

**STARTING THE CONVERSATION EARLIER: USING OB/GYN PRACTITIONERS
TO COMMUNICATE THE IMPORTANCE OF CHILDHOOD VACCINATION TO
THEIR PREGNANT PATIENTS**

by

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Submitted to the Graduate Faculty of
the Graduate School of Public Health in partial fulfillment
of the requirements for the degree of
Master of Public Health

University of Pittsburgh

2016

UNIVERSITY OF PITTSBURGH
GRADUATE SCHOOL OF PUBLIC HEALTH

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ABSTRACT

Childhood vaccination rates have steadily declined over the past decade and traditional educational strategies such as written resources and pediatrician recommendations have failed to produce immunization rates recommended by the American Academy of Pediatrics and Centers for Disease Control. Starting the vaccination conversation with parents prior to the first pediatric visit could restore childhood immunization rates to their peak levels. This has strong implications for public health because it could prevent the re-emergence of infectious diseases and help maintain herd immunity. OB/GYN practitioners play a critical role in the timing of this conversation with parents prior to the birth of their child.

To facilitate conversations between OB/GYN practitioners and expectant parents, micro-learning videos will be developed and used by the OB/GYN practitioners to improve their risk communication and shared-decision making skills. Once the program is implemented, they will report back upon their completion of video viewing, surveys and the number of women to whom they are communicating this knowledge. Pregnant women will also complete surveys after receiving these messages and take-home materials during program implementation. The goal of this program is to increase childhood vaccination rates in Allegheny County by providing information to pregnant women during prenatal visits. The target population is pregnant women receiving prenatal care at OB/GYN offices and clinics in Allegheny County, Pennsylvania. With

successful implementation of this program, parents will now have time to make this critically important decision, without feeling rushed or overwhelmed at their first pediatric visit and ultimately deciding to vaccinate their child(ren).

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PREFACE

This essay is written in honor of my grandmother, JoAnn Ragan, who passed away on September 2, 2016. Without her and my grandfather's support, I would not have had the opportunity to pursue my graduate degree. I love you, Gram.

1.0 INTRODUCTION

Childhood vaccination rates have steadily declined over the past few years for several reasons. A major reason is the growing fear of vaccine composition and side effects, instead of for the diseases they prevent.¹ While vaccines are not 100% free of negative side effects, their benefits significantly outweigh this issue, especially from a public health perspective.¹ In the United States, several vaccine preventable illnesses are no longer or rarely observed, which causes many parents to believe they do not need to vaccinate their child against them.² Another commonly held belief is that building immunity from exposure to a disease provides more protection than vaccine acquired immunity.³ All of these beliefs need to be addressed and discussed with a medical professional to explain the necessity of herd immunity, which is when the majority of the community has immunity against a pathogen therefore protecting those that do not, and vaccinations. Traditionally, pediatricians fill this role. However, pediatricians also report not having enough time to discuss overall health with patients' parents because they spend a large portion of each visit discussing immunization.⁴

To alleviate this issue, OB/GYN practitioners could be trained to communicate childhood vaccination messages through micro-learning videos to their pregnant patients during their regularly scheduled prenatal visits. Micro-learning videos are 3-5 minute blurbs that provide vital information in a short burst.⁵ Expectant mothers also may be more willing to listen to what their OB/GYN is saying, since they have the ability to follow up with their questions and

concerns before they need to make a final decision. Opening the vaccination conversation early is critical to reach a common ground, and it is difficult to achieve that when a decision typically has to be made immediately during a pediatric visit.

The goal of this program is to increase childhood vaccination rates in Allegheny County by providing information to pregnant women during prenatal visits. The target population is pregnant women receiving prenatal care at OB/GYN offices and clinics in Allegheny County, Pennsylvania.

There are several assumptions made related to and regarding this informational program. Childhood immunization rates have steadily declined over the past few years both statewide and nationally.¹ Pediatricians do not have enough time in childhood wellness visits to only focus on vaccines.⁴ OB/GYN practitioners already educate pregnant patients about the importance of influenza and pertussis booster vaccinations, so incorporating their future child in to the dialogue is logical. Micro-learning is also considered “the future training style of the workplace.”⁵ Most employees have a minimal amount of time in their work day to fit in formal training, which makes a training system that can be completed in their own time advantageous. The brevity of these materials also help with maximum recall of information.

2.0 PROBLEM AND STATEMENT OF NEED

The purpose of this program is to educate OB/GYN practitioners about proper risk communication messages and methods of educating prospective parents regarding childhood vaccinations using micro-learning videos. OB/GYNs will use these skills to communicate with their pregnant patients about the importance of childhood vaccinations. Ultimately this leads to the goal of the program, which is to improve childhood immunization rates in Allegheny County.

Since 2011, Allegheny County Health Department (ACHD) has collected and compiled vaccination data on school-aged children. They recorded a decline in vaccination rates every year, with the exception of the 2015-2016 school year.⁶ However, the percentage of children who were immunized upon entering kindergarten was the lowest of all the age groups at 94.9%.⁶ One of the reasons for those low immunization rates may be that parents are permitted to claim medical, religious, moral, and personal belief exemptions in Pennsylvania.⁶ For the 2015-2016 school year, 2.7% of all the students enrolled claimed an exemption.⁶ Of those exemptions, 2% could be attributed to religious, moral, and personal belief reasons, and only 0.7% were for medical reasons.⁶ While Allegheny County has higher overall vaccination coverage compared to the national average, it is still not reaching a herd immunity level required by the virulence of certain diseases.⁶ By starting the vaccination conversation earlier with parents, physicians can potentially reduce the number of religious and personal belief exemptions claimed, and ultimately increase the number of children immunized in Allegheny County.

Vaccinations are critical for maintaining the overall health of a community and preventing infectious diseases. Newborns and infants are particularly vulnerable, which is why they should be immunized according to the schedule recommended by the American Academy of Pediatrics and the Centers for Disease Control and Prevention. By targeting OB/GYNs and their pregnant patients in this program, these children will have a better chance of receiving their vaccinations as advised. In 2013, the Allegheny County Health Department reported that there were 13,291 births while the total population was 1,231,527 people, which means that newborns alone accounted for over 1% of the total population of Allegheny County.⁷ There were 238,711 females of reproductive age (15-44) in Allegheny County in 2013, and the crude birth rate was 10.8 births per 1,000 women.⁷

Allegheny County is home to approximately 30 hospital facilities under two major health networks; University of Pittsburgh Medical Center (UPMC) and Allegheny Health Network (AHN). The program will target these large medical facilities, as opposed to individual practices. Independent practices are also less common, as most obstetricians opt to work under the umbrella of a large health network. Between the two major health networks, there are 218 obstetrical and gynecological licensed physicians that practice in Allegheny County.^{8,9} Therefore, the ratio for pregnant patient to physician is 61:1, which can be managed for this program.

While the abundance of hospital facilities and low patient to physician ratio are strengths of this program, several barriers still exist. OB/GYN practitioners must agree to participate in the program, as they are one of the strongest stakeholders. Contributing to positive public health goals could be a strong motivator for this group. Pregnant patients can also refuse to participate, falsely self-report their intentions for vaccinating their children, or simply change their mind. In order to attend school, children are required to be vaccinated according to the recommended

schedule. However, Pennsylvania allows religious, moral, and personal belief exemptions in addition to medical exemptions for immunizations.⁶ This allows children that are unvaccinated by choice, and not only for medical or health reasons, to attend school.

The burden of communicating the importance of vaccinations generally falls on pediatricians and family medicine physicians. The limited amount of time pediatricians have with their patients contributes to their inability to fully educate and discuss immunizations with them. Using the 2000 National Survey of Childhood Health, Halfon et. al. found that nearly 80% of patients spent less than 20 minutes with their pediatrician, and one-third spent less than ten minutes.¹⁰ A major conclusion was that shorter pediatric visits results in lower quality of care and condensed content according to parents surveyed.¹⁰ Conversely, obstetrical appointments have a longer duration and there are at least 10 visits prior to the patient giving birth. Therefore, OB/GYNs have multiple opportunities to develop rapport and discuss the importance of childhood immunization with expectant parents.

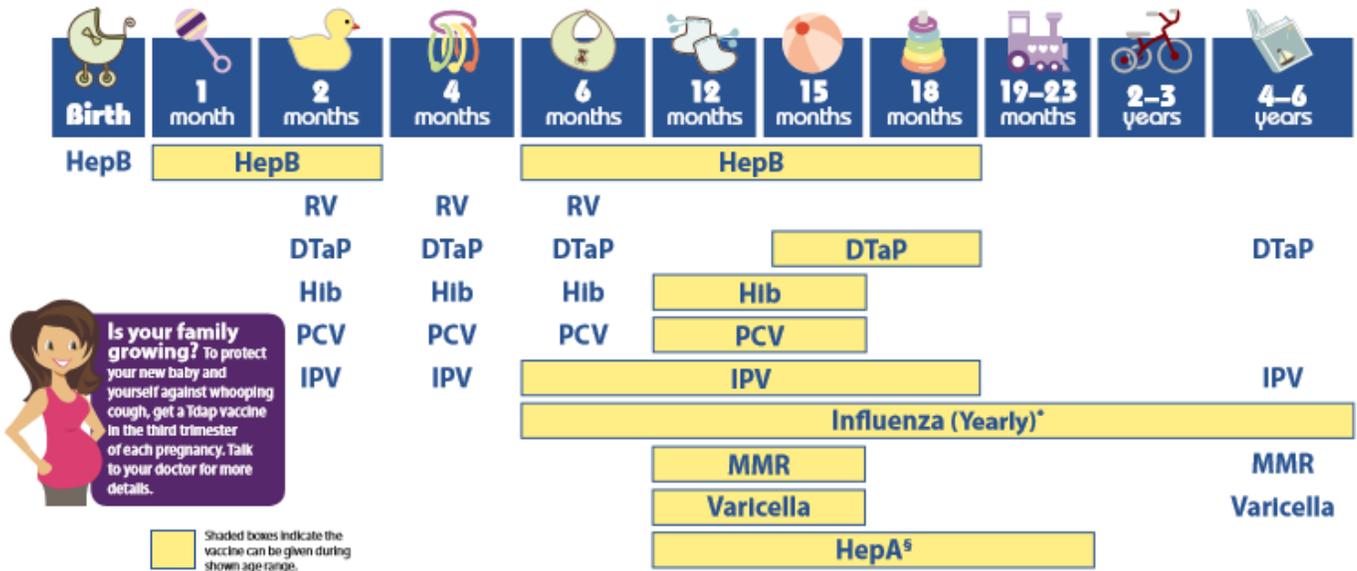
Parents also have to make numerous decisions regarding their infant's health in the first few months of life. The act of vaccinating is a controversial topic and is often approached with emotional decision-making by parents. Vannis et. al. performed a survey to assess the impact of timing and providing parents concerned about vaccinations with informational materials.¹¹ They reported that participating mothers preferred receiving the information during their prenatal visit, opposed to a 1-week and 2-month post-partum well-child visit.¹¹ It was concluded that giving mothers' time to review the materials was beneficial for increasing their support of immunizations.¹¹ Additionally, Návar et. al. found that obstetrical visits are a missed opportunity for informing expectant mothers about childhood vaccinations.¹² Only 23% of the obstetric practices they surveyed provided immunization educational materials to their pregnant patients.¹²

Both of these studies indicate a need for training OB/GYNs in risk communication skills to advocate the importance of childhood vaccinations to their pregnant patients. This program could also capitalize on this period of hyper awareness for parents to make healthy decisions for their babies.

2.1 VACCINES

The Centers for Disease Control and Prevention provide a recommended schedule of vaccinations for people of all ages. This schedule is developed by the Advisory Committee on Immunization Practices (ACIP), which has members from medical and public health backgrounds.¹³ Approval of the schedule is required by the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP).¹³ In order to produce an appropriate schedule, the ACIP reviews various aspects of the vaccines and the diseases they prevent.¹³ These include FDA-approved vaccine efficacy and safety at particular ages, disease infectivity and virulence, as well as a child's ability to produce an appropriate immune response at a particular age.¹³ Figure 1 shows the CDC's parent handout for the recommended vaccine schedule for children between 0-6 years old, while Figure 2 explains the diseases the vaccines protect against (available by open access from the CDC).¹⁴

2016 Recommended Immunizations for Children from Birth Through 6 Years Old



Is your family growing? To protect your new baby and yourself against whooping cough, get a Tdap vaccine in the third trimester of each pregnancy. Talk to your doctor for more details.

NOTE: If your child misses a shot, you don't need to start over, just go back to your child's doctor for the next shot. Talk with your child's doctor if you have questions about vaccines.

FOOTNOTES:

- * Two doses given at least four weeks apart are recommended for children aged 6 months through 8 years of age who are getting an influenza (flu) vaccine for the first time and for some other children in this age group.
- † Two doses of HepA vaccine are needed for lasting protection. The first dose of HepA vaccine should be given between 12 months and 23 months of age. The second dose should be given 6 to 18 months later. HepA vaccination may be given to any child 12 months and older to protect against HepA. Children and adolescents who did not receive the HepA vaccine and are at high-risk, should be vaccinated against HepA.

If your child has any medical conditions that put him at risk for infection or is traveling outside the United States, talk to your child's doctor about additional vaccines that he may need.

SEE BACK PAGE FOR MORE INFORMATION ON VACCINE-PREVENTABLE DISEASES AND THE VACCINES THAT PREVENT THEM.

For more information, call toll free 1-800-CDC-INFO (1-800-232-4636) or visit <http://www.cdc.gov/vaccines>



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



American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Figure 1. CDC 2016 Recommended Immunizations for Children from Birth through 6 Years Old

Vaccine-Preventable Diseases and the Vaccines that Prevent Them

Disease	Vaccine	Disease spread by	Disease symptoms	Disease complications
Chickenpox	Varicella vaccine protects against chickenpox.	Air, direct contact	Rash, tiredness, headache, fever	Infected blisters, bleeding disorders, encephalitis (brain swelling), pneumonia (infection in the lungs)
Diphtheria	DTaP* vaccine protects against diphtheria.	Air, direct contact	Sore throat, mild fever, weakness, swollen glands in neck	Swelling of the heart muscle, heart failure, coma, paralysis, death
Hib	Hib vaccine protects against <i>Haemophilus influenzae</i> type b.	Air, direct contact	May be no symptoms unless bacteria enter the blood	Meningitis (infection of the covering around the brain and spinal cord), intellectual disability, epiglottitis (life-threatening infection that can block the windpipe and lead to serious breathing problems), pneumonia (infection in the lungs), death
Hepatitis A	HepA vaccine protects against hepatitis A.	Direct contact, contaminated food or water	May be no symptoms, fever, stomach pain, loss of appetite, fatigue, vomiting, jaundice (yellowing of skin and eyes), dark urine	Liver failure, arthralgia (joint pain), kidney, pancreatic, and blood disorders
Hepatitis B	HepB vaccine protects against hepatitis B.	Contact with blood or body fluids	May be no symptoms, fever, headache, weakness, vomiting, jaundice (yellowing of skin and eyes), joint pain	Chronic liver infection, liver failure, liver cancer
Influenza (Flu)	Flu vaccine protects against influenza.	Air, direct contact	Fever, muscle pain, sore throat, cough, extreme fatigue	Pneumonia (infection in the lungs)
Measles	MMR** vaccine protects against measles.	Air, direct contact	Rash, fever, cough, runny nose, pinkeye	Encephalitis (brain swelling), pneumonia (infection in the lungs), death
Mumps	MMR** vaccine protects against mumps.	Air, direct contact	Swollen salivary glands (under the jaw), fever, headache, tiredness, muscle pain	Meningitis (infection of the covering around the brain and spinal cord), encephalitis (brain swelling), inflammation of testicles or ovaries, deafness
Pertussis	DTaP* vaccine protects against pertussis (whooping cough).	Air, direct contact	Severe cough, runny nose, apnea (a pause in breathing in infants)	Pneumonia (infection in the lungs), death
Polio	IPV vaccine protects against polio.	Air, direct contact, through the mouth	May be no symptoms, sore throat, fever, nausea, headache	Paralysis, death
Pneumococcal	PCV vaccine protects against pneumococcus.	Air, direct contact	May be no symptoms, pneumonia (infection in the lungs)	Bacteremia (blood infection), meningitis (infection of the covering around the brain and spinal cord), death
Rotavirus	RV vaccine protects against rotavirus.	Through the mouth	Diarrhea, fever, vomiting	Severe diarrhea, dehydration
Rubella	MMR** vaccine protects against rubella.	Air, direct contact	Children infected with rubella virus sometimes have a rash, fever, swollen lymph nodes	Very serious in pregnant women—can lead to miscarriage, stillbirth, premature delivery, birth defects
Tetanus	DTaP* vaccine protects against tetanus.	Exposure through cuts in skin	Stiffness in neck and abdominal muscles, difficulty swallowing, muscle spasms, fever	Broken bones, breathing difficulty, death

* DTaP combines protection against diphtheria, tetanus, and pertussis.

** MMR combines protection against measles, mumps, and rubella.

Last updated January 2016 • CS261834-D

Figure 2. Vaccine-Preventable Diseases

2.2 VACCINE HESITANCY AND REFUSAL

In recent history, vaccine hesitancy and refusal has increased globally.¹⁵ Vaccine hesitancy is defined as “a delay in acceptance of vaccines despite availability of vaccination services” according to the World Health Organization (WHO).¹⁵ The WHO estimates that approximately 1 in 5 children intentionally did not receive a vaccine in the past decade.¹⁵ During

this same time frame, 1.5 million children under 5 years old died from vaccine preventable illnesses, which accounts for 17% of the mortality in that age group.¹⁵ Identifying the reasons for hesitancy and refusal is the first step in counter-acting this trend.

In the United States, parents cite three major reasons for vaccine hesitancy or refusal. The first is that there is no longer a perceived need for immunizations because the diseases they prevent are not witnessed or experienced.¹⁶ Parents are also concerned about the efficacy of vaccines and if they are actually protecting their child.¹⁶ Finally, vaccine safety concern causes parents to be hesitant; while adverse reactions to a vaccine are rare, they are a possible outcome of immunization.¹⁶ Concerns about autism were also mentioned, but are steadily declining.¹⁷ Due to these concerns, pediatricians have seen an increase in the number of parents delaying or refusing vaccinations for their child.

The American Academy of Pediatrics completes a Periodic Survey of Fellows to gather information on current topics in pediatrics.¹⁷ In 2006, they found that 3 of 4 pediatricians experienced vaccine hesitancy and the follow-up survey in 2013 saw an increase to 87%.¹⁷ Of this group, pediatricians reported that they were able to reverse this hesitancy and refusal 30% of the time.¹⁷ It is important to remember that the vast majority of people accept the recommended vaccines on the appropriate schedule. The Vaccination Confidence Scale is a valuable tool for pediatricians to utilize when identifying where a parent is mentally and emotionally about immunizing their child.¹⁸

2.3 PEDIATRIC TRENDS

The CDC has published national vaccination data through 2014 for children aged 19-35 months in the United States. It is categorized by race, ethnicity, socioeconomic status, and location of residence.¹⁹ Between 2009 and 2014 there has been an upward trend in the percentage of children receiving their combined 7-vaccine series on the recommended schedule, which was 44.3% and 71.6%, respectively.¹⁹ The 7-vaccine series is comprised of the most likely potential infections and are listed in Table 1 (available by open access from the CDC).¹⁹ Individual vaccination coverage varies depending on the age of the child and if their parent(s) choose to not follow the advised schedule.¹⁹ While this trend is promising, more work needs to be done to achieve the recommended 95% coverage goal by 2020 of the World Health Organization.²⁰

Table 1. CDC Combined 7-Vaccine Series Recommendations for Children Ages 19-35 Months

Vaccine	Recommended Doses
Diphtheria, Tetanus-toxoids, and Pertussis (DTP)	≥4
Poliovirus	≥3
Measles-containing	≥1
<i>Haemophilus</i> Influenza Type B (Hib)*	≥3 or ≥4
Hepatitis B	≥3
Varicella	≥1
Pneumococcal conjugate (PCV)	≥4

*Depends on Hib vaccine product type (full series Hib)

Kindergarten MMR vaccination coverage for the 2015-2016 school year ranged from 87.1% in Colorado to 99.4% in Mississippi.²¹ Pennsylvania fell in the higher coverage area at 95.5%, which means it achieved the Healthy People 2020 goal set by the WHO.^{20,21} More specifically, Allegheny County kindergarteners recorded >95% coverage for the combined 7-vaccine series, which is the first time this was achieved in the past five years.⁶ It was also the first time vaccination coverage held steady with the previous school year, instead of decreasing.⁶ In order to maintain or increase immunization levels, clinicians and public health professionals need to remain vigilant and proactive about advocating the importance of childhood vaccinations.

2.4 PUBLIC HEALTH IMPLICATIONS

The public health implications for vaccinations are well documented. They are a cost effective, primary intervention, with very rare and typically minor negative side effects. Vaccinations have saved millions of lives over the past 100 years and their development is considered one of the top public health achievements of the 20th century.²² As of 2015, the WHO reported a mortality reduction of 79% in measles deaths alone.²³ However, there is still progress to be made when it is estimated that 19.4 million infants have incomplete vaccinations.²³

Thus far, only smallpox has been globally eradicated due to an aggressive vaccination campaign. The WHO has set a goal to eliminate poliomyelitis as well by 2020.²⁰ Currently, endemic infections are isolated to Afghanistan and Pakistan.²⁴ At the end of September 2016, the Region of the Americas was declared measles-free by the International Expert Committee for Documenting and Verifying Measles, Rubella, and Congenital Rubella Syndrome Elimination in

the Americas.²⁵ In total, the Americas have eliminated all five of the vaccine-preventable illnesses previously listed.²⁵ It is also estimated that over 100 million cases of childhood infectious diseases have been prevented in the United States since the development of vaccinations.²²

There are also major economic outcomes that are a result of immunizations. Direct costs include inpatient and outpatient healthcare visits, and outbreak control which are listed in Table 2 (available through open access from the CDC).²⁶ Indirect costs are estimated using the human capital approach for productivity lost due to early mortality.²⁶ There are also emotional and psychological costs, but these are more difficult to categorize and assign a monetary or time loss value. Table 3 displays estimates of annual disease incidence in the United States before and after vaccination introduction (available through open access from the CDC).²⁶ The total number of estimated days of hospitalization and cost per hospitalization are tabulated in Table 4 (calculated with open access data from the CDC).²⁶ Total hospitalizations were calculated by multiplying the number of reported cases of a disease by the average probability of hospitalization. The average cost per hospitalization was used to estimate the total cost of all hospitalizations. It can be assumed that 77,450 days of hospitalization were avoided and over \$304 million was saved in hospital costs in 2013 USD. While these are not the only cost-benefits of vaccination, they emphasize the importance of immunization from an economic and public health perspective.

Table 2. Probabilities and Costs of Hospitalizations, and Outpatient Visits for Selected Vaccine Preventable Diseases

Disease	Probability of Hospitalization	No. of Hospitalization Days	Cost per Hospitalization	Cost per outpatient visit
Diphtheria	100%	6.1	\$16,982	\$100
Tetanus	100%	16.7	\$102,584	\$100
Pertussis	0.65-30%	5.5-15	\$10,765-22,410	\$100-173
Hib				
Sequelae Among Meningitis Cases	50-100%	2-7.29	\$4,111-38,270	\$100-353
Acute Cases	5-30%	2.84-26.75	\$18,195-49,236	\$310-570
Poliomyelitis	5-100%	4-17	\$7,781-50,554	\$100
Measles	11-100%	1.3-10.9	\$4,032-46,060	\$88-526
Mumps	1-100%	2.8-8.7	\$11,196-46,060	\$110-556
Rubella	0.1-100%	2.6-8.7	\$4,886-46,060	\$89-651
Congenital rubella syndrome				
Hospitalization for investigation	100%	13.6	\$62,233	\$110
Heart surgery	100%	8.9	\$37,082	
Cataract surgery	100%	2.2	\$8,786	
Hepatitis B	0.001-100%	3.9-11	\$15,662-27,051	\$214-599
Varicella	0.1-2.1%	3.1-9.3	\$4,136-22,113	\$83-254
Pneumococcal Diseases	0-100%	6.4-16.8	\$3,798-25,848	\$86-272
Rotavirus	0.5-3.8%	2-3.4	\$3,195-4,793	\$135-455

* Some estimates used in the analysis varied by age, outcome of disease, and with or without vaccination program. Cost per outpatient visit refers a visit associated with the occurrence of a preventable disease.

(All costs are in 2013 US \$)

Table 3. Annual Incidence Rates (cases per 100,000) of Diphtheria, Tetanus, Pertussis, Hib, Polio, Measles, Mumps, Rubella, Hepatitis B, Varicella, Invasive Pneumococcal Disease (IPD), and Rotavirus Before and After Vaccine Introduction

Disease	Baseline rates (before vaccinations)	Range of disease rates (after vaccination introduction)
Diphtheria†	600	0
Tetanus†	0.3	0-0.01
Pertussis†	4,720	3-43
Hib‡	158	0.2-0.3
Polio, Paralytic†	31	0
Measles§	10,641	0-3
Rubella†	6,205	2-27
Mumps†	3,300	0-1
Hepatitis B^{ll}	72	6-46
Varicella^{ll}	9,839	30-1,140
Invasive Pneumococcal Disease‡	212	14-69
Rotavirus***	12,750	4,551-7,150

* Incidence estimates used in the analysis varied by age.

† Estimates shown are for children 5-9 years old.

‡ Estimates shown are for children 1 year old.

§ Estimates shown are for children 2-4 years old.

^{ll} Estimates shown are for children 1-4 years old.

** Estimates shown are for children 2 years old in one region.

*** Estimates shown are for children 2 years old.

Table 4. The Estimated Number of Hospital Days and Cost of Hospital Stay for Infectious Diseases Pre-and Post-Vaccination Introduction

	Pre-vaccination		Post-vaccination Introduction	
Disease	Hospital Days	Cost per Hospitalization	Hospital Days	Cost per Hospitalization
Diphtheria	3,660	\$ 10,189,200.00	0	\$ -
Tetanus	5	\$ 30,775.20	0.0835	\$ 512.92
Pertussis	7,414	\$ 11,998,763.92	36	\$ 58,468.55
Hib	960	\$ 3,443,380.90	2	\$ 5,448.39
Polio, Paralytic	171	\$ 474,692.93	0	\$ -
Measles	36,025	\$ 147,915,539.73	5	\$ 20,850.80
Rubella	17,547	\$ 79,109,012.48	41	\$ 184,863.93
Mumps	9,582	\$ 47,708,562.00	1	\$ 7,228.57
Hepatitis B	268	\$ 768,823.69	97	\$ 277,630.78
Varicella	671	\$ 1,420,397.40	40	\$ 84,452.94
Invasive Pneumococcal Disease	1,230	\$ 1,571,238.00	241	\$ 307,577.25
Rotavirus	740	\$ 1,094,855.25	340	\$ 502,431.22
TOTAL COST	78,273	\$ 305,725,241.49	802	\$ 1,449,465.34

(All costs are in 2013 US \$)

3.0 PROGRAM PLAN

The program will utilize micro-learning videos to teach OB/GYN practitioners how to communicate appropriately and in a timely manner with their pregnant patients about childhood vaccinations. Micro-learning videos were chosen because they provide valuable information in a short time frame that can be easily retained.⁵ This approach works well with hectic physician's schedules, therefore allowing them to complete the modules in between patient visits or when they have a few minutes of down time. OB/GYNs will then use the knowledge and skills they learned from the micro-learning videos to provide their patients with immunization information. OB/GYNs are not traditionally trained to address child health topics, so it would be most feasible for them to start with short scripted messages. They are ideally suited to make the vaccine recommendation as parents will see them as unbiased because they do not benefit financially from vaccination, unlike pediatricians which charge for vaccine administration. Hospital systems and OB/GYN practices could easily integrate this program in their daily standard operating procedures. It could also be added to medical school curriculum without difficulty.

3.0.1 Choice of Approach

This program is aiming to accomplish increased childhood vaccination rates in Allegheny County, Pennsylvania. The first overarching goal is to prevent the spread of infectious disease

among children in Allegheny County through the development of herd immunity as a result of vaccination. Improving parent understanding and knowledge of the importance and necessity of childhood vaccinations is an additional goal. The third overarching goal is to help OB/GYNs develop risk communication skills regarding vaccinations and communicate with their pregnant patients using that strategy.

Micro-learning videos are now being used in various fields to teach people skills in a time and cost efficient manner.⁵ This approach is advantageous for OB/GYNs because their schedules are typically full. Physicians can watch the 3-5 minute micro-learning videos in between patient visits and during any other down time they may have throughout the day. The surveys and questionnaires associated with each video also only take 3-5 minutes to complete. Since both of these components do not add extra time to the physicians' workday, it makes the program more appealing to them.

The approach of using OB/GYNs instead of pediatricians is being used because pediatricians spend about half as much time with their patients as OB/GYNs.¹⁰ OB/GYNs can also introduce the immunization conversation prior to the child's birth, which should be less stressful for the expectant mother since it gives her more time to make an informed decision about vaccinating her child. Both OB/GYNs and pregnant patients should find this approach appealing because it can easily be incorporated in their regular well visits and does not require large amounts of additional time. Starting the vaccination conversation earlier also allows for more dialogue between patients and their physicians, with the ability to ask questions and have them answered prior to when the parents need to make a final decision. Overall, it could reduce the stress parents feel and develop a stronger relationship with their doctor. OB/GYNs will

participate in the program because it will help improve childhood vaccination rates and the overall health of that demographic in Allegheny County.

Developing and expanding knowledge about immunizations in the population is critical to maintaining a strong standard for public health. This program aims to address this issue through already existing infrastructure and programs. Therefore, it is cost effective, sustainable, and replicable.

3.0.2 Evidence Base

Utilizing micro-learning videos to educate obstetrical physicians on how to communicate the importance of childhood vaccination with their pregnant patients is a novel program plan, though components have been used separately and successfully in similar programs. Micro-learning videos are short enough for physicians to view in between patient appointments and during any other free time they may have during the day. Assessing if knowledge and skills are developed after viewing micro-learning videos is done through follow up activities such as surveys and case study scenarios. Both will be employed in this program. The messages about childhood vaccination that physicians will give to their pregnant patients will not add extra time to existing appointments and can be explained during routine procedures, such as ultrasounds and exams. Surveys and resource collection should also only take a minimal amount of time. OB/GYNs can access the online forum and modules from any device that connects to the Internet. Regarding timing, there are several required prenatal visits for expectant mothers that are opportunities for their doctors to bring up the vaccination conversation, as well as for the patients to ask follow up questions and have further conversations. These scheduled appointments are also opportunities for program feedback, so the project manager can adjust

components accordingly. The Health Belief Model will be used for the development of program goals, objectives, outcomes, and activities.²⁷ This model is based on the premise of using attitudes and beliefs to predict health behaviors.²⁷ A shared decision-making approach skill development set will also be used when creating micro-learning programming for the physicians.²⁸ OB/GYNs can employ shared decision-making strategies when communicating with their expectant patients.

3.0.3 Engagement

Engagement with the OB/GYNs will begin by developing a partnership with the hospital or practice where they work. Once a hospital or practice agrees to participate, an email with directions for the OB/GYNs will be sent to them. These directions will tell the OB/GYNs how to set up and access their personalized account on the online forum for the micro-learning videos and other resources. OB/GYNs will be engaged because of the public health implications of complete vaccination coverage, as well as the incentive of continuing medical education (CME) credits. It could also help them build a stronger relationship with their patients, who could influence each other in the desired direction of vaccination for this program.

Health insurers will be engaged by the financial incentive of future capital saved. It is in their best interest to insist that children covered receive the recommended vaccinations in order to avoid paying for hospital stays and medication if they become infected with a preventable disease. Financial implications are listed previously in Table 4.

Expectant parents will be engaged in this program due to their hyper-awareness of making the healthiest choices for their child. They will feel comfort in knowing their OB/GYN is listening to and addressing their concerns regarding childhood immunizations. Making an

informed decision prior to the birth of their child is relieving as well. For example, the first childhood vaccine, Hepatitis B, is given while the mother and baby are still in the hospital post-partum. It is especially appropriate for the OBs to endorse this first vaccine as a good start to being fully protected.

The Health Belief Model (HBM) will be used to engage participants and OB/GYN practitioners in this program because it helps with recognizing both individual and population level health status and needs.²⁷ Vaccination messages will not exceed five minutes per visit, so there is not an additional time issue with the patient because they can be given while their doctor is checking them in and catching up from their previous visit. The micro-learning videos are only 3-5 minutes in duration, so they can be easily viewed by the OB/GYNs in between patient visits, without adding time to their workday. Additionally, the videos will be developed in multiple formats so they can be viewed on various devices.

Stakeholders for this project include the Allegheny County Health Department, UPMC, Highmark, OB/GYNs, pediatricians, and community members. The two main funders of the program will be the Centers for Disease Control and Prevention and the Allegheny County Health Department. They both will provide guidance in material development and message dissemination. UPMC and Highmark will act as partners and assign the OB/GYN practices that will participate in the program.

3.1 GOALS AND OBJECTIVES

GOAL: Increase childhood vaccination rates in Allegheny County by providing information to pregnant women during prenatal visits.

OBJECTIVES

- 50% of OB/GYN providers in Pittsburgh, PA participate in the program by 2018.
- 95% of pregnant patients that present to a participating practice report that they will vaccinate their children according to the recommended schedule by 2019.
- >97% of children in Allegheny County are completely vaccinated by 2025.

3.2 IMPLEMENTATION PLAN

3.2.1 Logic Model

Goal: Increase childhood vaccination rates in Allegheny County by providing information to pregnant women during prenatal visits.

Inputs	Activities	Outputs	Initial Outcomes	Intermediate Outcomes	Long-Term Outcomes
<u>Resources</u> -Staff/Stakeholders -Project manager -Public health official -Pediatrician -OB/GYN physician -Parent -Risk communication expert -IT specialist -ACHD -AHN -UPMC -Materials -Pamphlets -Online physician Instructional program (micro-learning videos) -Message delivery schedule -Vaccination Messages -Cost -\$595,000 -Time -3 years <u>Constraints</u> -Changing educational	-Create vaccination messages for physicians -Create schedule for message delivery -Develop instructional materials for physicians (micro learning videos) -Develop take home materials for pregnant women -OB/GYN practitioners complete micro-learning curriculum -Pregnant women receive	-Vaccination messages developed for OB/GYN practitioners - 100 OB/GYNs participate in program - 100% of pregnant patients receive messages -10 micro-learning videos created to inform OB/GYN practitioners how to communicate about vaccines with their pregnant patients -Schedule for vaccination message dissemination -Take-home materials for pregnant women - # of mothers reporting they have an open dialogue with their	-Participating OB/GYN practitioners gain the knowledge of communication techniques regarding vaccinations in 6 months - Measured using post-test scores -Participating OB/GYN practitioners develop risk communication skills for recommending and educating about immunizations to pregnant patients in 6 months -Pregnant women develop knowledge about vaccinations throughout the course of their pregnancy - Measured using surveys -10% Pregnant women have a positive change in attitude toward childhood vaccinations by the end of their pregnancy	-50% of OB/GYN practitioners deliver vaccination messages and materials to 100% of their pregnant patients -95% of pregnant women accept and read educational materials about childhood immunizations -75% of OB/GYN practitioners and pregnant patients develop an open dialogue about vaccinations -95% of pregnant patients decide to immunize their children after they are born according to the recommended schedule -97% of parents are pro-vaccination for their child according to the	- Increased childhood vaccination rates in Allegheny County

<p>timeline culture from pediatric to OB/GYN visits - Time available during OB/GYN Visit - Willingness of patients to participate</p>	<p>messages and take-home materials at OB/GYN visits</p>	<p>physician - # of OB/GYN who completed the training - # of pregnant women who received messages and take home materials - # of electronic medical record entries for vaccination message dissemination</p>		<p>CDC's and AAP recommended schedule - 97% of children are up to date on their vaccines</p>	
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Figure 3. Logic Model

3.2.2 Gantt Chart

ACTIVITY	PERSONS INVOLVED	PY1				PY2				PY3			
		1	2	3	4	1	2	3	4	1	2	3	4
Create vaccination messages for physicians	Project manager and other staff	█	█										
Create schedule for message delivery	Project manager and other staff	█	█										
Develop micro-learning videos for physicians	Project manager and other staff	█	█										
Create appointment checklist for physicians	Project manager and other staff	█	█										
Create appointment follow-up survey for patients	Project manager and other staff	█	█										
Create vaccination survey for patients	Project manager and other staff	█	█										
Develop take-home materials for pregnant women	Project manager and other staff	█	█										
Build online forum to house practitioner videos, surveys, post-tests, and forums	IT Analyst and project manager	█	█										
OB/GYN practitioners complete micro-learning curriculum	Project manager and OB/GYN practitioners			█	█								
OB/GYN practitioners complete video post-test	Project manager and OB/GYN practitioners			█	█	█							
OB/GYN practitioners complete risk communication survey	Project manager and OB/GYN practitioners			█	█	█							
Pregnant women receive vaccination messages	Project manager, OB/GYN practitioners, and pregnant women				█	█	█	█	█	█	█	█	█
Pregnant women receive take-home materials	Project manager, OB/GYN practitioners, and pregnant women				█	█	█	█	█	█	█	█	█
Pregnant women complete childhood vaccination survey	Project manager, OB/GYN practitioners, and pregnant women				█	█	█	█	█	█	█	█	
Data are collected and analyzed	Project manager, OB/GYN practitioners, and IT analyst					█	█	█	█	█	█	█	█
Progress assessments completed and necessary changes made	Project manager, OB/GYN practitioners, and IT analyst						█		█		█		█
Results are reported to stakeholders	Project manager and stakeholders				█			█					█

Figure 4. Gantt Chart

Both quantitative and qualitative data will be collected and analyzed for this program.

Qualitative data includes the risk communication assessment completed by OB/GYN

practitioners and portions of the childhood vaccination survey done by the pregnant patients. Quantitative data will be recorded as the number of OB/GYN practitioners who complete the micro-learning videos and their related survey, the number of patients they speak to, the number of childhood vaccination pamphlets distributed, and the number of mothers that decide to vaccinate their children when they previously were not.

Since this program is designed to provide OB/GYN practitioners with the correct communication skills to educate their pregnant patients about childhood vaccinations, it will measure both the progress of the OB/GYN practitioners and ultimately the number of their patients that change their mind and decide to vaccinate their child. Ordinal descriptive statistics will be used to interpret the data from the risk communication survey and the vaccination survey that use Likert scales.

Qualitative data, from attribute information, will be coded and analyzed using nominal descriptive statistics. Starting in year two of the program, inferential statistics will be used to compare OB/GYN practitioners participating in the program to each other and practitioners that are not in the program. This includes a quantitative analysis of the demographics of the physicians, which will inform changes that need to be made in the program. The same comparison will be made for expectant mothers. These will be completed by two-sample and one-sample T-tests, respectively. If there are differences in follow up surveys from both groups that suggest revision of program materials, then they will be revised for future implementation. A comparison using an independent T-test will be used to analyze the difference between how participating OB/GYN physicians interact with their patients and how they answered questions on the surveys.

3.3 INTERMEDIATE RESULTS AND ACTIVITIES

The intermediate activities will be the OB/GYNs communicating and educating their pregnant patients about the importance of childhood vaccinations as designated by the schedule for message dissemination designed by the project staff. Physicians will also distribute the take-home materials to their patients and return completed surveys to the project manager.

The project manager will be collecting the data from the OB/GYN practitioners and analyzing them with the IT analyst. Additionally, they will regularly communicate with the OB/GYNs to make sure they are following the recommendations and carrying out their activities correctly and appropriately. Biannual progress assessments will be performed by the project manager and IT analyst and their results will be used to make necessary changes to the program so it continues to fulfill the correct goal and objectives. Finally, the information from the two biannual progress assessments will be combined and reported to stakeholders and funders during the final quarter of each program year.

Ideally, physicians and pregnant patients will develop an open dialogue about vaccinations as the project progresses. This will happen as the patients accept and read the educational materials about childhood vaccinations. An anticipated intermediate result is that vaccine-hesitant pregnant women begin reporting they have decided to immunize their child after they are born according to the recommended schedule. As the program continues, this number is predicted to rise.

3.4 MANAGEMENT PLAN

3.4.1 Staffing

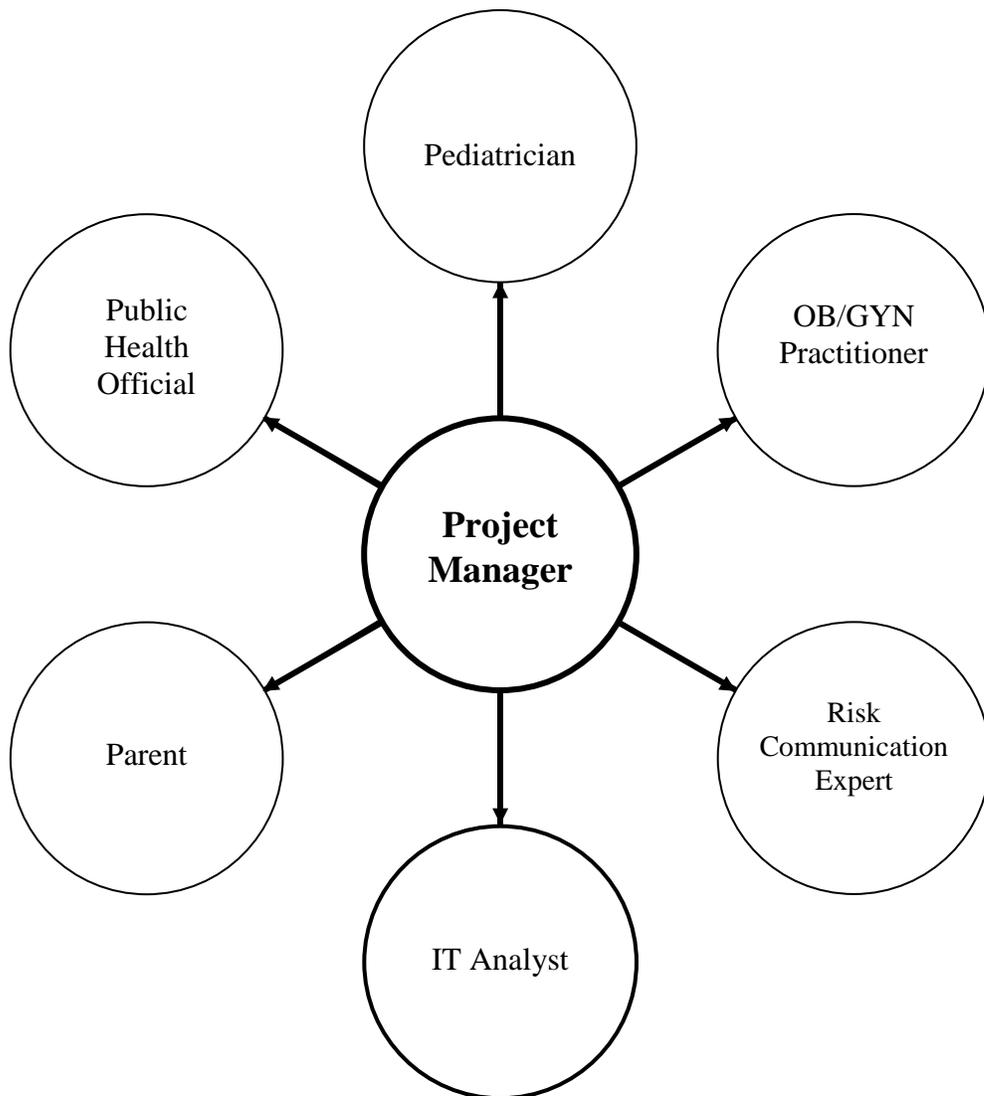


Figure 5. Staff Plan

Project Manager

The project manager oversees and executes the majority of the activities in this program. They will supervise the short contract members in development of materials and micro-learning

videos for OB/GYNs and their patients. Training and distribution of materials will also be major tasks completed by the project manager. They will work with the IT analyst to build the online forum for OB/GYNs to complete their curriculum and communicate with the project manager regularly. They will also communicate with funders and make sure intermediate results are reached.

IT Analyst

The IT analyst contributes 20% effort to this program. They will be in charge of developing and maintaining the online forum of OB/GYNs, assist with data collection and analysis, as well as producing progress assessments. The project manager and IT analyst will work together closely throughout the duration of the program. They will also interpret the data and identify areas of the program that need revised or changed so it will be working in the correct direction.

Other Staff

This group consists of representatives from each collection of stakeholders that this program involves or will affect. These are a public health official, pediatrician, OB/GYN, risk communication expert, and a parent who is pregnant or recently gave birth. Each person represents the interests of their particular stakeholder subset and helps create the messages, micro-learning videos, and curriculum for this program. They are only utilized for 15% of the program's duration, so none are considered full-time employees.

3.5 STAKEHOLDERS/PARTNERS

Stakeholders include public health officials, OB/GYN practitioners, pediatricians, parents or parents-to-be, risk communication experts. Each member represents the interest of their particular group and provides their expertise to all of the required materials for the program. Group representatives will be recruited through recommendations from the participating hospital systems. They will be provided a small monetary compensation for their participation with program content development. The project manager will oversee the entire group, all activities, and communicate with the OB/GYN practitioners participating in the program, the stakeholders, and funders. A strong partnership must be developed with the OB/GYN practitioners because the majority of the work they are completing will be without monetary compensation.

The rest of the group will work together to develop the micro-learning videos, create the vaccination messages, the schedule for message delivery, and take-home materials for pregnant women. The team will remain engaged because they will be revising the micro-learning curriculum and other materials based on feedback from participants. The IT analyst will be in charge of data entry and analysis and report the results back to the project manager.

Major partners for this program include hospitals or hospital systems that employ the OB/GYNs participating in the program. It is critical to have their support and comply with the requirements of the program. Communicating the importance and benefits of employees trained in proper risk communication strategies, especially about controversial health topics, is key in earning their support.

3.6 SUSTAINABILITY PLAN

This program can be sustained in several ways. Since it utilizes micro-learning videos and curriculum that contain information that will not change, they will only need to be updated minimally after their original creation. It will help keep costs low for other sites that choose to adopt the program, so the affordability is attractive for program expansion.

Another option is for the hospitals and OB/GYN practices to adopt the program as part of their training and standard operating procedures. This could be done through both residency programs and practices. It will also save the hospital systems money from prevented hospital stays and other associated medical costs caused by vaccine-preventable illnesses. Their training can be supported by quality improvement initiatives in the major health care systems, including the annual online mandatory training of providers. A Best Practice Alert (BPA) can be added into the electronic medical record (EMR) reminding OBs to discuss childhood vaccinations with prospective mothers. For example, within the UPMC EMR, the After Visit Summary (AVS) print-out could include a standard section in the “Patient Instructions” area with the recommendation to have the baby vaccinated completely and on-time. This section could also include links to reputable vaccine information sites, such as the CDC, AAP and the Immunization Action Coalition (IAC). Insurance companies could also demand participation of providers to save money. Additionally, medical schools can incorporate this training in their curriculum for all medical students, as they may also encounter similar situations regarding vaccinations.

Table 5. Budget

Total cost for the duration of the program (3 years)	\$ 358,902.00				
Personnel					
Role	Effort	Quantity	Salary	Fringe (30%)	Total Cost
Project Manager	100%	1	70,000.00	21,000.00	273,000.00
IT Analyst	20%	1	67,000.00		40,200.00
OB/GYN Practitioner	contract	1	1,000.00		1,000.00
Public Health Official	contract	1	1,000.00		1,000.00
Pediatrician	contract	1	1,000.00		1,000.00
Risk Communication Expert	contract	1	1,000.00		1,000.00
Parent	contract	1	1,000.00		1,000.00
				Total Personnel	318,200.00
Other Costs					
Category/Item	Description	Quantity	Unit Cost	Total Cost	
Travel				\$702.00	
Gas for part-time personnel	Reimbursed for mileage used to travel to office @ \$0.54/mile driven (2016 federal mileage rate)	1,000 mi.	0.54	540.00	
Gas for site visits by project manager	Site (hospital and practices) will occur at program implementation, then annually	300 mi	0.54	162.00	
Equipment				\$ 3,000.00	
Program Online Interface	Interface houses micro-learning videos, discussion forum, surveys, post-tests, etc.	1	3,000.00	3,000.00	
Supplies & Minor Equipment				\$ 11,800.00	
Program interface upgrades and maintenance	Operating system upgrades are needed periodically	3	500.00	1,500.00	
Take-home materials	Brochures, fact sheets, and surveys for pregnant women	5000	1.00	5,000.00	
Instruction sheets for program interface for OB/GYN practitioners	Written step-wise instructions for OB/GYN practitioners using the program	500	1.00	500.00	
Prism (Graphpad)	Data collection and analysis program	3 (renewed annually)	200.00	600.00	
Office Supplies	Paper, pens, pencils, staplers, paperclips, etc.	1	200.00	200.00	
Apple iMac Computers	For IT Analyst and Project Manager	2	2000.00	4000.00	

Table 5 Continued					
Facilities				\$	
				7,200.00	
Office	Located in ACHD and houses Project manager and IT Analyst	36 months	200/month	7,200.00	
Miscellaneous				\$	
				18,000.00	
Video recording and editing team	To record and edit 10 micro-learning videos	1	15,000	15,000.00	
Report writing and dissemination	Reporting the results of the program throughout and at the conclusion	3	1000	3000.00	
		Total Other Costs:		\$40,159.25	

3.7 BUDGET SUMMARY

Personnel costs account for nearly 94% of the overall budget. The other staff are considered part-time and only contribute during the first two quarters of the first year of program implementation in creating all of the educational and informative materials used throughout the program. The remaining 6% of the budget can be attributed to other costs, which include travel expenses, major equipment, supplies & minor equipment, facilities, and miscellaneous expenses. Travel costs include gas for the project manager when they are traveling to healthcare facilities, as well as the cost of travel for the part-time employees. A custom interactive online forum is the only piece of major equipment required for this program and it will be developed, monitored, and continuously updated by the IT analyst. Supplies for the program are general office supplies, program interface upgrades, take-home materials for patients, instructional sheets for physicians, and Prism data analysis software. The program will be renting an office space at the Allegheny County Health Department throughout its duration. Finally, miscellaneous expenses will include a video recording and editing team to develop the micro-learning videos for OB/GYN

practitioners, as well as report writing and dissemination of results at the conclusion of the program. This is the total cost of the program over the three years it will be implemented.

4.0 EVALUATION PLAN

Two types of evaluation, formative and monitoring, will be used throughout this program. Formative evaluation will be used to define the underlying rationale of the program to increase childhood vaccination rates. It will also help to organize and identify program activities that will result in the desired impact. A monitoring evaluation will also be used to make sure all components of the program are being completed and utilized appropriately. Suitable coverage will also be assessed through the monitoring evaluation. The following evaluation questions will be used:

Formative

1. What information should be included in the OB/GYN practitioner micro-learning modules?
2. What vaccination messages should be emphasized when communicating with pregnant women?
 - a. What information is missing from available literature?
3. Should messages be communicated to all women? Or certain at-risk groups?

Monitoring

1. Were the micro-learning videos effective forms of educating the OB/GYN practitioners?
 - a. How many OB/GYN practitioners completed the micro-learning video training?

- i. How many OB/GYNs developed risk communication skills after watching the videos?
2. How were the selected immunization messages communicated to pregnant women?
 - a. Were the messages communicated with fidelity at each OB/GYN practice?
 - b. Were they communicated correctly?
 - c. Were they understood by the intended audience?
3. Did pregnant women accept the take-home educational materials?

5.0.1 Sampling

All results will be collected from participating OB/GYN practitioners. However, since there are more patients than physicians, a random sampling will be used for this group to track the progress of the program. This will ensure the results remain unbiased. At each designated time point for a data collection method, only 20% of patient information will be collected and analyzed for progress. Samples from each attribute group will be used to ensure objectivity and that the data are representative of the population. At the conclusion of the program the entirety of the data will be collected and analyzed for comprehensive results.

4.1 RESULTS FRAMEWORK

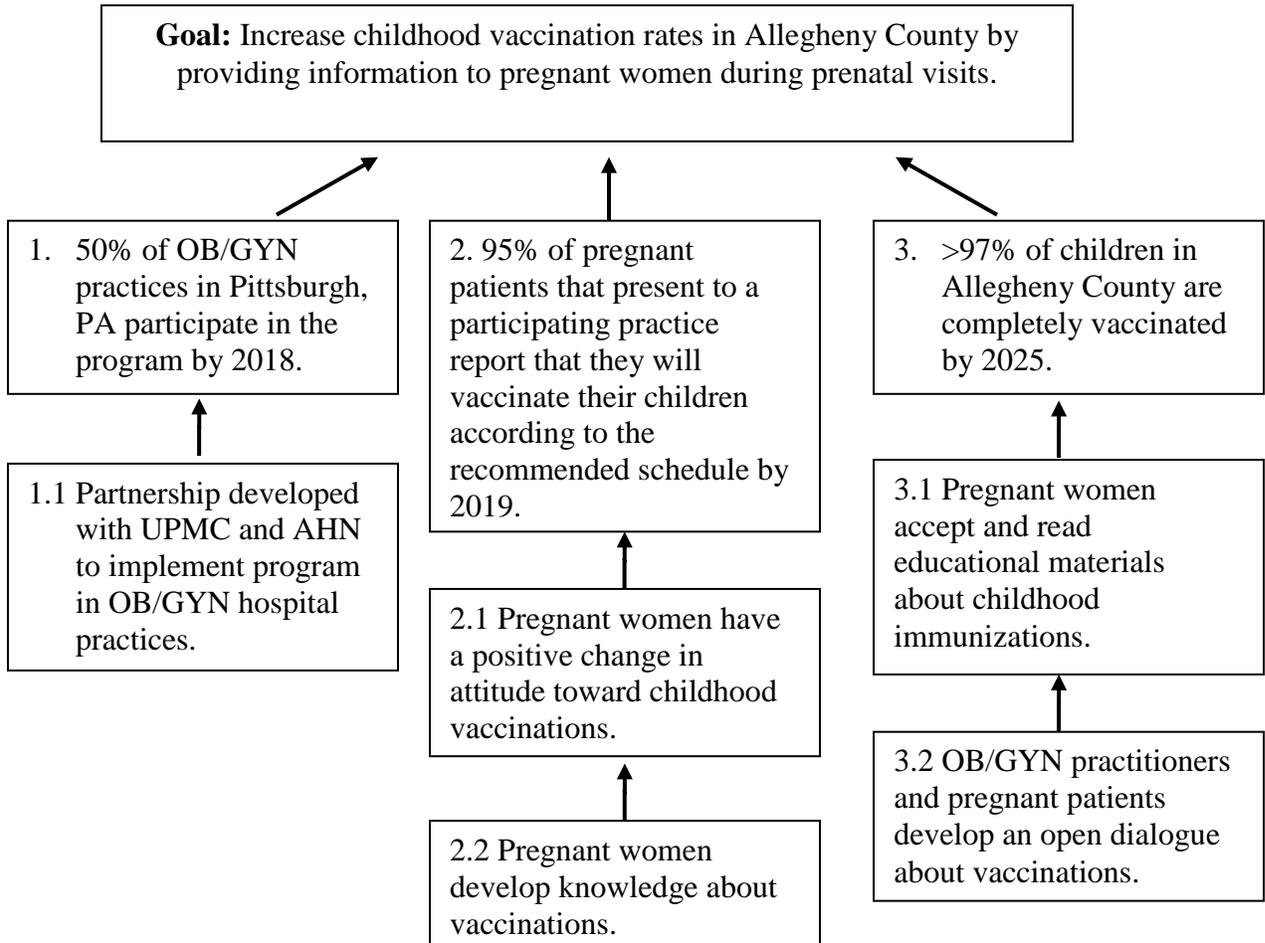


Figure 6. Results Framework

4.2 DATA COLLECTION METHODS

There are multiple data collection methods that will be employed throughout this project. The project manager will oversee production of vaccination messages, micro-learning videos, and take-home materials according to a production checklist. A post-test will be completed by OB/GYN practitioners when they finish the micro-learning modules. They will complete a survey about their risk communication skill set and report how comfortable they are with providing these childhood vaccination messages to patients. All of these surveys will be

available on the online forum that houses the micro-learning videos and message board. Practitioners will be prompted to complete them at specific time points throughout their module completion. All data will be accessible to the project manager and IT analyst electronically and will automatically be filed according to the OB/GYN practitioner's identification number.

Once the program moves to the messaging stage, appointment checklists will be used by OB/GYN practitioners to ensure that pregnant women receive the correct childhood vaccination messages and take-home materials according to the timeline. A follow-up survey will be given to the pregnant women at their next appointment to gauge their understanding of the materials. Both at the final prenatal visit and at the infant's six-week check-up, OB/GYNs will give a survey to expectant mothers to complete about her decision to vaccinate her child.

4.3 TOOLS

The major activities of this program are to create tools for OB/GYN practitioners to use when communicating with their pregnant patients about the importance of childhood vaccinations. They will all be developed during the first two quarters of program implementation. These include creating vaccination messages for physicians to provide to their patients and the schedule in which to do so, as well as the take-home materials for pregnant patients.

Micro-learning videos will represent the major instructional portion for the OB/GYN practitioners and will be created by the program staff based on CDC recommendations. There will be ten micro-learning videos developed and they will each be between 3-5 minutes long. Topics will include risk communication skills, which will help identify what the pregnant

woman's perceived risk and benefit feelings are about vaccines for her unborn child. The next videos will cover a successful dialogue strategy series which suggests taking time to listen, soliciting and welcoming questions, maintaining the conversation, discussing risks and benefits, identifying how much science to include, documenting the parents' questions and concerns, and respecting parental authority.²⁹ The final two videos will explain what to do if parents plan on not vaccinating their children and where parents can find additional resources about childhood immunizations.

Take-home materials for expectant mothers will also be developed by the team using guidelines from the CDC as well. They will include all of the information that is in the micro-learning videos, written at a third grade reading level to ensure the majority of pregnant women can both read and comprehend them. They are available via text-to-talk, in Braille, and in Spanish, with the potential for additional languages in the future, for those with a disability or who do not speak English fluently. Website links to the vaccine specific CDC pages will be included along with their YouTube channel. All surveys and questionnaires will be written by the stakeholders group and the schedule of message delivery will coincide with regular obstetrical visits beginning at the third month of pregnancy, during the first trimester.

The IT analyst will create an electronic forum, similar to a web page, which will house the micro-learning videos, message center, as well as surveys and post-tests for the OB/GYN practitioners to complete. Each practitioner will create their own profile, which will assign them a specific identification number that all of their surveys, post-tests, and other data will be linked to for analysis. This will ensure confidentiality and allow the data analysis to be completed without bias. There will also be an electronic notebook for the doctors to enter which patients they give vaccination messages to and how frequently. Attribute and demographic data for each

OB/GYN practitioner will be entered in to the electronic profile and directly linked to their identification number when completing the data analysis to ensure anonymity.

4.3.1 Data Collection Instrument

Survey of Physician Risk Communication Skill Set

This survey will gauge your comfort level for communicating about controversial health topics with your patients. It will let the project manager know of any additional training you would need to feel comfortable to talk about childhood vaccinations with your pregnant patients. All of your answers will be confidential and will be linked to your profile number. Attribute questions should be addressed in your user profile.

1. How frequently do you communicate with patients about medical treatments that have both positive and negative outcomes?

- Always
- Very Frequently
- Occasionally
- Rarely
- Very Rarely
- Never

2. What type of verbal language do you use?

- What type of body language do you use?
- How comfortable do you feel discussing this type of information with patients?

- Very comfortable
- Comfortable
- Uncomfortable
- Very Uncomfortable
- Unsure

- How often do you listen intently to their concerns?
 - Always
 - Very frequently
 - Occasionally
 - Rarely
 - Very Rarely
 - Never

- How do you convey to your patient that you are listening to them intently?

- What techniques do you use to ensure patient comprehension?
 - Do you ask them if they understand the information?
 - Yes
 - No

- 3. How would you rank the importance of your patients' emotional well-being and knowledge regarding personal health decision-making? Rank them by assigning a 1 or 2 with 1 being for most important
 - Emotionally content
 - Knowledgeable

- 4. What medical topics do you find the most difficult to discuss with patients and why?
 - How do you approach the discussion of these topics compared to others?

- 5. If a patient disagrees with your recommendations, how do you respond?

- 6. What is your success rate for getting apprehensive patients to agree with your recommendations? (based on electronic medical records)
 - 81-100%
 - 61-80%
 - 41-60%
 - 21-40%
 - 0-20%

4.4 PERFORMANCE MEASURES AND INDICATORS

Table 6. Performance Measures and Indicators

Level	Performance Measures					
Client (Pregnant women)	<ol style="list-style-type: none"> 95% of pregnant women receive messages and take-home materials at their OB/GYN appointment. 75% of pregnant women who receive the take-home materials read them. 					
Program (OB/GYN practitioners)	<ol style="list-style-type: none"> 100% of messages, micro-learning videos, and take-home materials are developed and distributed to participating OB/GYN offices by the end of the second quarter of the first year of the program. 75% of OB/GYN practitioners complete the vaccination micro-learning curriculum by end of first quarter in year 2 of the program. 					
PM #	Data Source	Data Collection Methods	Person Responsible	Timeline		
				Collect	Monitor	Report
1	OB/GYN practitioners	Appointment checklist	OB/GYN practitioners	Ongoing	Monthly	Quarterly as percentage to funders
2	Pregnant women	Survey at follow-up appointment	OB/GYN practitioners	Ongoing	Monthly	Quarterly as percentage to funders
3	Project manager/ Staff	Production checklist	Project Manager	Initial (Q1-Q2)	N/A	First progress meeting
4	OB/GYN practitioners	Post-test	OB/GYN practitioners	Initial/First Quarter of 2 nd year	Weekly	First progress meeting
<p><i>Notes for Performance Measures:</i> OB/GYN practitioners will be a critical part of the data collection and organization process, and will be incentivized by being awarded continuing education credits for their participation.</p>						

Table 6 Continued

Outcome Level	Indicators					
Initial	1. 90% of OB/GYN practitioners develop risk communication skills for recommendations and education about childhood immunizations to pregnant patients within three months of program implementation.					
Intermediate	2. Within six months of completing the micro-learning modules, 75% of OB/GYN practitioners deliver vaccination messages and materials to each of their pregnant patients at all of their wellness appointments.					
Long Term	3. 95% of pregnant women who previously did not want to immunize their child, and 100% of pregnant women who planned on immunizing their child, report they plan to vaccinate their child according to the recommended schedule after receiving vaccination messages and materials from their OB/GYN.					
Indicator #	Data Source	Data Collection Methods	Person Responsible	Timeline		
				Collect	Monitor	Report
1	OB/GYN practitioners	Survey/test	Project manager/ OB/GYN practitioners	Participant's last session	Monthly	5th quarterly report
2	OB/GYN practitioners	Vaccine messages checklist	Project manager/ OB/GYN practitioners	Monthly (after OB/GYN completion of modules)	Quarterly	Biannual meetings
3	Pregnant women	Survey	Project manager/ OB/GYN practitioners	8 and 8.5 month visit/ follow up visit 6 weeks post-birth	Quarterly	Quarterly
<i>Notes for Indicators:</i> OB/GYN practitioners will be a critical part of the data collection and organization process.						

The project manager and OB/GYN practitioners will work the closest throughout this project. The forum where the micro-learning modules are available will also have a messaging/communication area so these two entities can communicate openly and constantly.

There is also a live video chat function that allows for one-on-one and conference calls between the practitioners and the project manager.

4.5 PERFORMANCE REPORTING

The project manager is in charge of all the performance reporting. They ensure the IT analyst and temporary staff complete their assigned duties correctly and on time. OB/GYN practitioners participating in the program directly communicate with the project manager about all of the components they need to complete. If there are issues with getting pregnant patients to participate, the project manager will help the OB/GYN through the process. The project manager will report performance evaluations to funders and stakeholders during the 4th quarter annual meetings.

4.6 ORGANIZATIONAL CAPABILITY

This program is linear in design, which supports a simple organizational set up. The most comprehensive and work-intensive portions of the program are developing the micro-learning videos, vaccination messages, associated materials for OB/GYNs and their patients, and the online interface. Existing materials and recommendations from the CDC will be used in message and schedule development. Partnerships with UPMC and AHN will provide a capacity for the project, since there will be participating obstetrical practices in the major hospitals in Allegheny

County. Once practices are willing to participate, the project manager can implement the remainder of the project.

5.0 LIMITATIONS

There are a few limitations that may be encountered throughout this program. The first is ensuring that the OB/GYN practitioners understand and can use the electronic forum to its maximum potential. The project manager will communicate with them more intensely during the first three months of program implementation. There will be written instructions sent along with the pamphlets and other take-home information for patients and a hotline number is available to contact the IT analyst to walk them through the program.

Another limitation is the self-reporting of both the OB/GYN practitioners and the patients on their surveys. One way to avoid this issue is to ensure confidentiality by using identification numbers to link the data. OB/GYN practitioners may also enter data incorrectly, incompletely, and/or inconsistently which would present an issue. To avoid this, a reminder will automatically be scheduled for the patient's next appointment(s), so when the doctor enters information in the electronic health record (EHR), it reminds them to follow up about the childhood vaccination conversation. They will also automatically be prompted in the electronic form for each piece of necessary information that should be entered in to certain fields, which will help make sure data points can be followed correctly over time.

Sampling of approximately 20% of participating OB/GYN practitioners will be used throughout the program to measure progress and if changes need to be made. At the conclusion of the program the entirety of the data will be analyzed and reported to stakeholders and funders.

A limitation could be that the sampling data is not indicative of the entire group participating in the program. To avoid this, a portion of each OB/GYN group based on demographics and attributes will be included in every sampling to allow for representative data.

For this program, only OB/GYNs will be used. There are other positions that assist pregnant women with their preparation and act of infant delivery. Midwives and doulas are more holistic in their approach to child-bearing. Neither will be included in the initial implementation of this program, but can be involved later when it expands.

Finally, changing the educational timeline for mothers and parents from pediatric to prenatal visits could pose a challenge to OB/GYNs. Providing these types of messages is a behavior change for these physicians. This is the part of the overall goal of the program, so it will be addressed through the micro-learning videos and vaccination message scheduling. Another related issue could be the amount of time available during a visit to talk through the messages. The vaccination messages will not exceed two minutes in total length and can be communicated during vitals collection or other transition moments during the appointment. Each visit typically lasts 15-20 minutes, which is almost twice as long as the average pediatric visit.¹⁰ OB/GYN visits are also more frequent during pregnancy than well-child visits with a pediatrician, which allows for more opportunities to communicate these immunization messages in a shorter time frame.

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