

Implementation of MenB Vaccine Recommendations in Older Adolescents & Young Adults Living in Central Texas

Grant ID 27207231

Main Collaborators:

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- Killeen, Belton and Temple Independent School Districts
- Temple College, Central Texas College, and University of Mary Hardin-Baylor

Abstract:

The overall goal of this education and quality improvement project is to improve vaccination rates among adolescents and young adults against meningococcal B disease by implementing the current Category A and B Centers for Disease Control (CDC) and Prevention, Advisory Committee on Immunization Practices (ACIP) recommendations for serogroup B meningococcal (MenB) vaccine. The target audience is individuals aged ≥ 10 years at high risk for meningococcal disease and those aged 16-23 years, their parents, the general public, and BSWH healthcare providers (doctors, physician extenders or advanced practice providers such as physician assistants, nurse practitioners, nurses, and support staff) in Pediatrics, Family Medicine, Gynecology, and Adolescent & College Health. We will accomplish this goal by improving provider education, initiating quality improvement projects within local primary care clinics, utilizing monthly reminders and provider incentives, partnering with local schools and colleges to increase public education, and utilizing our Electronic Health Record System (EHR) to encourage providers to actively offer the vaccine to adolescents and young adults at every clinic visit. At the clinic level, subject matter experts will utilize onsite presentations to educate BSWH primary health care professionals on how to recommend and effectively communicate the importance of this vaccine. Clinics will have sufficient product inventory to vaccinate all eligible adolescents with the MenB vaccine, and the project team will measure local data and improvements.

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MAIN PROPOSAL

1. Overall Goal & Objectives

The overall goal of this project is to improve vaccination rates among adolescents and young adults against meningococcal B disease by implementing the current Category A and B recommendations for serogroup B meningococcal (MenB) vaccine by the Centers for Disease Control (CDC) and Prevention, Advisory Committee on Immunization Practices (ACIP) recommendations, as well as the recommendations for high risk groups.¹

We will accomplish this through the following key objectives:

1. Improve provider education through educational sessions conducted at the clinic level by subject matter experts (SME), utilizing onsite and web-based capabilities such as WebEx presentations and role play to educate Baylor Scott & White Health (BSWH) pediatricians, family medicine physicians, gynecologists, and related primary health care professionals on how to recommend and effectively communicate the importance of this vaccine to patients and parents. Training will be repeated a second time after receiving feedback from the first round physician educational sessions and public community forums in order to reinforce vaccine objectives and keep providers engaged.
2. Initiate evidence-based quality improvement projects at local primary care clinics with project team collecting data and documenting improvements at specific intervals.
3. Utilize monthly reminders to encourage continued provider engagement and provide clinic incentives for reducing missed opportunities and improving vaccination rates.
4. Partner with local schools and colleges to increase public education and empower parents, adolescents, and young adults with the knowledge needed to accept the vaccine. Vaccine education and awareness will increase among the public through community forums at local schools and colleges. These forums directed at parents, adolescents, and young adults, aim to improve MenB immunization rates by empowering the public to ask for the vaccine.
5. Utilize system-based changes through BSWH's Electronic Health Record System (EHR) to generate patient lists, send reminders electronically, and generate automated EHR alerts to encourage providers to actively offer the vaccine to adolescents and young adults at every clinic visit, evaluating patient immunizations at every opportunity in order to avoid missed opportunities for vaccination. Patients and their parents will also have the opportunity to view messages regarding the vaccine on screen savers and television monitors throughout primary care clinics within BSWH as part of the system-based changes. In addition, clinics will have sufficient product inventory to vaccinate all eligible adolescents with the MenB vaccine.

As the largest not-for-profit healthcare provider in Texas, and in association with the Texas A&M Health Science Center College of Medicine (TAMHSC-COM), Baylor Scott & White Health is committed to system-based solutions when appropriate to improve population health. If effective, this pilot program can be replicated throughout the entire BSWH system and have statewide and national impact. These goals will build on the work by BSWH to continue to engage in system-wide changes that improve population health. As an example, BSWH is

currently engaged in a system-based initiative to improve Human Papilloma Virus (HPV) vaccination rates among adolescents utilizing quality improvement and provider incentive initiatives.

2. Current Assessment of Need in Target Area

According to our EHR database, only 15 teens were vaccinated at BSWH Pediatric clinics in 2015 with the MenB vaccine from the eligible population of 5,455 adolescents between the ages of 16-18 years who access care in this area. Recent studies indicate approximately 78% of adolescents aged 17 years received 1 dose of the Meningococcal 4-valent vaccine (MCV4) but only approximately 28% received the 2nd dose.^{2,3} At BSWH in 2015, only 19% of adolescents aged 16-18 years received the 2nd MCV4 dose. (Note: The vaccination rate was calculated using data on adolescents aged 16-18 years who received the MCV4 vaccine in 2015 divided by the number of adolescents aged 16-18 years that visited a primary care or pediatric provider in 2015 that would have been eligible to receive the vaccine. Clinical care visits to a subspecialty provider, urgent care, emergency department, mental health or inpatient treatment were not included in the vaccination rate calculation). This is a common trend for adolescent vaccines, such as with the HPV vaccine for example, which has a national immunization rate of approximately 30% almost 10 years after the introduction of the vaccine.⁴ The data provides evidence of missed opportunities to immunize teens during all clinic visits. The *Healthy People 2020* targets for vaccination rates for teens aged 13-15 years are 80% for Tetanus Diphtheria and Pertussis (Tdap), MCV4, and the HPV vaccine series. The goal is 90% for the varicella vaccine.³ Forty-percent of adolescents have had only one preventive care visit during their teen years (ages of 13-17), therefore, targeting all relevant health care providers in an effort to improve teen and young adult immunization rates is critical. BSWH vaccination rates are well below what has been reported in other studies, thus educational interventions for providers and patients and their families are vital to improving vaccination rates.

The goal will be to increase the knowledge among providers within BSWH on the Category B recommendation for the MenB vaccine as well as the Category A recommendation to immunize high-risk groups. We will also address the health insurance coverage for this vaccine to ensure all providers are aware that it is covered by most major private insurance plans and the Vaccine for Children Program. Starting in February of 2016, MenB vaccines became available for order through the Texas Vaccines for Children (TVFC) Program. TVFC Program supplies publicly purchased vaccines at no cost to enrolled providers. The TVFC Program aims to increase access and reduce barriers to vaccination services in Texas. MenB vaccines may be administered to eligible children and adolescents aged ≥ 10 years identified to be at high-risk, in addition to adolescents aged 16-18 years under the open recommendation.⁵ An updated resolution for the Federal Vaccines for Children (VFC) Program was released in June 2015 to allow for individual clinical decision-making regarding the use of MenB vaccines in children aged 16-18 years.⁶ The vaccine is included in the CDC's federally funded Vaccines for Children program, which provides vaccines free to children whose families cannot afford them. America's Health Insurance Plans, a national political advocacy and trade association with about 1,300 member companies that sell health insurance coverage to more than 200 million Americans, stated that even though the

vaccine received a lower-level recommendation, health insurance plans would still cover the MenB vaccine. This information needs to be disseminated widely to all health care providers.

Between 2002 and 2012, there were approximately 717 cases of bacterial (meningococcal) meningitis reported in Texas.⁷ About 50 cases of meningitis are reported in the state annually, and 12.5% of these cases have resulted in death since 2007. The highest percentage of cases were reported among individuals aged 60 and older (16.6%), 20 to 29 (16.3%), and less than one year of age (13.8%).⁸ In order to address the risk of meningitis among young adults, the Texas Legislature passed several pieces of legislation regarding meningococcal vaccination (MCV4) among college students. In 2009, Texas became the first state to require all college students living on campus to show proof of meningococcal vaccination prior to enrollment. Two events led to the expansion of the law in 2011 (i.e., the CDC's updated recommendation for a meningitis booster dose at 16 years of age and the death of a Texas A&M student living off campus) to include all entering students up to age 30 living both on and off campus. In 2013, the law was revised to require vaccination of students up to 22 years of age only, which aligned with the CDC recommendations for high-risk age groups. Texas Department of State and Health Services (DSHS)'s recommendations to improve meningitis vaccine coverage include:

1. Educating students and parents about bacterial meningitis and the vaccine requirement. Schools and healthcare providers can use Texas Higher Education Coordinating Board (THECB) and Texas DSHS developed web resources to educate young adults and their parents about the vaccine requirement and the disease.
2. Implement "Vaccinate Before You Graduate" campaigns, by working with schools to educate high school students about the need for vaccination and to implement vaccine clinics. Educational messages should be promoted to both parents and students via social media, school websites, e-mail distribution lists, and public service announcements.
3. Improve coverage and make compliance easier by requiring that 11th grade students receive a booster dose of meningococcal vaccine (MCV4) which would align state policy with CDC recommendations and promote compliance among college students.⁹

The above three recommendations will be implemented through the efforts of this grant.

National data shows that seven meningococcal outbreaks have occurred on college campuses since 2009 resulting in 41 cases and 3 deaths. In 2015, the Rhode Island Department of Health was notified about a case of meningococcal disease in a male undergraduate student in a local college. Another case was reported 3 days later which indicated an attack rate of 44 cases per 100,000 students, about 500 times higher than the national incidence of 0.15 cases per 100,000 among persons 17-22 years of age. During this outbreak, approximately 94% of eligible persons (over 3,500 persons) received the first dose of one of the vaccines available for MenB, no further college-associated cases were identified following the original outbreak.¹⁰

Approximately 15-29 cases and two deaths could be prevented annually with a routine adolescent MenB vaccination program administered at 11, 16, or 18 years. A recommendation

for college students only is estimated to prevent approximately nine cases and one death annually.¹ This is the main reason for making the vaccine available to all adolescents and young adults, not only those going to college. Meningococcal disease is classified into 13 different serogroups with five of these causing most of the invasive disease. Invasive meningococcal disease has two peaks, one in infancy and another peak during adolescence. In age group 11-24 years, 70% of the disease is caused by the subtypes C and Y, whereas, 30% of the disease is caused by subtype B. There are approximately 50-60 cases per year of Meningitis B disease in the U.S. with approximately 60-80 cases per year of Meningitis C and Y. There are 5-10 deaths reported annually with greater than 80% of these cases occurring in older adolescents and young adults aged 16-23 years.¹¹

In spite of the high rate of Meningitis B, the current recommendation is classified under Category B versus the Meningococcal 4 valent (MCV4) vaccine having a classification under Category A. The reason for this discrepancy in the classification is possibly due to a relative low burden of the disease, waning immunity, unknown effects on carriage, unknown herd effects, unknown strain coverage, and high cost of vaccine. The existing MCV4 vaccine only prevents about 50% of the disease. In regards to the MCV4 vaccine for adolescents between the ages of 11-12 and 16 years, there were 184 cases averted, 22 deaths prevented, with an estimated cost per quality-adjusted life years of \$212,000. In regards to the Meningitis subtype B vaccine for adolescents age 16 years, there were 28 cases averted with 5 deaths prevented with a cost per quality-adjusted life years of \$4,000,000.¹

All adolescents, rather than college students only, should be considered for the vaccine mainly because serogroup B meningococcal disease cases also occurs in persons aged 18-23 years who are not attending college. Vaccinating college students only is estimated to prevent the fewest cases and deaths. It is preferred to administer the vaccine to older adolescents and young adults due to the current data available on antibody persistence. Vaccinating those aged 16-18 years maximizes the likelihood that protection will last into the highest age-related risk period.¹ It is important to remember to vaccinate persons with persistent complement component deficiencies, anatomic or functional asplenia, microbiologists routinely exposed to the bacteria, and persons at increased risk because of serogroup B meningococcal disease outbreak. MenB vaccines are approved for use in persons aged 10-25 years and should be used in individuals at increased risk for serogroup B meningococcal disease in this age range.¹² The recommendation needs to be an active recommendation and providers need to say, "Today you are going to get your 2nd MCV4 vaccine and your 1st dose of the MenB vaccine to prevent meningitis." There are two different vaccines available that can protect against these disease types, and physicians need to make a strong recommendation to ensure their patients are vaccinated against this devastating disease.

3. Target Audience

The target audience is individuals aged 16-23 years, their parents, the general public, and BSWH healthcare providers (HCPs) (doctors, APPs, nurses, and support staff) in Pediatrics, Family Medicine, Gynecology, and Adolescent & College Health. Our goal is to impact 200+ HCPs, 500+

parents, and 3000+ adolescents and young adults; however, because we are educating HCPs and visiting clinics throughout the entire BSWH Central Texas region, and having web-based access to the presentations, we expect our reach to be up to four times higher.

The target physician population consists of 305 residents and attending physicians located through Central Texas (Temple, Waco, Killeen, Brenham, College Station, Austin/Round Rock, and Hill Country Region).

| Physician Age | | Physician Race/Ethnicity | | Gender | |
|---------------|--------|--------------------------|--------|--------|--------|
| 26-30 | 15.7% | Amer. Indian/Alaskan | 0.7% | Male | 50.5% |
| 31-35 | 18.0% | Asian | 11.8% | Female | 49.5% |
| 36-40 | 15.1% | Black/African Amer. | 1.3% | Total | 100.0% |
| 41-45 | 11.1% | Hispanic/Latino | 8.5% | | |
| 46-50 | 9.8% | Not Specified | 0.3% | | |
| 51+ | 30.2% | White | 77.4% | | |
| Total | 100.0% | Total | 100.0% | | |

| Discipline | Physicians | Residents | Total (n) |
|-----------------|------------|-----------|-----------|
| Family Medicine | 147 | 23 | 170 |
| Pediatrics | 58 | 25 | 83 |
| OBGYN | 36 | 16 | 52 |
| Totals (n) | 241 | 64 | 305 |

Although physician education will occur throughout Central Texas, the target general public population for this project consists of 62,142 high school and college students located in Bell County Texas. The child poverty rate for Bell County is 20%. Participating ISDs report that 53-55% of their high school students are considered “at risk” and 46-62% are eligible for free/reduced lunches. Bell County is also home to the Fort Hood U.S. Army Base and a veteran population of 21.6%

| High School/College Students Age 16-23 | | Bell County Race/Ethnicity | |
|--|--------|----------------------------|--------|
| Temple Independent School District | 1,866 | Amer. Indian/Alaskan | 1.2% |
| Belton Independent School District | 3,193 | Asian | 2.7% |
| Killeen Independent School District | 9,198 | Black/African Amer. | 20.4% |
| Temple College | 5,264 | Hispanic/Latino | 21.6% |
| Central Texas College | 39,294 | Not Specified/2 or More | 3.4% |
| Univeristy of Mary Hardin Baylor | 3,327 | White | 50.7% |
| Total | 62,142 | Total | 100.0% |

There is strong support from directors, clinical coordinators, section chiefs and residency program directors, and department chairs to educate healthcare professionals and the community on this vaccine preventable disease. BSWH has established educational programs

training Texas A&M Health Science Center – College of Medicine (TAMSCOM) medical students and physicians in various basic, translational and clinical science disciplines through residency and fellowship training programs. There is a culture of education established at the institution which fosters learning and improvement in preventive medicine and population health. Grand-rounds type programs are wide spread, allowing for Continuing Medical Education (CME) credit to be earned by healthcare providers, and to educate physician learners on various aspects of their future practice. This environment is conducive to educational interventions that impact high numbers of health care providers from young physician learners to well-seasoned, established physicians. Therefore, educational sessions regarding meningococcal disease and the vaccine will be incorporated into educational sessions for healthcare providers with the support of the key leaders in each department and residency training programs. Recruitment of healthcare providers will include advertisements via emails, flyers, posters, and reminders at meetings. Furthermore, sessions will be incorporated into the regularly scheduled lectures to increase participation, along with the option for web-based access to educational sessions through WebEx capabilities, which will enable us to reach a larger audience. This will meet the primary objective of this project which is improvement in the MenB vaccination rates through provider education and also meets the educational need for teaching updated national recommendations.

BSWH has conducted numerous community programs, establishing itself as a respected leader, helping improve the health in this region, as well as, empowering the public to make healthy lifestyle choices that impact individuals and their families. Examples of successful programs sponsored by BSWH include:

- A-to-Z: Heart-Aware Rural Populations Program, a school-based clinic program that targeted rural, medically underserved communities. The program was designed to reduce the incidence of heart attack, heart failure, and stroke through risk factor screening, treatment, health care access, advocacy and evaluation. The project consisted of four key areas: 1) Engagement of identified communities and school partners; 2) Risk factor and CVD screening and treatment; 3) Implementation of an advocate program; and 4) Evaluation of program reach, effects, cost and implementation. Program reach: ~2,500 people, including 169 patients tracked in the American Heart Association (AHA) web-based tool, Heart360.
- Community events that promote healthy lifestyles within families such as the “Family, Food, and Fun” wellness program and the “Celebrate Killeen Festival” which involved the Killeen ISD Family Fitness and Wellness Fair.
- The “Un-Included Club” where children were taught qualities such as leadership, health, fitness, and an overall sense of self-acceptance and usefulness.
- Pediatric physician trainees promoted the “5, 2, 1, 0 - Rule” program to promote a healthy lifestyle teaching children about eating fruits and vegetables, limiting screen time, exercising, and eliminating sugared beverages.
- In May 2016, there were five assembly presentations sponsored by McLane Children’s Scott & White for Belton ISD students which summarized teen health based on five components of the district’s school health policies. During student lunch periods across three campuses, several interactive health education exhibits were supported by community partners

including BSWH's Injury Prevention team, Asthma Outreach, and the Scott & White Health Plan.

- BSWH and McLane Children's Scott & White have partnered with Peaceable Kingdom, a local children's camp, to sponsor "Camp Bluebonnet", a camp for children with Type 1 Diabetes. The Pediatric endocrinology department has also partnered with local schools to teach school nurses on the topic of diabetes, obesity, and nutrition, among other topics.
- BSWH healthcare professionals have partnered with "Feed My Sheep," a local ministry for poor and homeless families, to conduct a monthly free clinic for children in need, providing vaccines free of charge as part of the program.

Based on this well-established relationship with the local community, we foresee no obstacles generating interest in the public education component of this proposal. Our school and public recruitment efforts will include flyers sent home with students, promotion at the school and college level with strategically placed posters, automated phone calls to students and parents, and emails sent to students and their parents advertising the sessions.

4. Project Design and Methods

During 2016-2017, subject matter experts (SME) will travel to key departments and primary care clinics in the seven major BSWH CTX regions associated with approximately 70 outlying primary care clinics to present MenB immunization education and emphasize the importance of strong provider recommendation for all vaccines. There is potential for reaching up to 140 locations representing a geographic area of 29,000 miles due to web-based capabilities through WebEx. During 2017-2018, the project leadership will strategically partner with local school districts and colleges to provide educational outreach forums for the general public.

BSWH CTX Division has seven major regions with numerous clinic sites associated with those regions. Therefore, seven live educational sessions will be conducted, at least one at each major region, with these sessions accessed by the majority of clinics in that particular region through the WebEx system for those not able to participate in the live sessions. In an effort to reach a large audience in the BSWH CTX Division, WebEx will be used, giving the team the flexibility of sharing presentation files, spreadsheets and video from a host computer. Participants can utilize their own desktop computers, smartphones, or any conference room with a computer to participate. Multi-site conferences will use telephones for interactive audio among sites with the advantage of Microsoft webcams. BSHW Internal Skype for Business and WebEx will allow the team to collaboratively develop, critique, and revise documents as well. The locations that will be the focus of this project include the 1) Temple Region with 14 primary care clinics, 2) Waco Region with 11 primary care clinics, 3) College Station Region with 5 primary care clinics, 4) Brenham Region with 3 primary care clinics, 5) Hill Country Region with 9 primary care clinics, 6) Austin/Round Rock Region with 15 primary care clinics, and 7) McLane Children's Scott & White with 12 pediatric care clinics. The WebEx sessions will be recorded and the web link to the recordings will be distributed to all participants for wide dissemination.

There will be CME credit available to those providers who wish to receive credit for attending the educational session. The remote locations will have a liaison that can facilitate the sign-in sheet for attendance and the remainder of the requirements will be done via WebEx to include evaluation of the program for improvement in future sessions. We will send feedback forms to the learners to critique our intervention and make suggestions for improvement that will be incorporated into the second round of educational sessions.

The curriculum format for provider education will include a standardized presentation, role play, informational reference materials, and pre-post quizzes to assess knowledge gained. Provider education topics will include meningococcal disease burden, vaccine recommendations, safety concerns, tips on how to actively offer the vaccine, and interactive sessions with role play to address possible questions and concerns from parents. Role play will allow for full audience engagement and gives providers the opportunity to practice answering tough questions parents may have regarding the disease and need for vaccine. We will have a list of online resources on the vaccine readily available for physicians to share with patients. We will encourage providers to access “A Minute of Health with CDC” podcast: “Teens Vaccines” as a reminder that teens need vaccines too.

The pre-educational session quiz will be administered prior to the start of each session to measure baseline knowledge. The post-educational session quiz will be administered at the end of each educational session and then again six months later to determine retention rates, and the results will guide the planning of the second wave of educational sessions. Additionally, the results will enable the project team to analyze improvement in knowledge associated with the educational intervention. The quizzes will be available via paper during live sessions and online through SurveyMonkey for those unable to participate at live sessions and for the six month post-educational session evaluation.

The interaction between parents and healthcare professionals is critical in shaping parental attitudes towards vaccination. Being effective in the interaction between vaccine supportive parents and motivating hesitant parents towards vaccine acceptance is critical. Poor communication can lead to rejection of vaccines, therefore strong provider recommendation is crucial in this endeavor. In a focus group conducted by the Centers for Disease Control and Prevention, parents indicated that they trusted their child’s doctor and would get the vaccine for their child as long as they received a recommendation from the doctor.¹³ Including all recommended vaccinations at every visit is important in a strong provider recommendation. The goals for the encounter with different types of parents will vary based on their readiness to vaccinate. In all encounters, health care professionals should build rapport, accept questions and concerns, and facilitate valid consent. However, for those who are hesitant or refusers, strategies should include eliciting the parent’s own motivations to vaccinate but avoiding excessive debates. Recommendations should be tailored to specific parental positions on vaccination and provide a structured approach to assist professionals.¹⁴

We will create a standard quality improvement (QI) project for all clinics to follow. As a measure of success, we will obtain and analyze data on current vaccination rates and monthly

thereafter to determine trends in vaccination rates. We will incorporate the continual assessment and feedback model called AFIX which is a quality improvement program used to raise immunization coverage levels, reduce missed opportunities to vaccinate, and improve standards of practices at the provider level.¹⁵ The acronym for this four-part strategy stands for:

- **A**ssessment of the healthcare provider's vaccination coverage levels and immunization practices;
- **F**eedback of results to the provider along with recommended quality improvement strategies to improve processes, immunization practices, and coverage levels;
- **I**ncentives to recognize and reward improved performance; and
- **E**Xchange of information with providers to follow up on their progress towards quality improvement in immunization services and improvement in immunization coverage levels.

We will also take advantage of the “4 Pillars of immunization” toolkit developed at the University of Pittsburg, which is a step-by-step guide reflecting evidence-based research to improve vaccination rates in the outpatient practice settings. It includes models based on: 1) convenience, 2) notification, 3) systems changes, and 4) motivation. In addition to the practice improvement program, there are vaccination resources, videos, links, and fliers that are freely available within the Toolkit to aid participants during the intervention.¹⁶

During 2017-2018, the community education forums at the public schools and colleges will be aimed at the general public and presented in a question and answer format. Real-life stories obtained through www.immunize.org will describe the extent of meningococcal disease and its consequences if not prevented.¹⁷ Vaccine communication will highlight how bacterial meningitis is transmitted, why college students and young adults are high-risk, the dangerous consequences that can result from the disease and the importance of vaccination at the 16-18 years of age range. The forums will be assessed by having attendees evaluate the sessions, give feedback, and share concerns through an anonymous paper survey administered at the conclusion of each session. Attendees will evaluate the sessions giving responses using a 5-point Likert scale and will be given space for open-ended comments and/or concerns. Data from the paper surveys will be hand-entered into a Microsoft Excel spreadsheet. Survey data obtained will be analyzed immediately following collection so that the results may be used to guide the education and discussion at future public school or college forums. This information will be used to educate providers so they can better address patient concerns during clinic visits. Nursing staff will also ask clinic patients who receive the vaccine if they attended a community forum to evaluate if the community is acting on the message they received during the forums.

We will be utilizing system-based changes through our Electronic Health Record System (EHR) to generate patient lists, send reminders electronically, and generate EHR provider alerts to encourage providers to: 1) actively offer the vaccine to adolescents and young adults at every clinic visit, and 2) evaluate patient immunizations at every opportunity in order to avoid missed opportunities for vaccination. We also have the capability of showing messages on screen savers in all patient rooms as well as on the televisions in the waiting rooms. BSWH is currently

testing this concept of adding messages that are helpful to parents on screen savers and televisions at several pediatric clinic locations. The goal will be to have messages regarding the MenB vaccine posted in all primary care clinics.

A project of this scope, addressing the implementation of the current MenB vaccine recommendations, has not been done in the BSWH Central Texas region. In addition, community forums educating the public at local schools and colleges on this topic have not been conducted in this area. Therefore, this is a unique educational intervention with far reaching impact that affects the health of the community. This program will be standardized and reproducible, as well as available online, free of charge nationwide, to include the North Texas Division of Baylor Scott & White Health.

This project encompasses various aspects of the mission of this organization. For example, BSWH is currently engaged in a system-based initiative to improve Human Papilloma Virus (HPV) vaccination rates among adolescents utilizing quality improvement and provider incentive initiatives. The institution is also fully embedded in the community through various educational programs and key community partnerships as described previously in the proposal. BSWH works in partnership with the Texas A&M Health Science Center College of Medicine, the University of Mary-Hardin Baylor Nursing School, the Temple College Nursing Program, Central Texas College and numerous other schools to train physicians, nurses, and advanced practice professionals. Therefore, a culture of learning and improving health is embedded in the organization. This project will build on the institutions' commitment to engage providers and improve health outcomes through education, primary prevention, and continued involvement in the community.

We will provide the clinic within each of the seven major regions, with the highest improvement in MenB immunization rates with a plaque that will be displayed in their clinics stating their achievement regarding this vaccine. Also, the most improved of the seven regions will receive a plaque that will be presented to the chief medical officer of that particular region to display, demonstrating their efforts and support for this project. This information will be disseminated throughout all of the BSWH divisions to include Central and North Texas via email and physician portals so that all providers become aware of the improvement made in each one of these top performing locations. This will allow for healthy competition amongst clinics in all major regions.

5. Evaluation Design

To measure our reach and impact among potential adolescents in counties in Central Texas ages 16-18 years and participating clinics in BSWH Central Texas, we will obtain data on current numbers of patients receiving the vaccine at each clinic and collect subsequent data on a monthly basis through the EHR. Based on 2015 data, we have the potential to target nearly 18,000 adolescents aged 16-18 years who attend a primary care or pediatric clinic for health care. Data on current and future vaccination rates will be obtained using MIDAS. Monthly data

will include all patients aged 16-18 years who obtained a MenB vaccination during the specified month divided by the number of adolescents aged 16-18 years who visited a primary care provider, during the same timeframe, who would have been eligible to receive the vaccine. Data will be stratified by clinic to determine clinic-specific vaccination rates. We will facilitate the start of QI projects at every clinic so healthcare professionals can continually see improvement and take ownership of the program. This will allow for objective data on improvement in rates of vaccination as a result of the educational sessions and provider engagement. Quizzes regarding vaccine preventable diseases, with the focus being on MenB, and vaccination knowledge will be given to providers during pre- and post- educational interventions. A follow-up quiz will be administered to providers to determine long-term retention rates at six months post-educational session. This information will allow project team to assess if the educational intervention made an impact on the knowledge of participants. By regularly monitoring both vaccine rates and provider knowledge scores, we will be able to target specific locations that may need more intervention.

Expected Change: The goal is to increase the MenB immunization rate by ~50% during year one of the project, and another ~30% by year two of the project in an effort to achieve greater than 80% vaccination rate increase from the current baseline rate across the Central Texas region. Secondly, the goal will be to reach 100% of providers in all participating clinics by conducting at least two waves of training and starting quality improvement projects, with 200+ providers expected to be reached through this intervention. Finally, community outreach's goal will be to reach 500+ parents, and 3000+ adolescents and young adults.

Statistical Analysis Plan: Descriptive statistics will be provided for all variables of interest. Means and standard deviations (or medians and ranges, if appropriate) will be reported for continuous variables. Frequencies and percentages will be reported for categorical variables. If the normality assumption is valid, the paired t-test will be used to compare the results from the knowledge test before and after the educational intervention. The Wilcoxon sign test will be used to make the comparison if the normality assumption fails. McNemar's test will be used to compare vaccination rates across time to see if there is a significant improvement from the baseline rate. This will be done for the entire sample as well as by clinic. Line graphs will be created in order to compare the improvement in vaccination rates between the clinics. Since multiple interim analyses are planned, the O'Brien-Fleming approach will be used to adjust the significance level and reduce the risk of making a Type I error.

Dissemination: We will give clinics and providers specific information on their progress, creating a healthy competitive atmosphere that fosters improvement. This program will be standardized and reproducible, as well as, available online, free of charge nationwide, including the North Texas Division of Baylor Scott & White Health. We will work towards public dissemination through professional activities such as peer-reviewed publications, posters, and presentations at national scientific meetings.

6. Detailed Workplan and Deliverables Schedule

| | | |
|-----------------|--|--|
| Year 1 | Aug-Dec 2016 Initial Project Planning | Development of overall program with leadership to discuss timeline and overall goals; begin development of lectures, quizzes, evaluation tools, development of QI projects, recruitment of faculty for teaching sessions; begin collection of baseline data on current vaccine rates for each clinic and region; begin coordination of community forums with school districts and colleges with development of community educational program; hiring of key personnel |
| | Jan-Mar 2017 Continued Project Planning and Project Development | EHR changes request and development; addition of screen saver/television monitor messages at primary clinics, requests for CME development to include incorporation of program into the WebEx system, incorporation of quizzes into SurveyMonkey, dissemination of quality improvement strategies to primary care clinics using resources available through the CDC and toolkits online; establish baseline data on vaccine rates for each clinic and region; development of flyers & posters for educational sessions and community forums; printing of educational materials & quizzes |
| | Apr-May 2017 Phase 1: Provider Education | Lectures at the 7 primary locations, one location per week with goal of completing all sessions within 2 months |
| Year 1 and 2 | June-Nov 2017 Provider Education Evaluation Phase | Monthly reminder emails, continued monthly collection of vaccine data for 6 months post educational sessions, pre/post quiz analysis; 6-month post educational session quiz administration via SurveyMonkey & analysis; finalize development of community educational forums |
| Year 2 | Dec 2017- May 2018 Phase 2: Community Forums | Community forums at 6 local school districts and colleges on a monthly basis; evaluation of feedback received from community; conduct booster educational sessions at clinics in need of education based on data collected up to this point & based on feedback provided in community forums; send emails to clinic locations discussing feedback received at community forums for improvement in provider recommendation |
| | June-Aug 2018 Final Data Analysis and Dissemination of Information | Final collection of data, data analysis; dissemination of program to North Texas Division of BSWH, preparation for presentations at national conferences, and work towards website development for national dissemination |

The first part of year 1 will involve the initial program development to include meetings with project leadership to discuss timeline and overall goals. A calendar with a project timeline will be developed. We will also begin development of lectures, quizzes, evaluation tools, and QI projects, along with recruitment of faculty for teaching sessions. Furthermore, during year 1 we will begin collection of baseline data on current vaccine rates for each clinic and region that will be involved in the educational intervention. Initiation of discussions with the local community to coordinate community forums with school districts and colleges will be started during the first part of project development. Development of community educational programs will begin at this time. Hiring of key personnel to include a project manager will occur during the early part of the project development phase. EHR changes, requests, and development will be part of the second half of year 1. Request and implementation of messages regarding MenB disease and the vaccine on screen savers and television monitors will begin at this point as well. Requests for CME development to include incorporation of program into the WebEx system will also occur during this phase with incorporation of quizzes into SurveyMonkey. Dissemination of quality improvement strategies to primary care clinics using resources available through the CDC and toolkits online will occur prior to the educational sessions with establishment of baseline data on vaccine rates. Development of flyers and posters for educational sessions and community forums along with printing of educational materials and quizzes will occur during the second part of year 1. Lectures at the seven primary locations will begin towards the last third of year one, with one lecture per location each week with goal of completing all sessions within 2 months.

Starting year 2 of the project, monthly reminder emails will be sent to providers to keep them engaged and we will continue monthly collection of vaccine data for 6-months post educational sessions. Pre/post quiz data collection and analysis will occur with 6-month post-educational session quiz administration via SurveyMonkey. During this time period, final development of community educational forums will occur. During the second part of year 2 of the program, community forums will be conducted at six local school districts and colleges on a monthly basis. Additionally, we plan to concurrently conduct booster educational sessions at clinics in need of further education based on previously collected data and feedback provided in community forums. Emails to clinic locations discussing feedback received at community forums for improvement in provider recommendation will also be sent to all locations who received the educational intervention. The last part of year 2 will allow for the final collection of data and data analysis. We will also begin dissemination of the program to the North Texas BSWH region. Lastly, preparation for presentations at national conferences, and work towards website development for national dissemination will be occur.

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