine Schedules – “Vaccination providers should adhere to recommended vaccination schedules. Administration at recommended ages and in accordance with recommended intervals between doses of multidose antigens provides optimal protection.” (CDC, 2018)
2. Consider contraindications		Contraindications and precautions for applicable immunizations for this patient's visit.
3. Discuss benefits and bad things	Risks	Preventing and Managing Adverse Reactions – “Parents, guardians, legal representatives, and adolescent and adult patients should be informed about the benefits of and risks from vaccines in language that is culturally sensitive and at an appropriate educational level. Opportunity for questions should be provided before each vaccination. Discussion of the benefits of and risks from vaccination is sound medical practice and is required by law.” (CDC, 2018)
4. Give it good		Vaccine Administration – Right dose and the appropriate route, select a good site, utilize proper mix and combination doses where applicable (CDC, 2018).
5. Record it right		Vaccination Records – “Appropriate and timely vaccination documentation helps ensure not only that persons in need of recommended vaccine doses receive them but also that adequately vaccinated patients do not receive excess doses.” (CDC, 2018)

Conclusion

To assess the effect of education on the topic of vaccine administration and immunizations and reduction of missed opportunities, an educational booklet was designed containing links to multiple resources found on the multiple pages of the CDC website. This information was bookended by a pretest and posttest that was designed to offer prompts for realization of need to seek greater understanding regarding the dimensions of knowledge with respect to schedule, administration, and medications. Results of the posttest suggest that focused education on these three dimensions can improve provider and clinical staff confidence and competency of overall vaccine knowledge. It is surmised, based upon these results, that such education will contribute to dispersion of the education to patients and their representatives and subsequently reduce the number of missed opportunities for vaccinations among pediatric populations.

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APPENDIX

Appendix A

Educational Booklet



**A STUDY ON THE EFFECT OF PEDIATRIC VACCINE EDUCATION
ON IMMUNIZATION KNOWLEDGE AND COMFORT
FOR HEALTHCARE PROVIDERS AND CLINIC STAFF**

BY

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June 19, 2019

Dear Participant:

Hello! Please let me introduce myself. I am John (Matt) Derfelt, a Doctor of Nursing Practice student at Pittsburg State University. For my scholarly project, I am examining healthcare provider and clinical staff's perceived knowledge and comfort level regarding pediatric immunization practices. Because you are a provider and/or clinical staff member of a Family Medicine Clinic or Pediatric Clinic, I am inviting you to participate in this research by completing the attached pre-test, reviewing the educational brochure, and then finishing the post-test.

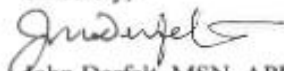
The pre-test, educational brochure, and post-test will take approximately 20-30 minutes to complete. There is no compensation for completion of the research material, nor is there any known risk. There is an opportunity for voluntary participation in a raffle drawing for participation in the study. Please do not include your name, to ensure confidentiality.

If you choose to participate in this project, please complete the pre-test, review the educational brochure, and take the post-test. When finished, place the tests in the accompanying collection container by the last day in June. Participation is voluntary and you may refuse to participate at any time.

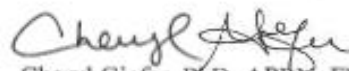
Thank you for taking the time to help me complete my educational requirements. The data collected will provide useful information for decreasing associated anxiety and confusion about the CDC recommended immunization schedule, administration knowledge, and vaccine specific knowledge. If you would like a summary copy of this study, please feel free to contact the researchers at the number or email below.

If you have any complaints or problems with the conduct of this study, you may contact my DNP Scholarly Project Chair, Dr. Cheryl Giefer, Irene Ransom Bradley School of Nursing. Thank you very much for participating in my DNP Scholarly Project!

Sincerely,



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Cheryl Giefer, PhD, APRN, FNP
University Professor, Project Chair
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INDEX FOR VACCINATION COMPLIANCE PRETEST

The purpose of this survey is to find out about your knowledge and comfort level with the CDC immunization schedule, vaccine administration, and vaccine-specific recommendations. This survey is conducted as a research project as a condition for fulfillment of the Doctor of Nursing Practice degree at Pittsburg State University, Pittsburg Kansas. The project coordinators are John Derfelt, MSN, FNP-C and Dr. Cheryl Giefer, Pittsburg State University. The project has been approved by the *Institutional Review Board*, PSU. Nowhere on this survey are you asked to reveal your identity. You may request the results of this survey by e-mailing derfelts@yahoo.com by the end of September 2019.

Gender: M ☐ F ☐ AGE: _____

Education: Technical School ☐ Associates ☐ Bachelors ☐ Masters ☐ Doctorate ☐ On the job training ☐

Licensure or Certification: Physician ☐ NP ☐ PA ☐ RN ☐ LPN ☐ MA ☐ None ☐

Do you have experience with immunization guidelines of the CDC recommended immunization schedule?
Yes ☐ No ☐

How many years have you practiced in family medicine or pediatric care?
0-5 ☐ 6-10 ☐ 11-15 ☐ more than 16 years ☐

Please check the response that best indicates your position

Immunization schedule knowledge

- 21) Do you ever reference the CDC recommended immunization schedule?
Yes ☐ No ☐
- 22) Are you familiar with the CDCs ACIP ongoing review of immunization practices?
Yes ☐ No ☐
- 23) To your knowledge, does your clinic follow a standardized approach to encountering children for immunization scheduling and administration?
Yes ☐ No ☐
- 24) Do you know how to access and utilize the CDC vaccine catch up guide?
Yes ☐ No ☐
- 25) Is there an objective benefit to prescreening of the patient's vaccination record prior to the scheduled visit of the patient?
Yes ☐ No ☐
- 26) Do you have access to a personal reference tool to aid you in accuracy of determination of immunization needs for children?
Yes ☐ No ☐
- 27) Do you give a vaccine information statement (VIS) to every patient who receive a vaccination?
Yes ☐ No ☐

Administration knowledge

- 28) Are you comfortable with your current knowledge regarding pediatric immunization records and vaccination administration?
Yes ☐ No ☐
- 29) Have you ever received formal training regarding vaccination knowledge and administration?
Yes ☐ No ☐

**INDEX FOR VACCINATION COMPLIANCE
PRETEST**

- 30) Have you ever made a vaccination error (to include missed opportunities for vaccination, wrong dose, early administration, etc...)? Yes ☐ No ☐
- 31) If a patient's immunization history is incomplete or unknown, does the CDC advise administration of recommended vaccinations? Yes ☐ No ☐
- 32) Do you know the minimum number of days before the recommended age that a dose may be given without requiring re-administration? Yes ☐ No ☐
- 33) Do you understand the benefit of everyone in your office using the same sites for each vaccination, utilizing a standardized anatomical map? Yes ☐ No ☐
- 34) Did you know that it is not a federal law for a parent to sign a refusal form if they choose not to immunize their child, but a provider can require one for formal documentation and protection? Yes ☐ No ☐

Vaccine-specific knowledge

- 35) Do you know which vaccines are "live attenuated" and how often (minimum interval) between administration of them? Yes ☐ No ☐
- 36) Did you know that adolescents should be given the Tdap (not the Dtap) at age 11-12? Yes ☐ No ☐
- 37) Do you know the rationale for the minimum interval between administration of live vaccines? Yes ☐ No ☐
- 38) Are you now aware that administration of combined MMR and Varicella (MMRV) is not recommended in patients with a personal or immediate family history of seizures, instead MMR and varicella should be administered separately? Yes ☐ No ☐
- 39) Are you aware that the combined vaccination, Kinrix (DTaP and IPV) should not be given before age 4 years? Yes ☐ No ☐
- 40) Do you know where to find a listing of the contraindications and precautions for each recommended vaccine? Yes ☐ No ☐

THANK YOU FOR PARTICIPATING

Instructions: Please tear off and place in collection container. If you would like entered into the raffle drawing, you may add your phone number here so we can notify you. Your answers will remain anonymous.

Phone number: _____

Purpose

The purpose of this research is addressing medical provider and clinic staff's self-awareness of the Centers for Disease Control and Prevention's (CDC) recommended immunization schedule and administration of vaccines and improving baseline knowledge through focused education.

Just so you know...

In primary care, you will encounter many parents who do not agree with the Center's for Disease Control and Prevention's (CDC) recommended schedule. Many will decide to alter the schedule to a level of their comfort, though they will not know why. As a healthcare provider, you should know that the CDC Advisory Committee on Immunization Practices (ACIP) meets three times a year to consider evidence vaccine information and data. They use an evidence-based method based upon the "Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) approach to consideration of current immunization practice -

<https://www.cdc.gov/vaccines/acip/meetings/index.html>

And then you have some parents who want to come in early...

"Doses administered too close together or at too young an age can lead to a suboptimal immune response. However, administering a dose a few days earlier than the minimum interval or age is unlikely to have a substantially negative effect on the immune response to that dose. Known as the "grace period", vaccine doses administered ≤ 4 days before the minimum interval or age are considered valid; however, local or state mandates might supersede this 4-day guideline" - <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html>

Yet some will have reservation about subsequent doses, because they witnessed the distress of their child during a previous immunization...

"Approximately 90%-95% of recipients of a single dose of certain live vaccines administered by injection at the recommended age (i.e., measles, rubella, and yellow fever vaccines) develop protective antibodies, generally within 14 days of the dose. For varicella and mumps vaccines, 80%-85% of vaccines are protected after a single dose. However, because a limited proportion (5%-20%) of measles, mumps, and rubella (MMR) or varicella vaccinees fail to respond to 1 dose, a second dose is recommended to provide another opportunity to develop immunity. Of those who do not respond to the first dose of the measles component of MMR or varicella

vaccine, 97%-99% respond to a second dose” -

<https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html>

Still, parents deserve your consideration of possible contraindications and knowledge of vaccine precautions. Here is a resource that the CDC provides...

Vaccine Contraindications and precautions:

<https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/contraindications.html>

You should consider documenting vaccination refusal. It may be up to you... “There is no federal law requiring such documentation. Several major medical organizations, including the American Academy of Pediatrics, have stated that healthcare providers may decide it is in their best interest to formally document a parent's refusal to accept vaccination for their (minor) child” - <http://www.immunize.org/askexperts/documenting-vaccination.asp>

Regardless, all patients should receive a Vaccine Information Statement (VIS)...

“The National Childhood Vaccine Injury Act requires that a VIS must be given to parents, legal representatives, or adult patients before administering the vaccine. A VIS must be provided prior to each dose, not just the first dose. Providers should be sure they are using the most current version of each VIS” - <http://www.immunize.org/askexperts/documenting-vaccination.asp>

“Federal law does not require a patient, parent, or guardian to sign a consent form in order to receive a vaccination; providing them with the appropriate VIS(s) and answering their questions is sufficient under federal law” - <http://www.immunize.org/askexperts/documenting-vaccination.asp>

And remember, “if it’s not written down, it wasn’t done”...

The following information must be documented on the patient’s paper or electronic medical record or on a permanent office log:

- 1) The vaccine manufacturer
- 2) The lot number of the vaccine
- 3) The date the vaccine is administered
- 4) The name, office address, and title of the healthcare provider administering the vaccine

- 5) The vaccine information statement (VIS) edition date located in the lower right corner of the back of the VIS. When administering combination vaccines, all applicable VISs should be given and the individual VIS edition dates recorded.
- 6) The date the VIS is given to the patient, parent, or guardian
<http://www.immunize.org/askexperts/documenting-vaccination.asp>

IMMUNIZATION SCHEDULE KNOWLEDGE

One of the first immunizations given is the Hepatitis B vaccine. The first dose is given at birth -

<https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html>

Further dosing is recommended for a total of 3 doses, however administration of **4 doses** is permitted when a combination vaccine containing HepB is used after the birth dose -

<https://www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html>

There is a recommended minimum interval between vaccines. In order to provide better understanding, the CDC provides a “Vaccine Catch-Up Guide” - <https://www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html>

You need to understand that there is a difference between the four types of vaccines: Live attenuated; Inactivated; Subunit, Recombinant, Polysaccharide, and Conjugate; and Toxoid -

<https://www.vaccines.gov/basics/types>

These different types of vaccines of specific rules about their scheduling:

“If the first dose in a series is given ≥ 5 days before the recommended minimum age, the dose should be repeated on or after the date when the child reaches at least the minimum age (7). If the vaccine is a live vaccine, ensuring that a minimum interval of 28 days has elapsed from the invalid dose is recommended” - <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html>

“If the first dose in a series is given ≥ 5 days before the recommended minimum age, the dose should be repeated on or after the date when the child reaches at least the minimum age” -

<https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html>

For calculating intervals between doses, 4 weeks = 28 days -

<https://www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html>

ADMINISTRATION KNOWLEDGE

Do not be surprised if a parent presents with their child, for a well child check, without documentation of their status...

Administer recommended vaccines if immunization history is incomplete or unknown - <https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html>

Perhaps you are wondering why Live-Attenuated Vaccines must be administered at a specific interval...

“The immune response to one live-virus vaccine might be impaired if administered within 28 days (i.e., 4 weeks) of another live-virus vaccine” - <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html>

Documentation may seem simple enough, but keep in mind that you might not be the only one providing vaccinations to the child...

“One way to handle this is to indicate if the vaccination was given either in the "upper" or "lower" portion of the injection area selected (e.g., DTaP: right thigh, upper; Hib: right thigh, lower; or PCV13: left thigh, upper; HepB: left thigh, lower). It is helpful if everyone in your office or clinic uses the same sites for each vaccine. Use of a standardized site map can facilitate this” - <http://www.immunize.org/askexperts/documenting-vaccination.asp>

VACCINE-SPECIFIC KNOWLEDGE

Some vaccinations require a little more emphasis...

“MMR and varicella vaccine can be administered simultaneously. Live, attenuated influenza vaccine (LAIV) does not interfere with the immune response to MMR or varicella vaccines administered at the same visit” - <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html>

However...

“In patients recommended to receive both PCV13 and PPSV23, the 2 vaccines should not be administered simultaneously. PCV13 should be administered first. If PPSV23 has been administered first, PCV13 should be administered no earlier than 8 weeks later in children 6-18 years, and one year later in adults 19 years and older” - <https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/timing.html>

There are some age restrictions and special guidelines for some combination vaccines...

“In 2008, FDA licensed Kinrix, a combination DTaP and IPV vaccine. It is approved for use as the fifth dose of DTaP and the fourth dose of IPV in children ages 4 through 6 years who received DTaP (Infanrix) and/or DTaP-HepB-IPV (Pediarix) as the first three doses and DTaP (Infanrix) as the fourth dose. It should not be given to children younger than age 4 years” - http://www.immunize.org/askexperts/experts_combo.asp

Some parents will tell you that they fear the MMRV vaccine the most, this might be why...

“In 2010 CDC issued new recommendations for the use of combination MMRV vaccine. Prior to issuing these recommendations, ACIP reviewed results of post-licensure studies that suggest that, during the 5–12 day post-vaccination period, approximately one additional febrile seizure occurred among every 2,600 children ages 12 through 23 months vaccinated with a first dose of MMRV vaccine compared with children in the same age group vaccinated with separate first doses of MMR vaccine and varicella vaccine administered during a single office visit” - http://www.immunize.org/askexperts/experts_combo.asp

Adolescents age 11–12 years: 1 dose Tdap – transition from Dtap. - <https://www.cdc.gov/vaccines/schedules/hcp/imz/catchup.html>

Combination vaccines can alleviate the parents' concern for multiple shots for their child. Some examples of current combination medications are...

Dtap-IPV-HepB (Pediarix); Dtap-IPV-Hib (Pentacel); Dtap-IPV (Kinrix); HepA-HepB (Twinrix); and MMRV (Proquad) -

http://www.immunize.org/askexperts/experts_combo.asp

The CDC provides an informational handout for parents...

<https://www.cdc.gov/vaccines/hcp/conversations/downloads/fs-combo-vac.pdf>

Practice Change Recommendation

Recommendation	Description	Definition
Check their Calendar	Evaluate the patient's vaccination schedule	General principles for vaccine schedules – “Vaccination providers should adhere to recommended vaccination schedules. Administration at recommended ages and in accordance with recommended intervals between doses of multidose antigens provides optimal protection.” (https://www.cdc.gov/vaccines/hcp/admin/admin-protocols.html)
Consider contraindications	Assessment	Contraindications and precautions for applicable immunizations for this patient's visit - https://www.cdc.gov/vaccines/hcp/admin/screening.html
Discuss benefits and bad things	Risks	Preventing and managing adverse reactions – “Parents, guardians, legal representatives, and adolescent and adult patients should be informed about the benefits of and risks from vaccines in language that is culturally sensitive and at an appropriate educational level. Opportunity for questions should be provided before each vaccination. Discussion of the benefits of and risks from vaccination is sound medical practice and is required by law.” (https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/adverse-reactions.html)
Give it good	Administration	Vaccine administration – Right dose and the appropriate route, select a good site, utilize proper mix and combination doses where applicable (https://www.cdc.gov/vaccines/hcp/admin/administer-vaccines.html)
Record it right	Documentation	Vaccination records – “Appropriate and timely vaccination documentation helps ensure not only that persons in need of recommended vaccine doses receive them but also that adequately vaccinated patients do not receive excess doses.” (https://www.cdc.gov/vaccines/hcp/acip-recs/general-recs/records.html)

You may consider tearing off and keeping in a common place at your clinic

**INDEX FOR VACCINATION COMPLIANCE
POSTTEST**

Please check the response that best indicates your position

Immunization schedule knowledge

- 1) Do you ever reference the CDC recommended immunization schedule?
Yes ☐ No ☐
- 2) Are you familiar with the CDCs ACIP ongoing review of immunization practices?
Yes ☐ No ☐
- 3) To your knowledge, does your clinic follow a standardized approach to encountering children for immunization scheduling and administration?
Yes ☐ No ☐
- 4) Do you know how to access and utilize the CDC vaccine catch up guide?
Yes ☐ No ☐
- 5) Is there an objective benefit to prescreening of the patient's vaccination record prior to the scheduled visit of the patient?
Yes ☐ No ☐
- 6) Do you have access to a personal reference tool to aid you in accuracy of determination of immunization needs for children?
Yes ☐ No ☐
- 7) Do you give a vaccine information statement (VIS) to every patient who receive a vaccination?
Yes ☐ No ☐

Administration knowledge

- 8) Are you comfortable with your current knowledge regarding pediatric immunization records and vaccination administration?
Yes ☐ No ☐
- 9) Have you ever received formal training regarding vaccination knowledge and administration?
Yes ☐ No ☐

**INDEX FOR VACCINATION COMPLIANCE
POSTTEST**

- 10) Have you ever made a vaccination error (to include missed opportunities for vaccination, wrong dose, early administration, etc...)? Yes ☐ No ☐
- 11) If a patient's immunization history is incomplete or unknown, does the CDC advise administration of recommended vaccinations? Yes ☐ No ☐
- 12) Do you know the minimum number of days before the recommended age that a dose may be given without requiring re-administration? Yes ☐ No ☐
- 13) Do you understand the benefit of everyone in your office using the same sites for each vaccination, utilizing a standardized anatomical map? Yes ☐ No ☐
- 14) Did you know that it is not a federal law for a parent to sign a refusal form if they choose not to immunize their child, but a provider can require one for formal documentation and protection? Yes ☐ No ☐

Vaccine-specific knowledge

- 15) Do you know which vaccines are "live attenuated" and how often (minimum interval) between administration of them? Yes ☐ No ☐
- 16) Did you know that adolescents should be given the Tdap (not the Dtap) at age 11-12? Yes ☐ No ☐
- 17) Do you know the rationale for the minimum interval between administration of live vaccines? Yes ☐ No ☐
- 18) Are you now aware that administration of combined MMR and Varicella (MMRV) is not recommended in patients with a personal or immediate family history of seizures, instead MMR and varicella should be administered separately? Yes ☐ No ☐
- 19) Are you aware that the combined vaccination, Kinrix (DTaP and IPV) should not be given before age 4 years? Yes ☐ No ☐
- 20) Do you know where to find a listing of the contraindications and precautions for each recommended vaccine Yes ☐ No ☐

THANK YOU FOR PARTICIPATING

Instructions: Please tear off and place in collection container. If you would like entered into the raffle drawing, you may add your phone number here so we can notify you. Your answers will remain anonymous.

Phone number: _____