

USING PARENTAL EDUCATION AND TEXT REMINDERS TO INCREASE THE HUMAN
PAPILLOMAVIRUS VACCINATION RATE IN EARLY ADOLESCENTS

A Doctor of Nursing Practice Project Report

by

GLORIA C. ROUX

BS, University of Texas Health Science Center San Antonio, 2003

MS Ed., University of Phoenix, 2011

MS, Simmons University, 2015

Submitted in Partial Fulfillment of the Requirements for the Degree of

Doctor of Nursing Practice

Texas A&M University-Corpus Christi
Corpus Christi, Texas

August 2023

© Gloria Colleen Roux

All Rights Reserved

August 2023

USING PARENTAL EDUCATION AND TEXT REMINDERS TO INCREASE THE HUMAN
PAPILLOMAVIRUS VACCINATION RATE IN EARLY ADOLESCENTS

A Doctor of Nursing Practice Project Report

by

GLORIA C. ROUX, MS Ed., MSN, APRN, FNP-C

This Doctor of Nursing Practice Project Report meets the standards for scope and quality of
Texas A&M University-Corpus Christi and is hereby approved.

Kyoung Eun Lee, Ph.D., WHCNP, RN
Chair

Mohan B. Rayala, M.D., FAAP
Committee Member

Jeffrey Turner, Ph.D.
Graduate Faculty Representative

August 2023

ABSTRACT

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States. HPV is transmitted through direct contact with skin and mucous membranes when having vaginal, anal, or oral sex with an infected person. There are 33,700 new cases of HPV diagnosed annually in the United States, and despite the availability of a safe and effective vaccine for HPV, parents are not vaccinating their adolescents. The current United States vaccination rate of adolescents aged 13–15 is 58.6%. The vaccination rate of early adolescents aged 9–11 is only 32.8%, much lower than those aged 13–15. Texas is ranked 31 of 50 states, with 54.9% of adolescents aged 13–17 vaccinated. Parents report declining the vaccine because the vaccine is not required, their children are too young, or their child is not sexually active and, therefore, does not need the vaccine. This quality improvement project aimed to examine the impact of text reminders, parental pre-reading, and individualized education on improving the HPV vaccination rates in early adolescents aged 9–11 at a suburban primary care clinic in a large Texas city. A convenience sample was used to recruit patients as they arrived for their appointments. This project offered parents individualized educational information and opportunities to discuss questions with providers. Over the project's twelve weeks, seventy-one patients ($n = 71$) met the inclusion criteria. The number of early adolescents initiating the vaccination series at their visit increased from 17.8% of 135 to 76.1% of 71. The results reveal that combining education and text message reminders increases HPV vaccine initiation effectively. The successful increase of vaccine initiation and completion rates will aid in cancer reduction overall health of our population and assist with reaching the current national goal of having 80% of adolescents vaccinated by 2030.

DEDICATION

I want to dedicate this work to my amazing and loving family. To my husband, Skip, thank you for always being my biggest cheerleader and always believing in my abilities to accomplish great things. To my children, Roan, Logan, Kellan, and Brennan, you four inspire me to be better every day. I could not have completed this without you all. Finally, to my mom, Maria, and my dad, James, I did it! I hope I have made you proud. I love you all.

ACKNOWLEDGEMENTS

My deepest gratitude to my committee chair, Dr. Kyoung Eun Lee, for her detailed feedback and unwavering support during this project. I could not have done this without you. To my project advisor, Dr. Mohan Rayala, for his constant support and encouragement during this project. This project would not have been possible without him and the dedication and help of the pediatric primary care clinic staff. Finally, to my graduate faculty representative, Dr. Jeffrey Turner, for asking difficult questions that forced me to think critically and showing genuine interest in this project.

TABLE OF CONTENTS

	Page
ABSTRACT.....	iv
DEDICATION.....	v
ACKNOWLEDGEMENTS.....	vi
TABLE OF CONTENTS.....	vii
LIST OF FIGURES.....	ix
LIST OF TABLES.....	x
1. INTRODUCTION.....	1
Background.....	1
Review of Literature.....	2
Problem Description.....	5
Purpose of the Project.....	7
Project Aims.....	8
Guiding Frameworks.....	8
2. METHODS.....	11
Ethical Considerations.....	11
Project Design.....	11
Interventions.....	13
Data Collection.....	15
Measurement Tools.....	15
Data Analysis.....	16
3. RESULTS.....	17

Aim 1.....	20
Aim 2.....	21
Aim 3.....	23
4. DISCUSSION.....	26
Relation to Other Evidence.....	27
Limitations.....	28
Interpretation.....	28
Conclusion.....	30
REFERENCES.....	31
APPENDIX A: HUMAN PAPILLOMAVIRUS OR HPV.....	37
APPENDIX B: HPV VACCINATION IMPROVEMENT PROJECT.....	39
APPENDIX C: FACILITY SUPPORT LETTER.....	41
APPENDIX D: RISK ASSESSMENT.....	42
APPENDIX E: FRAMEWORKS.....	43
APPENDIX F: IRB APPROVAL LETTER.....	44
APPENDIX G: HPV PROJECT TIMELINE.....	45

LIST OF FIGURES

	Page
Figure 1. Text Message and Vaccination Rate.....	21
Figure 2. Total Vaccination Rate.....	22
Figure 3. HPV Vaccination Rate by Age	23
Figure 4. Decision to Vaccinate Influenced by Intervention.....	24
Figure 5. Reasons for Declining Vaccine.....	25

LIST OF TABLES

	Page
Table 1. Pre-Implementation Data.....	18
Table 2. Post-Implementation Data.....	19

1. INTRODUCTION

Human papillomavirus (HPV) is the most common sexually transmitted infection (STI) in the United States (Centers for Disease Control and Prevention [CDC], 2020). HPV is transmitted through direct contact with skin and mucous membranes when having vaginal, anal, or oral sex with an infected person. There are 33,700 new cases of HPV diagnosed annually in the United States (Centers for Disease Control and Prevention [CDC], 2020). Most HPV infections are asymptomatic and self-limiting; persistent HPV infections can cause multiple cancers (CDC, 2020). Due to the frequency of the STI, it is essential to understand the potential long-term sequelae of HPV infection.

Background

The incidence of HPV is 13 million, and the prevalence is 42.5 million in the United States (CDC, 2020). The CDC estimates that HPV causes 90% of cervical and anal cancers, 70% of oropharyngeal, vaginal, and vulvar cancers, and 60% of penile cancers in the United States (Texas Health and Human Services, 2021). The incidence rate of HPV in Texas from 2013-2017 was 11.7 cases per 100,000 people (Texas Health and Human Services, 2021). From 2013-2017, 3,200 HPV-related cancers were diagnosed yearly in Texas, with 80% of diagnosed oropharyngeal and 60% of cervical cancers associated with HPV (Texas Health and Human Services, 2021). HPV and HPV-related cancers have taken a toll on the Texas healthcare system. Over 4,000 HPV-related deaths occur, and over \$4 billion is spent on cancer-related medical costs annually (Texas Health and Human Services, 2021).

A Healthy People 2030 objective is to increase the vaccination rate of adolescents aged 13–15 from 58.6% to 80% (United States Department of Health and Human Services, 2021). The vaccination rate of early adolescents aged 9-11 is only 32.8%, which is much lower than those

aged 13-15 (Chido-Amajuoyi et al., 2021). Texas is ranked 31 of 50 states, with 54.9% vaccinated adolescents aged 13–17 vaccinated against HPV (Centers for Disease Control and Prevention [CDC], 2020). Currently, there is only one HPV vaccine available in the United States (Centers for Disease Control and Prevention [CDC], 2021). Gardasil has been available since 2006 and prevents infection from the most common types of HPV, including types 6, 11, 16, 18, 31, 33, 45, 52, and 58 (CDC, 2021). The vaccine is indicated for males and females starting at age 9 (Merck Vaccines, 2022). The HPV vaccine is nearly 100% effective and can prevent over 90% of HPV-causing cancers (CDC, 2021). The vaccine is given in two or three doses depending on the age the first dose is administered (CDC, 2021). HPV will affect nearly every person within their lifetime, and finding effective educational interventions is essential to increase the vaccination rate and reduce HPV-associated morbidity and mortality.

Despite the availability of a safe and effective vaccine for HPV, parents are not vaccinating their adolescents. Parents report declining the vaccine because the vaccine is not required, their children are too young, or their child is not sexually active and, therefore, does not need the vaccine (Jacobson & Finney Rutten, 2019). Educating parents of early adolescents will correct these inaccuracies and improve overall vaccination rates, especially if initiated by age nine. St. Sauver et al. (2016) found a correlation between the initiation of vaccination by age nine with a higher series completion rate by age fifteen.

Review of Literature

Parents reported that lack of education is the most common barrier to HPV vaccination, including HPV-related infection, vaccine safety, and misinformation. A review of the current literature revealed that parents need more information on the vaccine, its efficacy, and the role of the vaccine in preventing cervical cancer (Widman et al., 2016). Knowledge of HPV infection,

rates, and subsequent cancer risks significantly increases parental intent to vaccinate adolescents against the virus (Mansfield et al., 2018).

Widman et al. (2018) completed a mixed-method approach, including a self-administered survey of 54 parents of adolescents aged 11–12. Parents reported that lack of education is the most significant barrier to vaccine uptake. Parents endorsed education focused on safety and cancer prevention to increase the vaccination rate. Overall results showed that parents desire more information on HPV, the benefits of the HPV vaccine, its efficacy, and the role of the vaccine in cancer prevention (Widman et al., 2018).

Spleen et al. (2011) used a 60-minute PowerPoint presentation to educate 117 parents of adolescent females aged 9-17 regarding HPV. The presentation reviewed information on the transmission of HPV, causative effects on cervical cancer and genital warts, and HPV vaccine-related facts. HPV-related knowledge increased for all participants, and an increase in the intent to vaccinate. Of the 23.7% of parents who completed a one-month post-education interview, 100% reported that the education was helpful, and 44.4% had initiated HPV vaccination (Spleen et al., 2011). Parents play a significant role in decision-making and must be adequately educated about HPV and the vaccine to make a well-informed decision about vaccinating their adolescents (Reiter et al., 2009).

Communication technologies, such as phone calls and text messages, to remind parents and patients about vaccine appointments are well-received and effective evidence-based methods to improve vaccination rates (Khuwaja & Peck, 2022). Aragonés et al. (2015) completed an exploratory study using a nonequivalent group of 69 Mexican parents of HPV vaccine-eligible children aged 9–17. All participants received a 20-minute educational session on HPV, the HPV vaccine, and HPV-related cancers. Parents were also given an educational pamphlet and were

given an opportunity to ask questions. Additionally, parents received text messages to remind them of vaccine eligibility. One week after the educational session, 45 of 69 participants received weekly text message reminders regarding vaccine eligibility, while twenty-four did not.

Aragones et al. (2015) found that 98% of parents in the education session plus text reminders reported initiating the vaccine, while 87% of those received the education session only. Eighty-eight percent of the education and text message group reported completing the vaccine series versus 40% of those in the educational-only group (Aragones et al., 2015).

Matheson et al. (2014) completed a quality improvement project at a busy urban pediatric clinic to evaluate whether sending text messages to patients or parents would improve the HPV vaccine series completion rates in those aged 11–22. The study was completed over eight months and included an intervention group, an interested group, and a standard care group. The intervention group included parents and patients who chose to receive text message reminders. The interested group included parents and patients who enrolled in the study but did not complete the process of receiving text messages. The standard care group included patients who initiated the HPV vaccine series but were not asked or declined to participate in the study. This study found that 14% of thirty-seven participants who received text message reminders completed the vaccine series within an optimal time window, whereas 0% and 3 % of the interested and standard care groups, respectively, completed the series within an appropriate time frame (Matheson et al., 2014).

Rand et al. (2017) completed parallel randomized control trials (RCTs) to assess the effects of phone or text message reminders on HPV vaccine series completion at three urban primary care clinics in Rochester, New York. The two-arm RCTs consisted of phone reminders versus standard-of-care controls and text reminders versus standard-of-care controls. Messages

were sent to parents of adolescents aged 11–17 who had already initiated HPV vaccination. Results revealed that 48% of the phone intervention versus 40% of phone control received all three vaccine doses. Additionally, 49% of the text intervention versus 30% of the text control group received all three doses (Rand et al., 2017). The results demonstrated that text message reminders were effective for adolescents who had begun the vaccination series. Together, these studies suggest that HPV-based education targeted at parents of early adolescents can be used to reach the United States' goal of vaccinating 80% of adolescents (Centers for Disease Control and Prevention [CDC], 2020).

The literature agrees that HPV is the most common sexually transmitted infection (STI) in the United States (CDC, 2020), and, despite vaccine availability, vaccination rates among early adolescents remain low. Studies have shown that education and reminder-recall are effective (Rand et al., 2015) for ages 9–22 years; however, few studies have specifically examined these effects on increasing vaccination rates in early adolescents aged 9–11. This quality improvement (QI) project focuses on the literature gap by including males and females aged 9–11 as the target population.

Problem Description

The COVID-19 pandemic resulted in dramatic drops in annual well visits and immunizations, causing significant vaccination gaps and lags in vital preventative services among adolescents in the United States. The exacerbation of health disparities has left sexually active minority adolescents at greater risk for missed doses of the HPV vaccine (The University of Texas Health Science Center at San Antonio [UTHSCSA], 2021). HPV vaccination rates in the United States remain significantly lower than other recommended vaccines and have declined by seventy-five percent since the beginning of the pandemic. Publicly insured adolescents have

missed an estimated one million doses of the HPV vaccine, and hundreds of thousands have missed for adolescents privately insured since March 2020 (The University of Texas Health Science Center at San Antonio [UTHSCSA], 2021). This decline prompted the Mays Cancer Center, home to UT Health MD Anderson, to urge practices to get HPV vaccination rates back on track (UTHSCSA, 2021). Our organization was not immune to the COVID-19 pandemic, and our vaccination rates also suffered.

An organizational assessment was performed through chart reviews using the electronic health record (EHR), eClinical Works. A retrospective chart review of routine well visits occurring from June through August 2022 for early adolescents aged 9-11 revealed a vaccination rate of 17.8%, while an overall vaccination rate of 48% was obtained for ages 9-18 years. The clinic offers Gardasil, a 9-valent vaccine (CDC, 2020), to adolescents beginning at age 11. The CDC states that the vaccine can be given as early as age nine; however, their recommendation to begin vaccination at age 11 has not changed (CDC, 2021). The American Academy of Pediatrics and Merck recommend initiating the vaccine at age nine (Merck Vaccines, 2022; O'Leary & Nyquist, 2019). The information revealed disparities in the clinic's practice for recommending and educating parents about the HPV vaccine. According to Vogels (2021), 76% of American families earning less than \$30,000 annually, and 87% of families earning \$30,000-\$99,999 own a smartphone allowing access to internet services, text messages, and phone calls. Seventy-nine percent of Americans have the literacy skills necessary to compare information, paraphrase, or make low-level inferences (United States Department of Education, 2019). Given this information and the clinic population, a protocol to improve vaccination rates through parental education and text message reminders were developed after meeting with the clinic owner.

Purpose of the Project

This QI project aimed to examine the impact of text reminders, parental pre-reading, and individualized education on improving the human papillomavirus (HPV) vaccination rates in early adolescents aged 9–11 years at a suburban primary care clinic in a large Texas city. The clinical question that guided the research for this project is: In adolescents aged 9–11 years not vaccinated for HPV, how will text reminders and parental education, compared with no reminders and education, improve vaccination rates over three months? This QI project aligns with the American Association of Colleges of Nursing (AACN) Doctor of Nursing Practice (DNP) Essential VI: Interprofessional collaboration for improving patient and population health outcomes and Essential VII: Clinical prevention and population health for improving the nation's health (American Association of Colleges of Nursing [AACN], 2021). Interprofessional collaboration with medical assistants and other providers was necessary to ensure that staff similarly presented information to parents and patients. Similar presentation and distribution of information mitigated confusion among parents and patients. Preventative measures were discussed at each visit, including HPV and vaccine education, effective treatment, and subsequent doses required. This QI project aligns with the American Organization for Nursing Leadership (AONL) Nurse Executive Competency III: Leadership, section E. Change Management. The change management competency states that the leadership style adapts to situation needs, uses change theory to implement change, and serves as a change leader (American Organization for Nursing Leadership [AONL], 2015). The DNP student served as a change leader using the Health Belief Model to assist parents with deciding to vaccinate their early adolescents. The leadership style remained democratic, allowing input from colleagues, parents, and their early adolescents.

Project Aims

Three aims were identified to guide the successful completion of increasing HPV vaccination rates in early adolescents aged 9–11 and included text message reminders, parental pre-reading, and individualized education. The first aim was to determine whether or not text message reminders sent to parents would increase HPV vaccination rates. A text message was sent to parents who provided their phone numbers one to two days before their appointment and stated, "Your child is eligible for the HPV vaccine. Ask your provider for more information or see the CDC website at <https://www.cdc.gov/HPV/parents/index.html>."

The second aim was to determine the impact of pre-reading and individualized education on HPV vaccination rates in early adolescents aged 9-11. An educational handout was given to parents upon check-in, and the provider discussed HPV and the vaccine during their appointment. See the sample educational handout. (Appendix A).

The third aim was to assess whether the parent's decision to vaccinate their adolescents was influenced by their perceptions of the education and text reminders. Once vaccination was complete, parents were given a survey of nine questions requiring an answer of "yes" or "no." See a sample survey. (Appendix B).

Guiding Frameworks

Conceptual Framework

The Transtheoretical Model (TTM) of Behavior Change is a research- and evidence-based integrative psychological model for understanding and facilitating behavior change (Prochaska & DiClemente, 1983). Prochaska and DiClemente developed this model of intentional change in 1979 (Prochaska & DiClemente, 1983) around addictive and problem behaviors (Bastable, 2023). The TTM assumes that people do not change behaviors quickly and

decisively but that change occurs continuously through a cyclical process (LaMorte, 2019). The four major constructs comprising the TTM are 1) stages of readiness to engage in the new behavior, 2) decisional balance inventory, 3) self-efficacy, and 4) processes of change (Walton et al., 2022). Stages of readiness to engage in new behavior are based on the theory that five recognizable stages are associated with any behavioral change. The five stages are pre-contemplation, contemplation, preparation, action, and maintenance (Walton et al., 2022). In the pre-contemplation stage, people resist the new behavior and can be unaware, discouraged, or resistant (Walton et al., 2022). The parents begin this stage one to two days before their visit when they receive the text reminder that their early adolescent is eligible for the HPV vaccine. During the contemplation stage, people still need to prepare to engage in the new behavior but are considering it (Walton et al., 2022). Parents proceed to this stage as they prepare for their visit. They may read more about the HPV vaccine through the CDC or other internet resources. The preparation stage involves preparing to engage in the new behavior, while the action stage is engaging in the new behavior (Walton et al., 2022). The preparation stage begins once the parent arrives with their early adolescent and receives the educational information. As soon as the parent decides to vaccinate their early adolescent against HPV, they enter the action stage. During maintenance, people continue the new behavior for at least six months (Walton et al., 2022). This stage begins when parents return with their early adolescents for subsequent HPV vaccine doses. Decisional balance inventory is the TTM second construct and is based on the understanding that decision-making requires considering the potential positive and negative consequences (Walton et al., 2022). When parents enter the preparation and action stages, they enter the decisional balance inventory. The third construct, self-efficacy, involves the person's confidence in the new behavior (Walton et al., 2022). The decision to act allows the parent to

reach the self-efficacy construct. The fourth construct is the ten processes that support the behavior change, five are cognitive and affective experiences, and five are behavioral processes (Walton et al., 2022). After utilizing the TTM to develop the conceptual framework of this project, the Health Belief Model (HBM) was used to develop the theoretical framework.

Theoretical Framework

The Health Belief Model (HBM) and constructs were used to identify parent beliefs associated with initiating HPV vaccination. The HBM was initially developed in the 1950s and updated in the 1980s by social psychologists Irwin M. Rosenstock, Godfrey M. Hochbaum, S. Stephen Kegeles, and Howard Leventhal. It is a model based on the theory that a person's willingness to change their health behaviors is based on their health perceptions (Rosenstock et al., 1988). The six critical constructs of the HBM are 1) perceived susceptibility, 2) perceived severity, 3) perceived benefits, 4) perceived barriers, 5) cues to action, and 6) self-efficacy (Rosenstock et al., 1988). When utilizing the HBM, it is crucial to determine how parents feel about their early adolescent's susceptibility to HPV-associated disease and disease severity. Determining parental beliefs on the benefits of the HPV vaccine, including the reasons parents do not vaccinate, was crucial to organizing the educational component needed to convey the importance of HPV vaccination. Parental beliefs, though often modifiable, were an essential factor to consider when deciding whether or not to vaccinate their early adolescents. Together, the frameworks provide a guide to understanding choices and behaviors. These frameworks were the foundation to increase HPV vaccination rates in early adolescents aged 9-11. See merged frameworks (Appendix E).

2. METHODS

Ethical Considerations

This QI project focused on improving HPV vaccination rates in early adolescents aged 9-11. The Texas A&M University-Corpus Christi Institutional Review Board (IRB) reviewed the project plan for project classification and received a determination of approval and permission to proceed. This project did not meet the FDA definition of a clinical investigation or the DHHS definition of research. See attached letter. (Appendix H). A HIPAA confidentiality form was signed to allow the project director (PD) to obtain personal health information (PHI) for this project. Data were maintained per TAMU-CC IRB and HIPAA guidelines. Electronic data was secured in a password-protected computer that only the PD could access. Identifying patient or parental data was removed prior to any documentation. Data collection forms and surveys were stored in a locked cabinet and shredded once computer documentation was complete. There were no conflicts of interest identified. The facility support letter was completed and signed by the clinic owner. See attached letter. (Appendix C).

Project Design

This DNP project was a quasi-experimental quality improvement initiative to increase HPV knowledge and vaccination rates for early adolescent patients aged 9-11 through education and text message reminders. The National Academy of Medicine defines quality as the degree to which health services increase the likelihood of desired health outcomes for individuals and populations and are consistent with current professional knowledge (United States Centers for Medicare and Medicaid Services [CMS], 2021). Quality improvement is a systematic, formal approach to improving performance by analyzing practice performance and efforts (American Association of Family Physicians [AAFP], 2023). Understanding and properly implementing

quality improvement is necessary for practices interested in improving efficiency, patient safety, or clinical outcomes. This methodology was chosen because parents must be well-informed to make the best health decisions for their early adolescents. Through a convenience sample recruited as the patient's arrived for their scheduled well-visits, this project offered parents individualized educational information and opportunities to discuss questions with providers. Noting the positive results of education and text messaging in the literature review, this approach seemed the most reliable way to reach parents. The clinic staff was motivated to improve HPV vaccination rates and agreed with this approach.

Setting

This project was implemented at a pediatric primary care clinic in an urban area of a large south Texas city. The clinic has nine patient rooms and serves a diverse population of about 4,500 registered patients. Approximately 65% of those patients are Hispanic, low-income, and have public health insurance. There are four providers, two physicians, and two nurse practitioners. The four providers treat approximately 320 patients weekly through sick and well visits. An average of ten patients aged 9–11 visit weekly for well-visits.

Risk Assessment

Potential barriers to the success of this quality improvement project include parent pushback due to low health literacy, lack of internet or mobile phone access, disagreements between parent and adolescent, parents not returning for subsequent doses, and language barriers. These factors would be mitigated by education and through discussion with the provider. Providers used the parents' native language to educate parents and their early adolescents about HPV, the importance of the HPV vaccine, and on-time completion of the series during their appointment. See the sample risk assessment table. (Appendix D).

Intervention

The 12-week educational and text messaging intervention to increase HPV vaccination rates in early adolescents aged 9-11 began with text messages to parents on December 30, 2022. The reminder texts were sent to all parents of patients aged 9-11 one to two days before their scheduled well-visit, regardless of HPV status. Patient encounters began on January 2, 2023. Once the parent arrived for their child's well-visit, they were given a one-page educational handout written at an eighth-grade reading level in English and Spanish. Eligibility requirements included parents who presented for a well-child visit with an early adolescent aged 9 – 11, had not started the vaccination series, could read English or Spanish, and were willing to complete the post-appointment survey.

The project team consisted of the PD, a board-certified pediatrician who owns the primary care practice, two additional providers, four medical assistants, a receptionist, and the office manager. The PD presented project information, including samples of the educational handout and survey, to the office staff during a one-hour lunch and learn one week before project implementation. The staff was encouraged to ask questions and offer suggestions. See intervention timeline. (Appendix I).

The DNP student sent text messages to parents one to two days before their child's scheduled appointment using the EHR eClinical Works based on scheduled appointments. The receptionist was responsible for giving parents the HPV educational handout when they checked in for their child's well-visit. The providers were responsible for discussing the vaccine with the patient and giving parents the survey. They collected the completed survey at the end of each visit. The medical assistants supported the providers with project implementation and gave the

vaccines. Motivational progress e-mails were sent to the staff by the PD every four weeks and included updated patient count and percentages.

Text messages were sent after clinic hours and delivered via a digital platform. Digital notifications facilitated the project implementation; however, some parents did not receive text reminders if they scheduled their appointment on the same day.

Inclusion criteria included parents with an early adolescent 9–11 years who were eligible for the HPV vaccine, had not started the vaccination series, could read and speak English or Spanish, and were willing to participate in the survey. Exclusion criteria included patients over the age requirement, adolescents that previously began the vaccination series, and parents who could not speak or read English or Spanish and were unwilling to complete a survey.

The PD developed the one-page educational sheet using the CDC and the National Cancer Institute at the National Institutes of Health website on HPV. Journal articles by Fenton et al. (2022) and Taumberger et al. (2022) were also used to gather data for the educational sheet. The information was written at an eighth-grade reading level. It was created to give parents short, easy-to-read information they could read while waiting for the provider rather than handing them complex data that would be more difficult to understand. The educational sheet was available in English and Spanish. See the sample educational sheet. (Appendix A).

While surveys can collect information about attitudes or opinions, they can also be used to evaluate knowledge gained (Cobern & Adams, 2020). In this project, it was necessary to develop an original survey to determine the educational component's benefit and ensure that at least fifty parents provided survey feedback. The PD developed the survey to gain specific data and knowledge based on the research. The survey was available in English and Spanish and consisted of nine questions that required a “yes” or “no” answer. Questions one through four

were related to the educational handout given to parents and included whether they chose to vaccinate their children. Questions five through eight were based on the text message sent to parents. In question nine, the parents are asked to reveal their gender. See a sample survey. (Appendix B).

Data Collection

A retrospective chart review from June, July, and August 2022 using the electronic health record was collected prior to the implementation of this project. Post-implementation data collection began on January 2, 2023, with the first eligible patient and continued through March 24, 2023. Data were collected at the end of weeks four, eight, and twelve for all eligible patients aged 9-11 that were seen for routine well visits. The information recorded included the ages and gender of each patient, insurance status, parent gender, vaccination status, and whether they completed a survey. Neither parent nor the patient identifying data was tracked or stored. All data were stored on a password-protected computer, with access given exclusively to the DNP student. See attached sample project timeline. (Appendix H).

Measurement Tools

Data was gathered from the electronic health record and logged using a data collection tool created by the PD and the PD's assigned chair. See attached data collection tool. (Appendix C).

The impact of text message reminders, pre-reading, and individualized education sessions was measured by 1) the total number and percentage of vaccinated early adolescents who received those interventions and 2) a survey comprised of nine “yes” or “no” questions given to parents upon completion of the visit. The PD created the survey and did not have any reliability or validity data. An essential part of the survey analysis was determining whether at least fifty

parents were successfully educated regarding the importance of HPV vaccination. See attached survey. (Appendix B).

Data Analysis

The DNP student analyzed data. The results were transferred to IBM SPSS Statistics (SPSS) version 29.0.0.0 for statistical analysis. Categorical data and survey data were analyzed using descriptive statistics. Descriptive statistics were used to summarize data understandably (Polit, 2010). Descriptive statistics allow the researcher to present, compare, and characterize relationships (Polit, 2010). Results were reported as frequencies and displayed using tables. Frequencies are the easiest way to examine categorical data (Sylvia & Terhaar, 2018). Bar graphs were created to display percentages of variables; bar graphs are beneficial for data visualization (Sylvia & Terhaar, 2018).

3. RESULTS

The structure and culture of the pediatric primary care clinic were conducive to the success of the project, and therefore a deviation from the original plan was not necessary. The healthcare providers were willing to participate and address all parent or patient concerns. This continued support allowed the primary care pediatric clinic to change critical processes required to increase HPV vaccination rates in early adolescents aged 9–11. In the twelve weeks of this project, seventy-one patients ($n = 71$) met the inclusion criteria. Immunization status was assessed for 100% of eligible patients upon check-in, and 100% of eligible patients participated in the project and survey completion. The number of early adolescents initiating the vaccination series at their visit increased from 17.8% ($n = 135$) in the pre-intervention period to 76.1% ($n = 71$) during the intervention cycle. See Table 1 for pre-implementation data. See Table 2 for post-implementation data.

Table 1*Pre-Implementation Data*

Characteristics	<i>n</i>	%
Age		
9	51	37.78
10	43	31.85
11	41	30.37
Gender		
Male	71	52.59
Female	64	47.41
Insurance		
Private	73	54.07
State	58	42.96
No Insurance or Self-Pay	4	2.96
Parent		
Mom	112	82.96
Dad	23	17.04
Vaccinated		
Yes	24	17.78
No	111	82.22

Table 2*Post-Implementation Data*

Characteristics	<i>n</i>	%
Age		
9	19	26.76
10	28	39.44
11	24	33.80
Gender		
Male	35	49.30
Female	36	50.70
Insurance		
Private	29	40.85
State	40	56.34
No Insurance or Self-Pay	2	2.82
Parent		
Mom	53	74.65
Dad	18	25.35
Vaccinated		
Yes	54	76.06
No	17	23.94
Text		
Yes	55	77.5
No	16	22.5

Survey

Yes

71

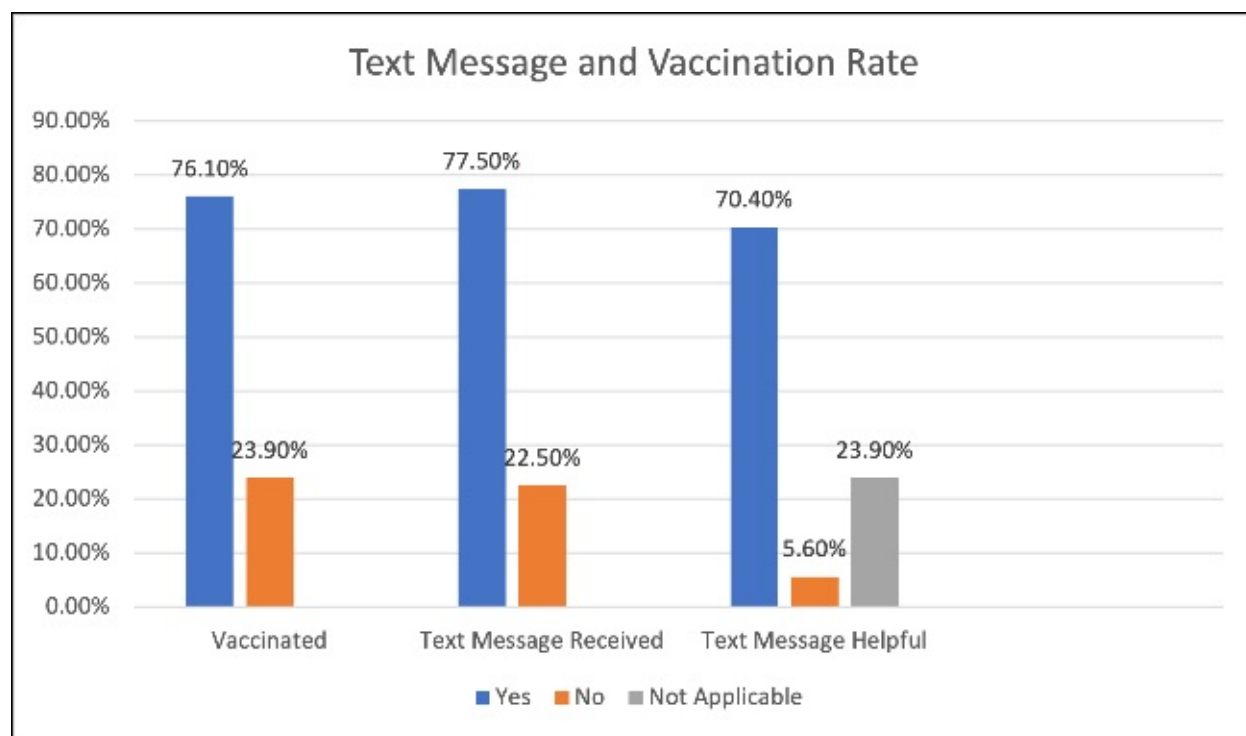
100.00

Aim 1

The first aim was to determine whether text message reminders sent to parents would lead to an increase in HPV vaccination rates. A text message was sent to each parent who provided a phone number one to two days before their child's well-visit appointment. This message read, "Your child is eligible for the HPV vaccine. Ask your provider for more information or see the CDC website at <https://www.cdc.gov/HPV/parents/index.html>." When asked if they had received this text message from the clinic, 77.5% ($n = 55$) answered "yes ."When asked whether the text message was a helpful reminder to ask about the HPV vaccine, 70.4% ($n = 50$) answered "yes ."The survey revealed that 76.1% ($n = 71$) of early adolescents started the vaccine series at the time of their appointment, supporting the belief that text message reminders would successfully increase vaccination rates. See Figure 1.

Figure 1

Text Message and Vaccination Rate



Aim 2

The second aim was to determine the impact of pre-reading and individualized education on HPV vaccination rates in early adolescents aged 9-11. An educational handout was given to each parent upon check-in, and the provider discussed HPV and the vaccine during the appointment. Following interventions, the clinic HPV vaccination rate of 17.8% ($n = 135$) rose to 76.1%, a 58.3% increase. *See Figure 2.* The vaccination rate for nine-year-old patients increased from 0% ($n = 51$) to 68.4% ($n = 19$). The rate for ten-year-old patients was 4.65% ($n = 43$) prior to this project and increased to 71.4% ($n = 28$), while that for eleven-year-olds increased from 56.09% ($n = 41$) to 87.5% ($n = 24$). The second aim was met, as evidenced by the significant increase in vaccination rates. *See Figure 3.*

Figure 2

Total Vaccination Rate

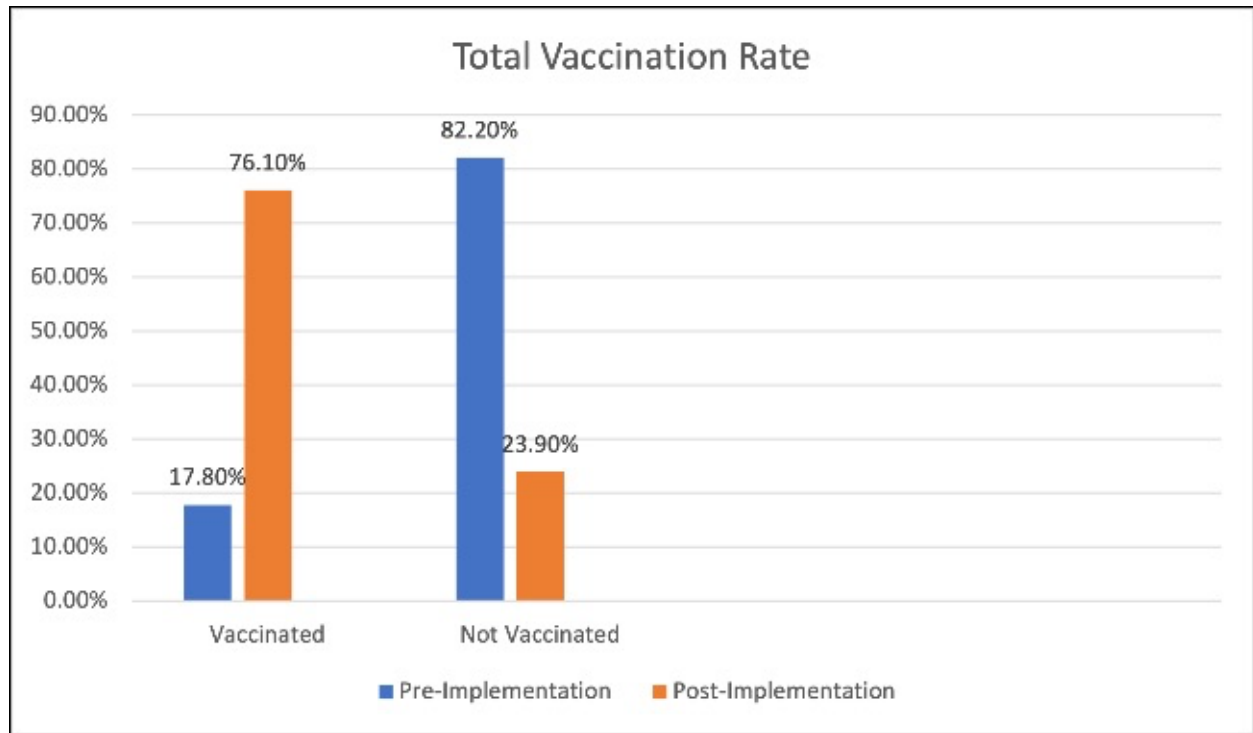
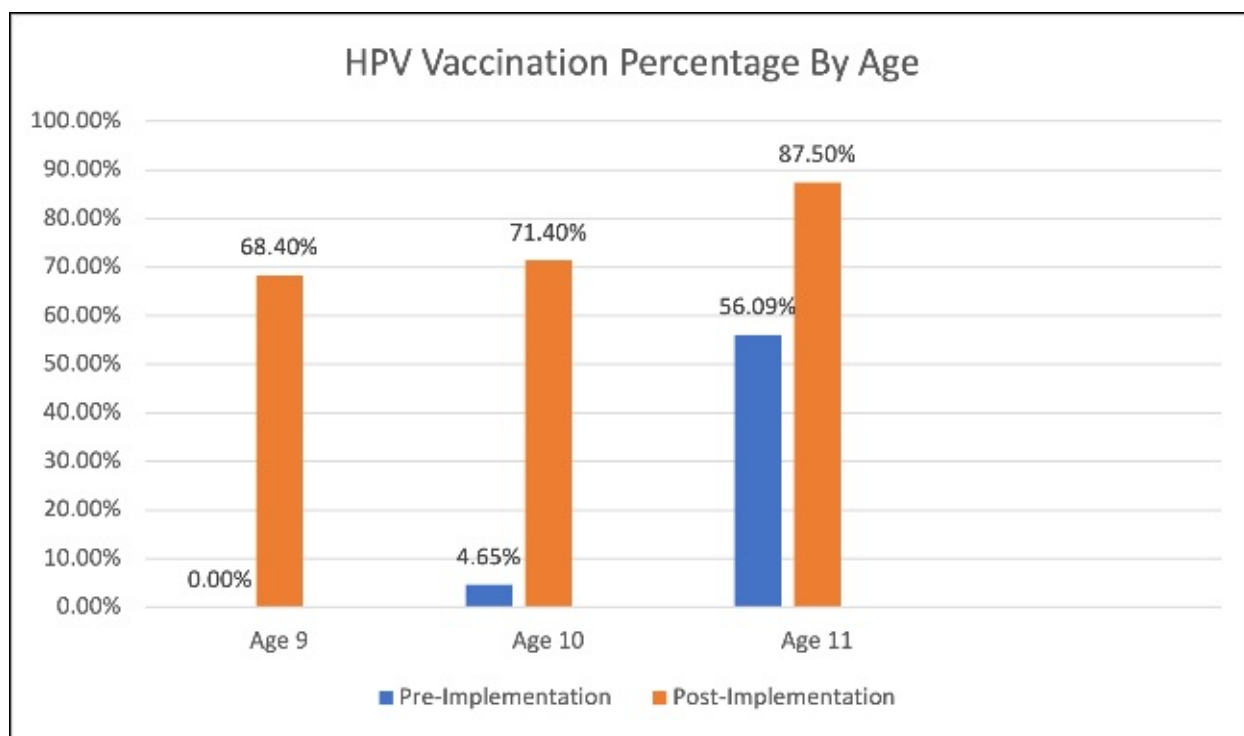


Figure 3

HPV Vaccination Rate by Age



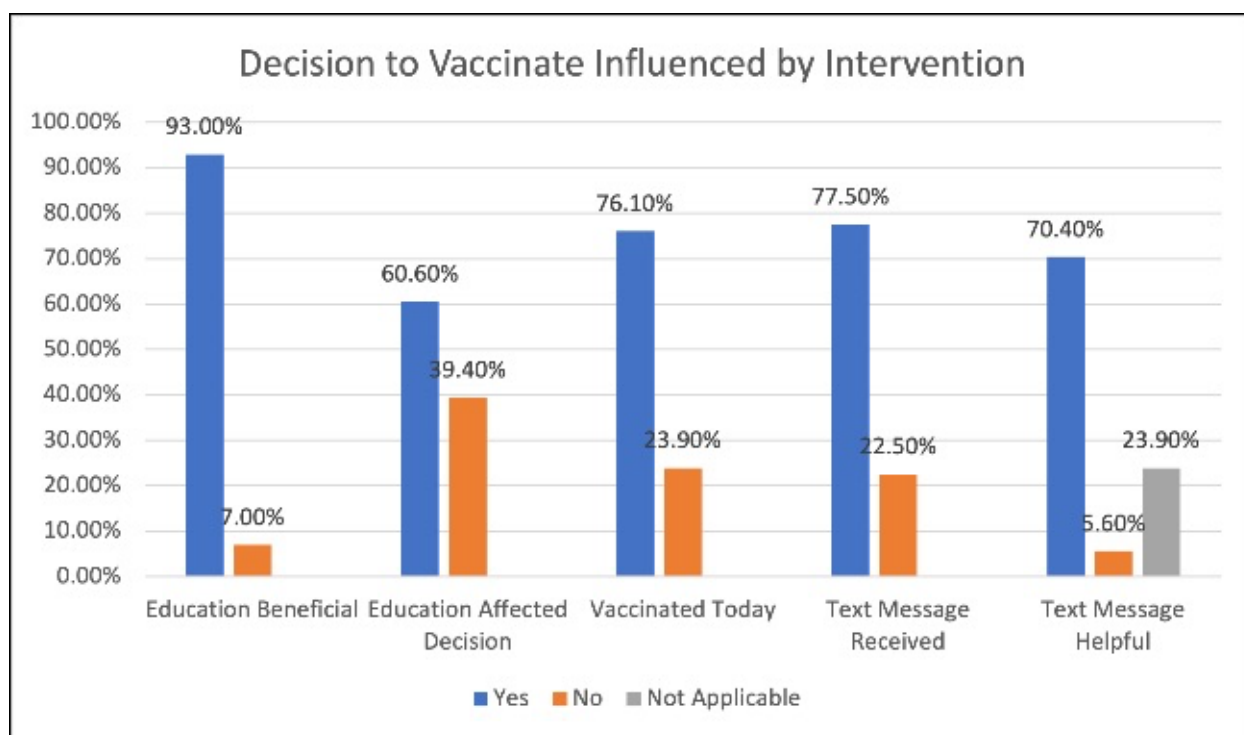
Aim 3

The third aim was to assess the role of the educational component and text message reminders. Specifically, we aimed to determine whether parent perceptions around these two interventions influenced the decision to vaccinate. Five of the nine survey questions were targeted to address this aim. In the first question, parents were asked whether they learned more about HPV, the vaccine, and its benefits after reading the educational materials and speaking to the provider. Ninety-three percent ($n = 66$) found the information beneficial. In the second question, parents were asked if the education received impacted their decision to vaccinate. A total of 60.6% ($n = 43$) of parents replied “yes” to this question. Finally, more than 77% ($n = 55$) of parents received a text message, and 70.4% ($n = 50$) found the text message to be a helpful reminder to ask about the HPV vaccine at their upcoming appointment. Aim three was met at the

end of the twelve weeks, as evidenced by the increase in vaccination rate to 76.1% ($n= 54$). See Figure 4.

Figure 4

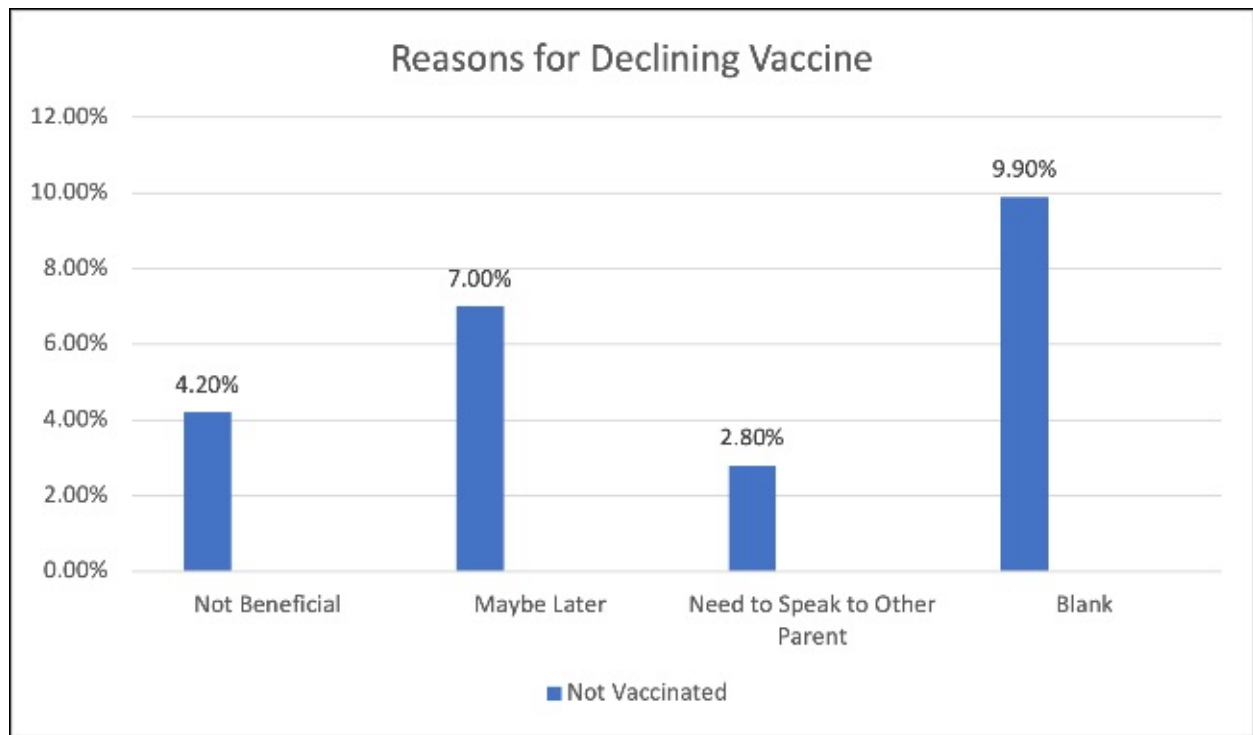
Decision to Vaccinate Influenced by Intervention



Of the seventy-one patients encountered, seventeen (23.94 %) refused to vaccinate. Thirteen of nineteen 9-year-old patients (68.4%) received the vaccine, while twenty of twenty-eight 10-year-olds (71.4%) and twenty-one of twenty-four 11-year-olds (87.5%) were vaccinated. Ten parents provided reasons for declining the vaccine, three (4.2%) felt that the vaccine would not benefit their child, five (7.0%) stated they might consider vaccinating their child later, and two (2.8%) stated that they needed to consult with the other parent before making any decisions. Seven parents (9.86%) that decided not to vaccinate their child did not provide a reason. See Figure 5.

Figure 5

Reasons for Declining Vaccine



4. DISCUSSION

This QI project aimed to examine the impact of text reminders, parental pre-reading, and individualized education on improving the HPV vaccination rates in early adolescents aged 9–11 years at a suburban pediatric primary care clinic in a large Texas city. Three aims were identified to support the goal of increasing HPV vaccination rates. The first aim was to determine the impact of parent text message reminders on increasing HPV vaccination rates. Parents who opted to schedule their child's appointment on the same day received text messages only if the appointment was in the afternoon. In that case, text messages were sent the morning of their appointment. Sixteen parents (22.5%) did not receive text messages because their appointment was scheduled on the same day.

The second aim was to determine the impact of pre-reading and individualized education on HPV vaccination rates in early adolescents aged 9-11. The vaccination rate for early adolescents increased from 17.8% to 76.1%, with parent pre-reading and individualized education from healthcare providers demonstrating that this aim was successfully reached.

The third aim was to assess whether a parent's decision to vaccinate was influenced by their perceptions of education and text reminders. Over 60% of parents ($n=43$) vaccinated their children after reading the educational information. Fifty-five parents received a text message, and 70.4% ($n=50$) found the text message to be a helpful reminder, prompting them to ask about the vaccine at their appointment. All three aims were met, and the 58.3% increase HPV vaccination rate was welcomed.

Though not explicitly addressed in the aims, the goal was to reach at least 50 parents. Although some parents were not interested in vaccinating their children, all were willing to

complete the survey. All seventy-one parents (100%) included in this project completed the survey; thus, the initial goal was achieved.

Relation to Other Evidence

Several studies that have incorporated education and text messages as interventions to improve HPV vaccination rates have reported positive results; however, few have seen as significant an increase as observed in this project. Mansfield et al. (2018) completed a retrospective, cross-sectional review to examine the association between HPV knowledge and parental intention to vaccinate their daughters against HPV. The study found that knowledgeable parents had higher intentions of vaccinating their daughters compared to parents who were not knowledgeable (adjusted relative risk ratio [aRRR] = 3.96, $p = .004$), suggesting that providers should incorporate HPV-related education for parents to increase vaccination rates (Mansfield et al., 2018).

Glenn et al. (2023) conducted a quasi-experimental study to determine whether parent reminders (text messages, mailed letters, robocalls) effectively increased HPV vaccinations in 12-year-old adolescents. Eight hundred seventy-seven adolescents were due to receive the HPV vaccine in the study sample within four months. Results revealed that 23% of intervention patients versus 12% of control patients received their next dose of the vaccine and that a text message was more effective than mailed letters or robocalls (Glenn et al., 2023).

Staras et al. (2021) conducted a study with 286 eleven and twelve-year-old adolescents who had not yet received the HPV vaccine. Both text messaging and phone-based Motivation Interviewing (MI) were used to contact parents. Parents were given a survey to assess whether they benefited from the reminders. Eighty-two percent of parents who completed the survey

favored vaccine reminders; however, only six of the 88 parents (7%) received text messages and scheduled vaccine appointments for their children (Staras et al., 2021).

McGlone et al. (2017) tested whether text message reminders with strategic wording might improve HPV vaccination rates. The study sample included 167 Spanish-speaking Hispanic/Latina women with unvaccinated daughters aged 11-17. Results of a survey revealed that strategic wording increased the mother's willingness to vaccinate, especially when the message cast them as agents of protection rather than focusing on the vaccine (McGlone et al., 2017).

Limitations

The findings of this QI project were limited due to several factors. First, the duration of the project was limited to twelve weeks. The results may have been impacted had the project duration been longer. A second limitation is the small sample size ($n = 71$). The project was implemented in only one of three clinic locations under the same owner and was initiated during a slower time of year for well-visits. The outcome of this project may have been different had the project been implemented during a peak time for well-visits, such as summer. Each clinic is in a different area of the city with different patient populations, which could affect the success or failure of the intervention. Future projects could be implemented in more extensive clinic settings with a more geographically diverse population and over a longer time during a peak well-visit season.

Interpretation

The Transtheoretical Model (TTM) of Behavior Change and The Health Belief Model provided the foundation required to increase the clinic HPV vaccination rate successfully. Together, the frameworks guided the understanding of parents' choices and behaviors and

assisted with developing educational materials and text messages. The parents began the pre-contemplation, perceived susceptibility, and perceived severity stages after receiving text message reminders. The text message link to the CDC website allowed parents to read about HPV and the vaccine prior to scheduled appointments. Parents could utilize this information to determine their thoughts and feelings about the material they read. Preparation through education allowed parents to enter the contemplation stage, perceived benefits versus perceived barriers, and perceived threats stages. Once the parent read the educational information, they could analyze what they read, determine if they had any questions or concerns for the provider, and dissect their feelings about vaccination. If parents decided to vaccinate, they entered the self-efficacy and the cues to action stages. At this point, parents are confident in their decision and understand the implications. The final stages, maintenance, and likelihood of engaging in the health-promoting behavior follow as parents return with their early adolescents for subsequent vaccines.

Following the success of this project, the clinic leadership decided to implement this project at the two other clinics. To sustain the improvements and benefits of this project, the clinic leadership will have monthly staff meetings to ensure that staff is still giving consistent information to eligible patients. Reminder texts will continue to be sent to parents one to two days before their scheduled visit, and educational handouts will be provided when they arrive at the clinic. Vaccination rates will continue to be monitored monthly to determine if any changes should be made to the sustainability plan. The clinic will not see any significant financial gain as insurance pays for the vaccine for those insured patients, only a small percentage of uninsured patients purchasing the vaccine, and there is no additional charge for vaccines at well visits.

Conclusion

The primary care pediatric clinic has successfully changed vital processes required to increase the HPV vaccination rate in early adolescents aged 9–11. Before this project began, the clinic did not consistently educate parents and patients about HPV or offer the HPV vaccine. The results of this QI project showed that combining education and text message reminders effectively promoted HPV vaccine initiation in this primary care clinic. Early identification of eligible patients is imperative to successful vaccination initiation and completion. The HPV vaccine is the only vaccine that prevents cancer and behooves every eligible person to complete vaccination. The successful increase of vaccine initiation and completion rates will aid in cancer reduction overall health of our population and assist with reaching the current national goal of having 80% of adolescents vaccinated by 2030 (United States Department of Health and Human Services, 2021).

REFERENCES

- American Academy of Family Physicians. (2023). *Basics of quality improvement*. Retrieved June 11, 2023, from <https://www.aafp.org/family-physician/practice-and-career/managing-your-practice/quality-improvement-basics.html>
- American Association of Colleges of Nursing. (2021, April). *AACN Essentials*. Retrieved June 6, 2023, from <https://www.aacnnursing.org/AACN-Essentials>
- American Organization for Nursing Leadership. (2015). *AONL nurse leader competencies*. AONL. <https://www.aonl.org/competencies>
- Aragones, A., Bruno, D. M., Ehrenberg, M., Tonda-Salcedo, J., & Gany, F. M. (2015). Parental education and text messaging reminders as effective community-based tools to increase HPV vaccination rates among Mexican American children. *Preventive Medicine Reports*, 2, 554–558. <https://doi.org/10.1016/j.pmedr.2015.06.015>
- Bastable, S. B. (2023). *Nurse as educator: Principles of teaching and learning for nursing practice* (6th ed.). Jones & Bartlett Learning.
- Centers for Disease Control and Prevention. (2020). *Sexually transmitted infections prevalence, incidence, and cost estimates in the United States*. <https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm>
- Centers for Disease Control and Prevention. (2021a, July 23). *Human papillomavirus*. <https://www.cdc.gov/hpv/parents/vaccine-for-hpv.html>
- Centers for Disease Control and Prevention. (2021b, November 16). *Human papillomavirus (HPV) vaccination: What everyone should know*. <https://www.cdc.gov/vaccines/vpd/hpv/public/index.html>

- Chido-Amajuoyi, O., Talluri, R., Wonodi, C., & Shete, S. (2021). Trends in HPV vaccination initiation and completion within ages 9-12 years: 2008-2018. *Pediatrics*, 147(6).
<https://doi.org/10.1542/peds.2020-012765>
- Cobern, W. W., & Adams, B. A. (2020). Establishing survey validity: A practical guide. *International Journal of Assessment Tools in Education*, 7(3), 404–419.
<https://doi.org/10.21449/ijate.781366>
- Fenton, R., & Perkins, R. (2022). *Here's why your preteen needs the HPV vaccine*. American Academy of Pediatrics. Retrieved September 16, 2022, from
https://www.healthychildren.org/English/safety-prevention/immunizations/Pages/How-to-Talk-to-Your-Preteen-About-HPV-Vaccine.aspx?_gl=1*b9uq2v*_ga*OTI2NTc1NDIxLjE2NjI4NjExNjQ.*_ga_FD9D3XZVQQ*MTY2MzQ0ODQzMy40LjEuMTY2MzQ0ODQ2OC4wLjAuMA..&_ga=2.212925020.993672108.1663448433-926575421.1662861164
- Glenn, B. A., Crespi, C. M., Herrmann, A. K., Nonzee, N. J., Rosen, D. L., Park, C. L., Johnson, G., Chang, L., Singhal, R., Taylor, V. M., & Bastani, R. (2023). Effectiveness and feasibility of three types of parent reminders to increase adolescent human papillomavirus (HPV) vaccination. *Preventive Medicine*, 169, 107448.
<https://doi.org/10.1016/j.ypmed.2023.107448>
- Jacobson, R. M., & Finney Rutten, L. J. (2019). Parent's hesitance about HPV vaccine: Using the CASE approach to address their concerns. *Minnesota Medicine*, 102(1), 24–27.
- Khuwaja, S. S., & Peck, J. L. (2022). Increasing HPV vaccination rates using text reminders: An integrative review of literature. *Journal of Pediatric Health Care*, 36(4), 310–320.
<https://doi.org/10.1016/j.pedhc.2022.02.001>

- LaMorte, W. W. (2019, September 9). *The Transtheoretical Model (stages of change)*. Boston University School of Public Health. Retrieved October 2, 2022, from <https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories6.html#:~:text=The%20Transtheoretical%20Model%20%28also%20called%20the%20Stages%20of,people%20were%20capable%20of%20quitting%20on%20their%20own.>
- Mansfield, L. N., Onsomu, E. O., Merwin, E., Hall, N. M., & Harper-Harrison, A. (2018). Association between parental HPV knowledge and intentions to have their daughters vaccinated. *Western Journal of Nursing Research*, 40(4), 481–501. <https://doi.org/10.1177/0193945916682953>
- Matheson, E. C., Derouin, A., Gagliano, M., Thompson, J. A., & Blood-Siegfried, J. (2014). Increasing HPV vaccination series completion rates via text message reminders. *Journal of Pediatric Health Care*, 28(4), e35–e39. <https://doi.org/10.1016/j.pedhc.2013.09.001>
- McGlone, M. S., Stephens, K. K., Rodriguez, S. A., & Fernandez, M. E. (2017). Persuasive texts for prompting action: Agency assignment in HPV vaccination reminders. *Vaccine*, 35(34), 4295–4297. <https://doi.org/10.1016/j.vaccine.2017.06.080>
- Merck Vaccines. (2022). *Indications for Gardasil 9*. Gardasil 9 (Human papillomavirus 9-valent vaccine, recombinant) for health care professionals. Retrieved October 6, 2022, from <https://www.merckvaccines.com/gardasil9/>
- National Cancer Institute at the National Institutes of Health. (2022, September 12). *HPV and cancer*. NIH National Cancer Institute. <https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer#transmitted>

- O'Leary, S. T., & Nyquist, A.-C. (2019, October 4). *Why AAP recommends initiating HPV vaccination as early as age 9*. American Academy of Pediatrics. Retrieved September 9, 2022, from <https://publications.aap.org/aapnews/news/14942>
- Polit, D. F. (2010). *Statistics and data analysis for nursing research* (2nd ed.). Pearson.
- Prochaska, J. O., & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. *Journal of Consulting and Clinical Psychology*, 51(3), 390–395. <https://doi.org/10.1037/0022-006X.51.3.390>
- Rand, C. M., Vincelli, P., Goldstein, N. P., Blumkin, A., & Szilagyi, P. G. (2017). Effects of phone and text message reminders on completion of the human papillomavirus vaccine series. *Journal of Adolescent Health*, 60(1), 113–119. <https://doi.org/10.1016/j.jadohealth.2016.09.011>
- Reiter, P. L., Brewer, N. T., Gottlieb, S. L., McRee, A.-L., & Smith, J. S. (2009). Parents' health beliefs and HPV vaccination of their adolescent daughters. *Social Science & Medicine*, 69(3), 475–480. <https://doi.org/10.1016/j.socscimed.2009.05.024>
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social Learning Theory and the Health Belief Model. *Health Education Quarterly*, 15(2), 175–183. <https://doi.org/10.1177/109019818801500202>
- Spleen, A. M., Kluhsman, B. C., Clark, A. D., Dignan, M. B., & Lengerich, E. J. (2011). An increase in HPV-related knowledge and vaccination intent among parental and non-parental caregivers of adolescent girls, age 9–17 years, in Appalachian Pennsylvania. *Journal of Cancer Education*, 27(2), 312–319. <https://doi.org/10.1007/s13187-011-0294-z>

- St. Sauver, J. L., Finney Rutten, L. J., Ebbert, J. O., Jacobson, D. J., McGree, M. E., & Jacobson, R. M. (2016). Younger age at initiation of the human papillomavirus (HPV) vaccination series is associated with higher rates of on-time completion. *Preventive Medicine*, 89, 327–333. <https://doi.org/10.1016/j.ypmed.2016.02.039>
- Staras, S. S., Richardson, E., Merlo, L. J., Bian, J., Thompson, L. A., Krieger, J. L., Gurka, M. J., Sanders, A. H., & Shenkman, E. A. (2021). A feasibility trial of parent HPV vaccine reminders and phone-based motivational interviewing. *BMC Public Health*, 21(1). <https://doi.org/10.1186/s12889-020-10132-6>
- Sylvia, M. L., & Terhaar, M. F. (2018). *Clinical analytics and data management for the DNP* (2nd ed.). Springer Publishing Company.
- Taumberger, N., Joura, E. A., Arbyn, M., Kyrgiou, M., Sehouli, J., & Gultekin, M. (2022). Myths and fake messages about human papillomavirus (HPV) vaccination: Answers from the esgo prevention committee. *International Journal of Gynecologic Cancer*, ijgc–2022–003685. <https://doi.org/10.1136/ijgc-2022-003685>
- Texas Health and Human Services. (2021). *HPV-associated cancers*. Texas Department of State Health Services. <https://www.dshs.texas.gov/tcr/data/modifiable/HPV-Associated-Cancers-in-Texas.pdf>
- The University of Texas Health Science Center at San Antonio. (2021, May 25). *Mays Cancer Center and other top United States. cancer centers call for urgent action to get HPV vaccination back on track*. UT Health San Antonio Newsroom. <https://news.uthscsa.edu/mays-cancer-center-and-other-top-u-s-cancer-centers-call-for-urgent-action-to-get-cancer-preventing-hpv-vaccination-back-on-track/>

- United States Department of Education. (2019, July). *Adult literacy in the United States*. United States Department of Education National Center for Education Statistics. Retrieved April 6, 2023, from <https://nces.ed.gov/pubs2019/2019179/index.asp>
- United States Department of Health and Human Services. (2021, October 7). *Get your child the HPV vaccine*. My Healthfinder. <https://health.gov/myhealthfinder/topics/doctor-visits/shots-vaccines/get-your-child-hpv-vaccine>
- United States Centers for Medicare and Medicaid Services. (2021, December 1). *Quality measurement and quality improvement*. Centers for Medicare and Medicaid Services. Retrieved March 12, 2023, from <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/MMS/Quality-Measure-and-Quality-Improvement>
- Vogels, E. A. (2021, June 22). *Digital divide persists even as Americans with lower incomes make gains in tech adoption* [<https://www.pewresearch.org/fact-tank/2021/06/22/digital-divide-persists-even-as-americans-with-lower-incomes-make-gains-in-tech-adoption/>]. Pew Research Center.
- Walton, A. A., Nageotte, N. L., Heimlich, J. E., & Threadgill, A. V. (2022). Facilitating behavior change: Introducing the Transtheoretical Model of Behavior Change as a conservation psychology framework and tool for practitioners. *Zoo Biology*, 1–12. <https://doi.org/10.1002/zoo.21704>
- Widman, C. A., Rodriguez, E. M., Saad-Harfouche, F., Twarozek, A., Erwin, D. O., & Mahoney, M. C. (2018). Clinician and parent perspectives on educational needs for increasing adolescent HPV vaccination. *Journal of Cancer Education*, 33(2), 332–339. <https://doi.org/10.1007/s13187-016-1105-3>

APPENDIX A

HUMAN PAPILLOMAVIRUS OR HPV

Fast Facts:

- HPV is a virus that causes genital warts, cancer of the cervix, vagina, vulva, anus, penis, and the back of mouth and throat.¹
- HPV is the most common infection that you can get from having sex in the United States.¹
- 40% of HPV infections happen within 2 years after the **FIRST** sexual partner.¹
- Nearly every person will get at least **ONE** type of HPV in their lifetime.¹
- HPV infects about 13 million people every year, including teens.¹
- Right now, there are 42 million Americans infected with HPV.¹
- The HPV vaccine can prevent your child from getting 90% of these cancers.¹
- The American Academy of Pediatrics, the American Cancer Society, and the Centers for Disease Control (CDC) recommend getting your child vaccinated as early as age 9.¹

How is HPV spread?

- Vaginal, anal, or oral sex.³
- Direct intimate skin-to-skin contact.³
- Condoms **DO NOT** always prevent HPV.³

Why should you vaccinate your child?

- The HPV vaccine is safe, effective, and provides protection that will last for a long time.¹

Early Teens 9-14 years	
Regimen	Schedule
2 doses	6 months apart
Teens 15+ years	
3 doses	0, 2, 6 months

- The vaccine works better if given at an earlier age.²
 - This is because preteens produce a better response after HPV vaccination than older teens do.²
 - The vaccine works better with their immune system.²
 - **Your early teenager will be protected from cancer PRIOR to HPV exposure.**²
 - Vaccinating your child will **NOT** promote sexual activity.⁴

¹ Centers for Disease Control and Prevention. (2021, July 23). *Human papillomavirus*. <https://www.cdc.gov/hpv/parents/vaccine-for-hpv.html>

² Fenton, R., & Perkins, R. (2022). *Here's why your preteen needs the HPV vaccine*. American Academy of Pediatrics. Retrieved September 16, 2022, from https://www.healthychildren.org/english/safety-prevention/immunizations/Pages/How-to-Talk-to-Your-Preteen-About-HPV-Vaccine.aspx?gl=1*b9uq2v*_*ga*OTI2NTc1NDIxLjE2Ni4NjE4NiQ.*_ga_FDP9D3XZVQO*MTY2MzQ0ODQzMTY4OTI2NTc1NDIxLjE2Ni4NjE4NiQ.*_ga=2.212925020.993672108.1663448433-926575421.1662861164

³ National Cancer Institute at the National Institutes of Health. (2022, September 12). *HPV and cancer*. NIH National Cancer Institute. <https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer#transmitted>

⁴ Taumberger, N., Joura, E. A., Arbyn, M., Kyrgiou, M., Schouli, J., & Gultekin, M. (2022). Myths and fake messages about human papillomavirus (HPV) vaccination: Answers from the esgo prevention committee. *International Journal of Gynecologic Cancer*, ijc-2022-003685. <https://doi.org/10.1136/ijgc-2022-003685>

VIRUS DEL PAPILOMA HUMANO O VPH

Datos rápidos:

1. El VPH es un virus que causa verrugas genitales, cáncer de cuello uterino, vaginal, vulva, anal, pene y la parte posterior de la boca y la garganta. ¹
2. El VPH es la infección más común que puede contraer al tener relaciones sexuales en los Estados Unidos. ¹
3. El 40% de las infecciones por VPH ocurren dentro de los 2 años posteriores a la **PRIMERA** pareja sexual. ¹
4. Casi todas las personas contraerán al menos **UN** tipo de VPH en su vida. ¹
5. El VPH infecta a unos 13 millones de personas cada año, incluidos los adolescentes. ¹
6. En este momento, hay 42 millones de estadounidenses infectados con VPH. ¹
7. La vacuna contra el VPH puede evitar que su hijo contraiga el 90% de estos cánceres. ¹
8. La Academia Americana de Pediatría, la Sociedad Americana del Cáncer y los Centros para el Control de Enfermedades (CDC) recomiendan vacunar a su hijo a partir de los 9 años. ¹

¿Cómo se transmite el VPH?

1. Sexo vaginal, anal o oral. ³
2. Contacto íntimo directo piel con piel. ³
3. Los condones **NO** siempre previenen el VPH. ³

¿Por qué debería vacunar a su hijo?

4. La vacuna contra el VPH es segura, eficaz y proporciona una protección que durará mucho tiempo.¹

Adolescentes 9-14 años	
Régimen	Horario
2 dosis	6 meses de diferencia
Adolescentes 15+ años	
3 dosis	0, 2, 6 meses

5. La vacuna funciona mejor si se administra a una edad más temprana. ²
 - Esto se debe a que los preadolescentes producen una mejor respuesta después de la vacunación contra el VPH que los adolescentes ²
 - La vacuna funciona mejor con su sistema inmunológico. ²
 - Su hijo adolescente temprano estará protegido contra el cáncer **ANTES** de la exposición al VPH. ²
 - Vacunar a su hijo **NO** promoverá la actividad sexual. ⁴

¹ Centers for Disease Control and Prevention. (2021, July 23). *Human papillomavirus*. <https://www.cdc.gov/hpv/parents/vaccine-for-hpv.html>

²Fenton, R., & Perkins, R. (2022). *Here's why your preteen needs the HPV vaccine*. American Academy of Pediatrics. Retrieved September 16, 2022, from <https://www.healthychildren.org/english/safety-prevention/immunizations/Pages/How-to-Talk-to-Your-Preteen-About-HPV-Vaccine.aspx?cid=196nbn2c>. `ss=OTDNTGtNDJhLjE2NjBhNjEw` & `FDjD3XV000MTY2M000D0zMc40L4h4MTY2M000D0z0C4u4AaM` & `ss=2.712972020.903672708.1663448343.926575121.1662861164`

³ National Cancer Institute at the National Institutes of Health. (2022, September 12). *HPV and cancer*. NIH National Cancer Institute. <https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-and-cancer/transmitted>

⁴Taumberger, N., Joura, E. A., Arbyn, M., Kyrgiou, M., Schouli, J., & Gultekin, M. (2022). Myths and fake messages about human papillomavirus (HPV) vaccination: Answers from the esgo prevention committee. *International Journal of Gynecologic Cancer*, *ijgc-2022-003685*. <https://doi.org/10.1136/ijgc-2022-003685>

APPENDIX B

HPV VACCINATION IMPROVEMENT PROJECT

Please complete the following survey. Your answers will be used only to evaluate the outcome of the project. Your name, your child's name, or any of your personal information will not be used.

Educational

1. Did you learn more about HPV, the vaccine, and its benefits after reading the educational materials and speaking to the provider?
Yes No
2. Did the education received about the vaccine affect your decision to vaccinate your child?
Yes No
3. Did you vaccinate your child today?
Yes No
4. If not, why did you choose not to vaccinate?

Text Message Reminder

5. Did you receive a text message from the clinic reminding you that your child is eligible for the HPV vaccine?
Yes No
6. Did you know your child was eligible for the HPV vaccine?
Yes No
7. Was the text message reminder helpful for you in remembering to ask about the HPV vaccine?
Yes No N/A
8. Would you like to receive a text message to remind you when the next dose of HPV is due?
Yes No

Parent Gender

9. What is your gender?
Male Female Prefer not to answer

PROYECTO DE MEJORA DE LA VACUNACIÓN CONTRA EL VPH

Encuesta

Por favor complete la siguiente encuesta. Sus respuestas se utilizarán únicamente para evaluar el resultado del proyecto. Se utilizará su nombre, el nombre de su hijo o cualquier información personal suya.

Materiales educativos

1. ¿Aprendió más sobre el VPH, la vacuna y su beneficio después de leer los materiales educativos y hablar con el proveedor?

SíNo
 2. ¿Los materiales educativos sobre la vacuna afectaron su decisión de vacunar a su hijo?

SíNo
 3. ¿Vacunó a su hijo hoy?

SíNo
 4. Si no, ¿por qué no elegiste no vacunar?
-

Recordatorio de mensaje de texto

5. ¿Recibió un mensaje de texto de la clínica recordándole que su hijo es elegible para la vacuna contra el VPH?

SíNo
6. ¿Sabía que su hijo era elegible para la vacuna contra el VPH?

SíNo
7. ¿Fue útil el recordatorio del mensaje de texto para recordar preguntar sobre la vacuna contra el VPH?

SíNo
8. ¿Le gustaría recibir un mensaje de texto para recordarle cuándo debe recibir la próxima dosis de VPH?

SíNo

Género de los padres

9. ¿Cuál es tu género?

MujerHombrePrefiero no responder

APPENDIX C

FACILITY SUPPORT LETTER

A thru Z Pediatrics

July 3, 2022

Dr. Tammy McGarity
DNP Program Coordinator
College of Nursing and Health Sciences
Texas A&M University – Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dear Dr. McGarity,

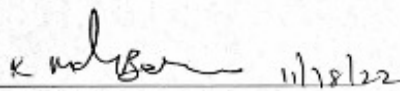
The purpose of this letter is to provide Gloria (Lena) Roux, a Doctor of Nursing Practice student at Texas A&M University College of Nursing and Health Sciences, support in conducting a quality improvement project at A thru Z Pediatrics. The project, increasing HPV vaccination rates, entails educating and reminding parents and patients about HPV and the benefits of the vaccine.

The purpose of this project is to increase the adolescent HPV vaccination rate. A thru Z Pediatrics was selected for this project because Gloria is an employee and will be accessible. Gloria (Lena) Roux is employed at this institution and has an interest in improving care at this facility.

I, Mohan Rayala, physician, and owner at A thru Z Pediatrics, do hereby fully support Gloria (Lena) Roux in the conduct of this quality improvement project, increasing HPV vaccination rate at A thru Z Pediatrics.

I also approve Gloria (Lena) Roux to access protected health information (PHI) for purposes of conducting this quality improvement project. She has signed a HIPAA release form.

Sincerely,


Mohan Rayala, M.D.

APPENDIX D
RISK ASSESSMENT

Table 1

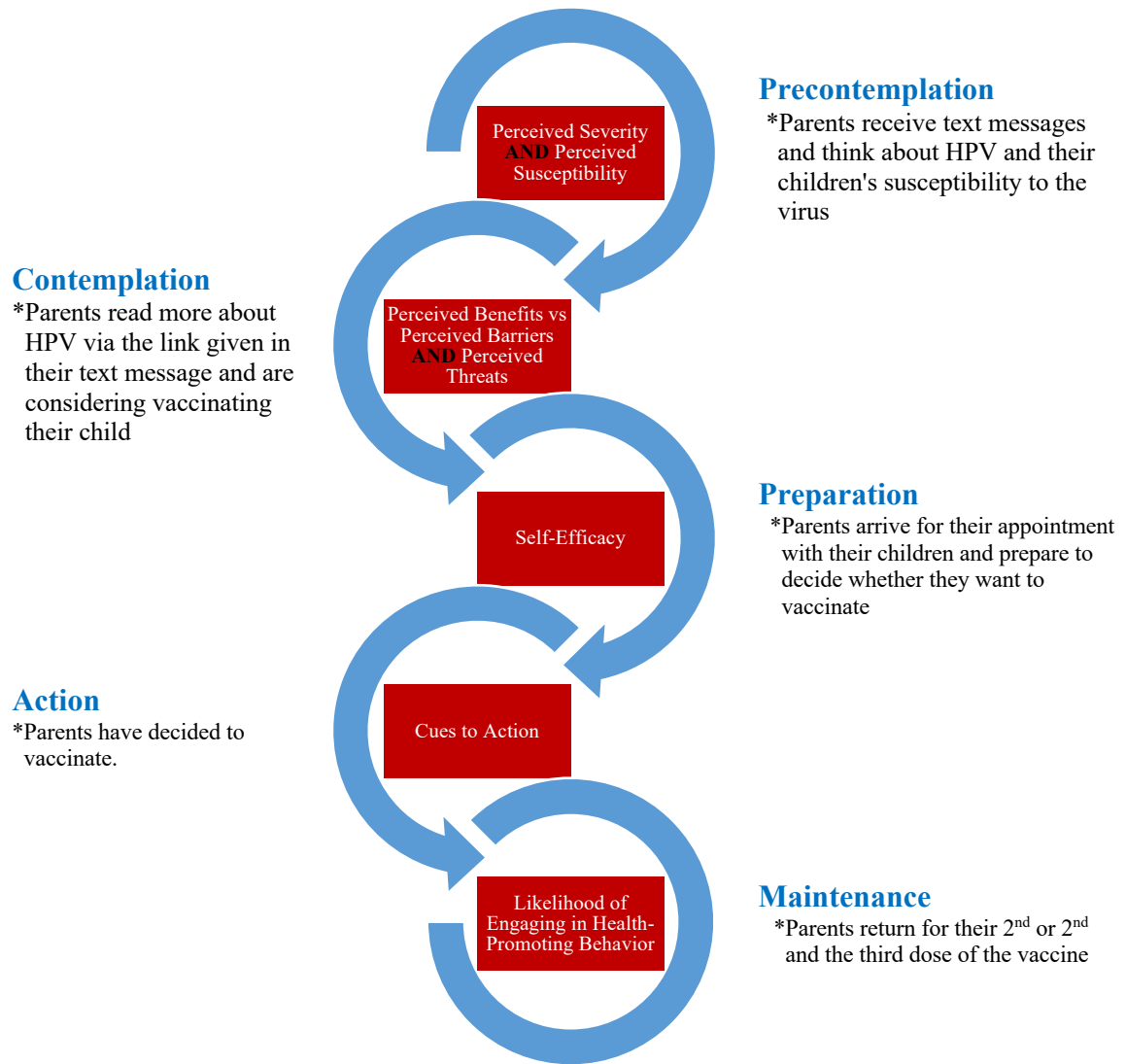
Risk Assessment

Risk	Impact	Countermeasures	Resources	Barriers
Push back from parents	Decrease in vaccinations given	Provide in-person education	Print out AAP and CDC guidelines	Parents may not be interested in data
No access to the internet or mobile phones	Inability to access HPV information or receive text messages	Provide in-person information	HPV educational information and vaccine importance	Parents may not be interested in data or learning
Parent/adolescent disagreement over vaccinating	Unnecessary turmoil between parent and adolescent	Education on the importance of vaccination	HPV educational information and vaccine importance	Adolescents may refuse to listen/walk out of the appointment
Parents do not understand information due to language barriers	Vaccines will not be initiated due to a lack of information	Provide educational sheets in the primary language	Have a translator available via telephone service	Parents may not want to wait for a translator to become available.
Parents not returning for subsequent vaccines.	Vaccines initiated but not completed.	Sent text message reminders	Schedule the second dose and give an appointment card while in the office	Parents may miss an appointment or forget due to the length of time

APPENDIX E

FRAMEWORKS

Transtheoretical Model of Behavior Change



The Health Belief Model

APPENDIX F

IRB APPROVAL LETTER



Date: November 09, 2022
To: Kyoung Eun Lee
CC: Gloria Collier, Marina Martinez, Michelle Eisenman, MSc, Tammy McGarity, DNP
From: Office of Research Compliance
Subject: **IRB Declaration of Research Not Involving Human Subjects**

Dear Kyoung Eun Lee,

Activities meeting the DHHS definition of research or the FDA definition of clinical investigation and involve human subjects are subject to IRB review and approval.

On 11/09/2022, the Office of Research Compliance reviewed the project below and determined that the proposed activity does not meet the FDA definition of a clinical investigation or DHHS definition of research.

Type of Review:	Review Board Response Review Submission form
Title of Study:	Using Parental Education and Text Reminders to Increase the Human Papillomavirus Vaccination Rate in Early Adolescents
Principal Investigator:	Kyoung Eun Lee
IRB Number:	TAMU-CC-IRB-2022-0596
Submission Action:	IRB Review not Required for projects not involving definition of research

This project does not involve a systematic investigation designed or intended to contribute to generalizable knowledge. Therefore, this project does not require IRB review and you may proceed. This IRB Declaration is in effect from 11/09/2022 and does not expire.

Limits to this determination:

1. This determination corresponds with the versions of the application and attachments in the electronic system most recently approved as of the date of this letter. This determination is issued with the understanding the data collected will be used internally by the organization for internal use and not be generalizable. Any planned changes require submission to the IRB to ensure that the research continues to meet the criteria for a non-human subject research determination.
2. This project may NOT be referenced as "IRB approved" or "research".

The following statement can be included in the manuscript: "This project was reviewed and determined to not meet the definition of research involving human subjects by the Texas A&M University IRB - Corpus Christi Institutional Review Board."

Please do not hesitate to contact the Office of Research Compliance with any questions at irb@tamucc.edu.

Sincerely,

Cari Loeffler, MA
Office of Research Compliance

APPENDIX G

HPV PROJECT TIMELINE

