**Program Evaluation: School-based Clinics' Response during the Pandemic to Enhance**

**Immunization Uptake & Assist with Social Determinants**

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**Abstract**

The COVID-19 pandemic has overwhelmed communities. Physical, emotional, and financial struggles have heightened, especially with our vulnerable populations. People have been afraid to return to their provider's office, and consequently, visits and immunizations have been interrupted for children. As the nation saw a decline in immunization uptake, a pilot nurse-led program was designed to increase vaccinations and address the social determinant needs during a global pandemic. The purpose of this project was to describe the planning, implementation, and evaluation of a curbside immunization event. The LOGIC model was used as the framework for implementation and evaluation. Results demonstrated an overall increase in immunization uptake and 97% of participants became current with recommended vaccinations. Most parents (93%) would attend a curbside event again and recommend it to others. They also felt infection control precautions helped make the care delivered safe and efficient. Social determinants of health were assessed and addressed. This method of vaccine delivery is a viable model for the future. Others may replicate this model, and it may also serve as a platform regarding influenza or COVID-19 vaccine distribution.

*Keywords: Curbside, immunizations, COVID-19, social determinants, nurse-led models of care, school-based clinic, Logic model, SWOT, modified-sociological model*

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**Program Evaluation: School-based Clinics' Response during the Pandemic to Enhance Immunization Uptake**

The immunization process is the most cost-effective intervention for reducing a child's morbidity and mortality (Siciliani et al., 2020). There has been a reduction in uptake since the beginning of the COVID-19 pandemic. This novel virus was detected in Wuhan, China in December 2019 and spread very quickly. By early September 2020, there were over 27,352,693 global cases confirmed and 892,880 deaths. Within this same time frame, the United States reported 6,301,320 cases and over 189,215 deaths (Johns Hopkins, 2020). These figures are almost certain to be an underestimate as testing for the virus has been a challenge.

The footprint of any pandemic demonstrates a 4-wave process: first, immediate mortality and morbidity; second, the impact of resource restriction on urgent non-pandemic conditions; third, interruption of care for chronic diseases and preventive care such as immunizations; fourth, post-traumatic stress, economic impacts, and the psychological burnout (Steward, 2020). There is evidence of Steward's statements on this pandemic footprint when one examines the impact on children’s health promotion and prevention. Parents may be delaying well-visits as they fear infectious exposures. Recent reports indicate a decline of over 2.5 million doses in orders for routine non-influenza pediatric vaccines (Santali, et.al, 2020; Jenco, 2020). As a result, children are at increased risks for outbreaks of vaccine-preventable diseases. Michigan reports vaccinations declines of 44.5% overall compared to the previous two years; adolescents (ages 9-18) in this same time frame were down 65.5% (Roelofs & French, 2020).

These alarming trends in decreased immunization uptake have prompted Michigan’s Licensing and Regulatory Affairs (LARA) to call for health care systems to "consider providing services, such as vaccinations or testing, as a drive-thru service" (p.1, 2020). The leadership of Beaumont Health supported this call to action to re-think design and process of vaccine administration. In late July and early August 2020, two events were held that provided curbside immunizations for adolescents 10-21 years of age.

**Background**

When the Coronavirus-19 (COVID-19) numbers peaked in Detroit, the surrounding community was deeply impacted; financially, emotionally, and with more significant high-acuity needs. As time passed, there was a dramatic reduction in immunization rates in Michigan and across the country, leaving already vulnerable populations more at risk for vaccine-preventable disease.

A pilot curbside immunization model was created and founded on the current best practice recommendations for preventing the transmission of the COVID-19 virus and addressing concerns related to social determinants (CDC, 2020). The events were held at a school-based center and at a school-linked center located in the near Detroit communities of River Rouge and Taylor. A total of 29 participants received immunizations. Patients 10-21years of age were targeted because they aligned with the population normally served within these clinics. Establishing the lower age cut off of 10 was decided because of a safety concern for younger children running out in front of cars and a potential lack of privacy for the younger child needing to receive immunizations in the thigh where pants would need to be adjusted or removed.

**Significance**

For each birth cohort that is vaccinated with the series of immunizations (DTaP, Td, HIB, Polio, MMR, Hepatitis B and Varicella) evidence shows that immunizations save 33,000 lives, prevent 14 million disease cases, reduces direct health care costs by 9.9 billion, and saves 33.4 billion in indirect costs (Healthy people 2020, 2020). Vaccines have contributed to increased life expectancy from 50 years of age in 1900 to more than 80 years of age (Gessner, et al., 2017). Global data from 2015 indicate that almost 6 million children died under the age of five, with over half of the deaths related to vaccine preventable infectious diseases (Smith, et al., 2017). Before the COVID-19 pandemic, lower vaccination rates have been correlated with being a person of color and being poor. Lack of access to health care may be related to this health disparity. Most of metropolitan Detroit is classified as a Medically Underserved area. This is measured by four categories: population to provider ratio; percent of the population below the federal poverty level; percent of the population over age 65 and the infant mortality rate (Data Detroit, 2019) See Figure 1 below.

**Figure 1**

*Medically Underserved Area*





*Note:* Circled areas are the River Rouge and the Taylor communities.

Quality of Life measures, including health care access are influenced by where persons live, work, and play. The opportunities such as safe neighborhoods, well-paying jobs, and quality education vary between zip codes. Data show a persistent pattern of barriers for those with lower incomes and in communities of color (2020 County Health Rankings Report, 2020; Institute for Healthcare Improvement [IHI], 2019). See Table 1 below.

**Table 1**

*Typical well-being measures and their known barriers*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Well-being measurements |  | Barriers to well-being | |  | |
| * Physical well-being * Economic well-being * Social well-being * Development and activity * Emotional well-being * Psychological well-being * Life satisfaction * Domain specific satisfaction * Engaging activities and work |  | * Access to health care * Air and water quality * Availability of healthy foods * Community safety * Educational supports * Employment opportunities * Housing opportunities * Income * Quality of care | | |  |
|  |  |  |  | | |

*Note: Source. CDC Health Related Quality of Life, & Michigan County Health Ranking*

School-based and school-linked health centers are strategically located in medically underserved areas where vulnerable populations exist. The staff practice cultural humility and are trusted within the communities they serve. The clinic staff are knowledgeable of the immunization process and are state certified in vaccine management. Teaching about prevention is a primary goal of school-based care.

**Problem Statement**

If vaccines are not received patients, families, and entire communities are at risk of contracting preventable diseases. The disease burden could further stress communities that have been so profoundly affected by the Covid-19 pandemic. The participating stakeholders for this pilot program were patients between 10-21 years of age, their parents, staff, and the school community associated with the event.

Nurses are trusted in the community and vital in helping parents feel safe to return to medical care, which is essential for recovery post-pandemic. This pilot program could be a platform for more than 100 other Michigan school-based/linked programs and for school health programs across the country. The results of this program evaluation may be applied to facilitate COVID-19 vaccine distribution.

**Clinical Questions**

As it is a new process, the evaluation of this program is essential, and the following questions were considered in four overall themes:

1. **Overall program output success**: Did curbside immunization improve uptake? Did this event prevent delayed treatment? Did the program provide resources for those affected by social determinants of health?
2. **Process questions**: Did the staff view this as a sustainable workflow process? How long did it take for full vaccine administration, and was the flow efficient? Were parents satisfied with the COVID-19 precautions, the immunization processes, and the care and education provided?
3. **Parental perceptions**: Did parents have concerns about going inside a provider’s office? Would they have delayed service without the curbside event?
4. **Feasibility:** Was the program economically feasible? Would this be a sustainable program? Could this process be a platform for other immunizations such as influenza and COVID-19 vaccinations?

**Literature Review**

A comprehensive literature search was conducted with the CINAHL and PubMed databases. Keywords included: Coronavirus, COVID-19, immunization rates, adolescents, cost-effectiveness, vulnerable populations, social determinants, health inequity, and health disparity. The following inclusion criteria were used to refine the results: only studies from the past five years were considered; they had to be written in the English language and must be available as full text. As the COVID-19 pandemic has a duration of less than one year, many aspects of the literature review were broadened to include governmental or agency reports, grey literature, and current reputable press releases. However, additional literature also consisted of a systematic review, policy statement, and epidemiological data, and studies on population health and cost analysis. Four themes were identified. They were: (1) preventing the spread of COVID-19, (2) reasons for decreased immunization uptake, (3) cost analysis, and (4) vulnerable populations/health disparity and inequities. This literature review was a catapult to provide evidence that the program elements were of importance.

**Preventing the Spread of COVID-19**

The “shelter-in-place” or the “stay at home” order required enhanced public health interventions to combat COVID-19. The CDC and LARA provided guidance to ambulatory practices to protect against transmission. Strict infection prevention measures were endorsed, due to the high possibility of asymptomatic transmission. These included physical distancing, respiratory precautions, hand hygiene, and surface decontamination. The CDC recommended six feet between patients and the use of physical barriers to assist with maintaining the proper distance. Movement restrictions, limiting appointments, staggering appointments, and screening questions regarding the risk of COVID-19 were recommended. LARA indicated the benefit of drive-up services if applicable (Centers for Disease Control and Prevention [CDC], 2020; "LARA Licensing and regulatory affairs," 2020). Understandably, the sheltering mandates, social distance factors, limiting/staggering appointments, and potential parental fears about returning to inside the clinic had impacted the steep decline in obtaining the recommended routine vaccinations (Santoli, et.al, 2020).

**Reasons for Decreased Immunization Uptake**

The World Health Organization describes vaccine hesitancy as a purposeful intention to delay or refuse vaccinations despite their availability (Siciliani et al., 2020). A systematic review by Smith et al. (2017) found reasons for delay or refusal to be in regard to; concerns for vaccine side effects, parental perception of a low-risk concern for potential preventable infectious illness, general attitudes which are often based on social influences, and a belief that combination vaccines are harmful. A correlation to almost all studies reviewed showed increased refusal rates when parents had incorrect or inadequate knowledge of the vaccine. One last theme and rationale for this project, is that delays or refusal to vaccinate can be related to logistical barriers, location, scheduling conflicts, cost, distance to provider, and overall general access issues. The COVID-19 pandemic has created access issues all over the country.

**Vaccine Programs: Cost Analysis**

The CDC indicates the importance of immunizations to be maintained or reinitiated to avoid the additional stress of vaccine-preventable diseases. Returning to ones’ medical home provider is ultimately the best scenario. However, under pandemic conditions, the CDC also indicates other off-site or curbside locations may provide greater access to care (CDC, 2020).

Cost analysis and immunization rates were reviewed with studies that served a larger population in a catch-up immunization program. One study of interest utilized data from a mobile pediatric program to serve children of transient and low-income families. This study reported on the increased costs of not vaccinating a community which is described as a societal cost. A cost-analysis compared a regularly scheduled appointment receiving immunizations to a summer-vaccine-only event; the results demonstrated that the summer-vaccine-only event had a $3.7 societal cost averted versus $0.9 cost of a regularly scheduled appointment. Societal costs consider not only the actual cost of immunization and administration, but also the averted cost a society would bear if no immunizations were given. The summer-vaccine-only program showed a higher cost savings because more individuals on that day were seen for care. The study also indicated the workflow of the vaccine-only events had higher efficiency and total vaccine uptake (Chen et al., 2020).

Immunizations globally have an enormous impact on public health at a relatively low cost. Outcomes are measured by individual protection as well as indirect protection of unvaccinated populations. Vaccinations assist in realizing health equity, economic equity, and social equity. Averting disease potentially helps decrease health expenditures. When administered equitably, vaccination can assist in the diminishing cycles of poverty and illness and improve a society’s overall health and economic security (Gessner et al., 2017; Keeling, et al., 2017).

Today, there are many methods to ensure and demonstrate the cost-effectiveness and value of immunization programs. Updated reviews include broader economic evaluation that measures the clinical outcomes and greater benefits to society. Societal hardships occur when there is an overburden on hospitalization and in-patient expenses (Gessner et al., 2017). This was exemplified in the beginning months of the pandemic when there was no COVID-19 vaccine to mitigate hospitalization expenses.

**Vulnerable Populations: Health Disparity**

Detroit and its surrounding Wayne County have a resounding history of health disparity and health inequities. Their quality-of -life measures rank the lowest in the state ("2020 County Health Rankings Report," 2020). The average life expectancy for individuals living in Detroit is lower compared to the overall state levels. In 2018, Detroit measured 99.2 % more crime than any other big US city, and had a poverty level of 38%, placing Detroit highest in both categories compared to other big cities. The unemployment rate pre-COVID-19 was 20%. Only 25% of Detroiters have a household vehicle, making it difficult to get a job or access health care (City data, 2020; "CHA, Detroit Health Department," 2019).

Educational disparities have been well documented with poor-performing schools and state-takeovers in the past. Detroiters are less likely to graduate from high school with a 75.84% graduation rate in 2019, compared to the state level of 81.4% ("CHA, Detroit Health Department," 2019; Higgins, 2020; Savit, 2019).

The infant mortality rate in 2018 for Detroit was double the state level; 14 per 1,000 live births. The percentage of women receiving prenatal care in the first trimester were significantly lower in Detroit (59%) as compared to the state level (74%). It was also reported that the teen pregnancy rate at that same time was 70 per 1,000 births compared to a rate of 27 for the state ("CHA, Detroit Health Department," 2019).

Adolescents living in poverty have lower overall vaccine coverage rates, especially for human papilloma virus, influenza, and the second dose of varicella (Gati, et al., 2020; Reagan-Steiner, et al., 2016). Additionally, a national and local disparity exists in the up-to-date status of vaccinations among children younger than 24 months. According to the Maternal and Child Health Services Title V block grant (2020), “the percent of children ages 19-35 months who have completed the seven-vaccine series has increased over time from 52.1% (NIS-Child) in 2009 to 70.5% in 2018. However, coverage is lower among non-Hispanic Black children (51.6%) and children living at less than 100% of the poverty level (60.4%) (p. 138).

Marginalized communities already struggle with basic needs. The COVID-19 pandemic has made these populations’ needs greater. The unemployment rate escalated, and the need for food pantries has increased. Reports of “a tidal wave of demand for free food” and an inability to meet the needs resulted in many being turned away in the early time frame of the pandemic (p.1, "Bridge Michigan," 2020; Gati et al., 2020).

This is reflected in the Social Vulnerability Index (SVI), which utilizes US Census data to project the resilience of a community when confronted with the stress of a natural or human-caused disaster or disease outbreaks such as a pandemic. The SVI creates a numerical score, and having a high score correlates with greater human suffering and higher financial burden. In 2016, Detroit and many zip codes of Wayne County were rated in the highest category (TOP 4) of SVI, showing greater disparity to cope with disasters than other counties in southeast Michigan ("CDC," 2016). This SVI measurement was reflective when reviewing the poor health response of COVID-19 in this population.

Based on the literature reviewed, a curbside approach may increase uptake, be a financially sound decision, and should include aspects of holistic care to assist with social determinants, especially food insecurity.

**Organizational Support**

Beaumont Health’s mission is to provide compassionate, extraordinary care every day, which is truly exemplified in the seven school-based health centers (“Beaumont,”2020). Each small clinic is staffed by a medical assistant (MA), social worker (SW) and led by a nurse practitioner (NP). These clinics are within schools or are in a community building near a school. They are strategically located in medically underserved areas where health disparity and health inequity are routine. Access to care that strives on prevention is a hallmark feature. These clinics welcome all school-age children, regardless of ability to pay. Sponsors of the school-based or school-linked clinics are a joint partnership between Beaumont Health, Michigan Department of Health and Human Service (MDHHS), and the Michigan Department of Education (MDE). They all have a vested interest in the clinic’s success to meet the needs of these vulnerable populations. The clinic’s state consultant favored this pilot program based on current conditions and encouraged further development with Beaumont Health.

Beaumont Health’s vision is to be a leading high-value health care network focused on extraordinary outcomes through education, innovation, and compassion. The values include respect, integrity, teamwork and excellence (“Beaumont,”2020). This pilot program aligns with the vision and values. The executive vice president and chief nursing officer (CNO) charged the system’s nurse leaders to innovatively aspire to create new models of care in response to the pandemic and strategically consider the implications of COVID-19. This call to action fueled and supported an environment of excellence and teamwork, which triggered innovations in care and highlighted the value of nurse-led initiatives that ultimately impact patient outcomes. The values that became the program’s foundation were driven by compassion for the community and respect for all.

**Pilot Curbside Immunization Model Design**

***Planning Event***

A pilot curbside immunization model was created and was founded on best practice recommendations to prevent the spread of COVID-19 while helping with the surge of social determinant concerns of this community. The building blocks of this innovation included a focus group approach. Participants were providers who specialized in the care of this population. During the planning phase, the group collaborated to ensure that the team agreed on the same problems, aims, and objectives. A SWOT (strengths, weakness, opportunity, and threats) analysis was created to refine program elements. See Figure 2 below.

**Figure 2**

*SWOT Analysis*

The strengths and opportunities for this program were the high urgent need for the community and administration’s support. The program had no additional costs other than day to day operational budgets. The concept was well supported by the school districts and had the support from the NPs that ran other school-based clinics. Additionally, clinics were slower in their own clinic schedules, which allowed more flexibility for scheduling and staffing the event. Having the event outdoors created excitement within the community. Employees that chose to attend this event described better job satisfaction while working along-side each other. Staff morale and staff retention are related and may be an intrinsic cost-saving. From a public health perspective, cost analysis should account for the overall assistance in health disparities and social determinant assistance provided by the social workers.

The CDC provided guidance on best infection prevention practices to keep staff and the community safe (CDC, 2020). All sites were previously enrolled in the Vaccine for Children (VFC) Federal program and have been trained in vaccine management and administration protocols. The health department was willing to collaborate and provided all VFC allocated vaccines. The two immunization clinic sites were located within the communities that needed service and were strategically set up for easy drive-up access. The clinicians were trusted in the community and were accustomed to the issues of health disparity and health inequity.

The weakness and threats included: potential staffing issues, needed supplies, unfavorable outdoor weather conditions, low community participation and potential breakdown in partnerships with the health department. It was not mandated to work at the event. The focus group recommended soliciting participants who voluntarily chose to work the events. Many of the MAs had been furloughed during the pandemic as schools had been shut down, and clinic service within school-based clinics was dramatically reduced. Many MAs returned to work just one week prior to the event. It would have been an asset to have them be a part of the focus group from the initial planning phase. Additionally, each NP had different medical directors, and they were not credentialed to the same clinic site. This created a potential threat, as a workaround had to be created. The provider of the clinic had to order all immunizations prior to the events. This issue also reduced capacity numbers for patients to participate in the event. The external factors that could potentially threaten the program included outside weather conditions, power outage, connectivity concerns with IT, and the electronic medical record (EMR). Additional threats were the potential for low public and low media interest. Other last potential threats to the program included a breakdown in partnership with the health department.

***The Implementation Phase***

The implementation phase of this new model of care was developed utilizing information obtained from the planning phase and especially the SWOT analysis. This helped the group work out the needed solutions for potential problems. The two immunization events were scheduled approximately one week apart to incorporate any changes to improve implementation. The implementation process included a pre-registration, which was accomplished by a phone call when scheduling appointments, and three workstations on the day of the event before exiting. See Figure 3 below.

**Figure 3**



Prior to the event, the pre-registration over the phone assisted with the creation of scheduled appointments, COVID screening questions, insurance verification, ordering immunizations, and the ability to create a temporary chart with the necessary paperwork to streamline efficiency on the day of the event. The three stations on the day of the events were:

1. Station one: COVID-19 Screening
2. Station two: vaccination administration
3. Station three: post-immunization area.

COVID-19 screenings occurred before entering the event, at station one. This included completing screening questions, temperature checks, receiving and using hand sanitizer, assurance of wearing face masks, and providing a free pen. If no allergies were noted, juice and a cereal bar were offered. The second station began with the car pulling into a parking spot next to a 10ft-by-10ft tent where the vehicle parked and shut the engine off, and staff came to the car. The third station was the post immunization area and required the car to move but was still in close observation. See Figure 4 below.

**Figure 4**

Note.The entrance to event at Beaumont Health Teen Center -Taylor.

While parked by the tent at Station Two, the activities included registration, provider assessment, teaching, guidance, review of orders, and the actual immunization administration. The detailed process of activities utilized the LOGIC model to ensure consistency and guide potential replication (See Appendix A). All immunization administration followed the policy already in place.

The last station provided a space for the waiting period recommended by the American Academy of Pediatrics guidelines to assess for potential reactions (CDC, 2020; "Immunization Action Coalition," 2021). This area also provided an opportunity for the parent/guardian to fill out a de-identified survey to help discern their opinion of flow, perceptions, and needs for social determinant resources (See Appendix B). These questions included assessing needs for assistance with transportation, gas, electrical bills, water bills, food concerns, shelter concerns, and assistance with Medicaid sign up. A box of groceries was provided and placed in their trunk. After fifteen minutes, the families drove away and exited the event. At the end of the day before clean-up, a short staff debriefing-focus group was completed.

***Cost Factors/Feasibility/Sustainability***

For this pilot event, outside tents were utilized from the institution and the schools. Caution cones for traffic were borrowed as well as tables and chairs. The health department allowed utilization of their high-tech cooler and data logger to ensure the temperature of vaccines was maintained. Vaccines were provided by the Vaccine for Children Federal program at no cost. The budget was cost neutral; no additional funding was needed beyond day-to-day operational costs. A toolkit was developed to assist other institutions to replicate a similar event. It provides helpful tips and evidenced-based resources while promoting a consistent program. This step-by-step guide helps review the strengths and weaknesses that may be individualized to many different health care facilities and encourages a problem solution approach.

**Rationale**

The assessment of background, significance, literature review, and organizational support leads to a strong rationale for piloting and evaluating this program, especially in these geographic areas. Holistic care can and should be provided in every encounter with patients. Combining best practice recommendations with strong infection control principles using this curbside immunization approach resulted in improved uptake of immunizations, enhanced efficiencies, reduced disparities, and provided a new model of care.

**Defining the Project**

This project evaluated the new curbside immunization model of care that was completed at the Beaumont Teen Health Centers. The purpose of the pilot program was to increase immunization uptake and assess and assist with resources to social determinant concerns in the COVID-19 pandemic time frame.

The evaluation measured if the goals or aims of the pilot program were met. This is essential to determine its effectiveness, sustainability, and replication potential. The goals of this program included improving immunization rates within Detroit and Wayne County area, assisting with social determinant concerns of a community needing to heal post-pandemic, and providing a community with access to medical care that is safe and efficient in a cost-effective manner.  ***Process Activities***

Process activities were defined to ensure the consistency of a program and are significant to the success and replication of a program. These included:

1. Pre-registration with reminders by text or direct phone calls 1-2 days prior to the events.
2. “Pop up” vaccination administration areas consistent with evidenced-based best practice.
3. Physical design and stationing to provide social distancing and heightened attention to infection control
4. Huddle prior to each event.
5. Consistency in the process flow for each patient.
6. Inclusion of a focus group debriefing before clean up on days of events.

***Output Measurements***

Output measurements are essential to assist in the evaluation of the goals of the program and included:

1. Each patient’s immunization record was reviewed and compared to the Michigan Care Improvement Registry (MCIR).

2. Number of children immunized at each event and total immunizations given.

3. Number children having an “Up to date” (UTD) status post-event.

4. Total number of immunizations administered per MCIR clinic report compared to those given on the same day one year prior, to measure uptake of total immunizations.

5. Survey post-event to determine parent perception on process and concerns about receiving or delaying medical treatment.

6. Survey to identify social determinant needs, compare categories and correlate with event locations.

7. Number of total participants needing resources for Medicaid sign up.

9. Qualitative review of staff focus groups.

**Conceptual Framework**

Health Disparities are interwoven between institutional, historical, and sociopolitical factors. Reducing or eliminating these disparities are complex and require a rethink approach. The Beaumont Teen Health Centers routinely creates a culture of equity: the staff provides genuine respect, fairness, are culturally humble, and help individuals feel they are safe to disclose hardship. Yet, the pandemic highlighted the inequitable access to healthcare which has challenged this community. Equitable access implies that people with elevated social determinant risk factors can easily get care, that it is affordable, and convenient. This project has been guided using a Modified Sociological conceptual model (See appendix C). The approach of the intervention must be appropriate with individuals and all the appropriate societal stakeholders. Improved outcomes can be achieved by leveraging person, family, provider, organization, community, and government (National Quality Forum, 2017). This model was utilized to guide program development to fully comprehend the phenomena of health disparity and access to care.

Additionally, the program evaluation used the LOGIC Model. The LOGIC model provides a systematic process that assists in a graphic roadmap to culminate the relationships among resources, activities, outputs, and outcomes expected. The model helped evaluate if the process activities and outputs completed did the intended effect (CDC, 2018; W.K. Kellogg, 2004).

The LOGIC model category of resources outlines all of the necessary people, equipment, budget or environmental aspects needed to accomplish the activities. Resources included: staff, volunteers, equipment (laptops, refrigeration coolers, data loggers for temperature control, tents), and VFC and private stock immunizations. Our constraints to the program included outside environmental concerns such as excessive heat or stormy weather, potential IT concerns (loss of internet connections or power), need for additional staff, a limited marketing budget, and an insufficient supply of vaccines. Lastly, the NPs were employed to one health care network but were assigned to different hospital affiliations and all had different medical directors.

The LOGIC model category of activities described the process to ensure a consistent workflow that aligned with evidenced-based best practice which included a physical design layout and car stationing to provide social distancing and heightened attention to infection control. The process activities included a huddle with staff prior to each event. The concepts discussed included patient flow, emergency protocol, lead team member identification, and additional team building concepts. The activities described a systematic manner how each person that attended the event went through the process of receiving their immunization. Movement to post-vaccination area was described, how surveys were provided and if needed, assistance for social determinants were given. Food boxes were offered to all participating families. Lastly, the activities described a post-event focus group for the staff to debrief before clean up.

The outputs defined what was measured: (1) Number of children immunized; (2) Number of immunizations given; (3) Compared the “Doses Administered Reports” from the past to the event days; (4) Reviewed how many UTD statuses were achieved via MCIR post-event; (5) Measured the typical time; (6) Measured which event location was most effective; (7) Measured the satisfaction survey; (8) Measured how many uninsured needed assistance to sign up with Medicaid; (9) Measured how many resources linked to social determinant needs.

The outcomes expected included: (1) Overall increased health equity by providing more access to immunizations; (2) Improved immunization uptake; (3) High parental and guardian satisfaction; (4) Improved assistance for social determinant needs; (5) Improved linkage to Medicaid service. (See appendix A).

**Methods**

The Method of this project was a program evaluation of the curbside immunization event with social determinant assistance. The process of care (activities), outputs, and outcomes were evaluated.

**Human Subjects Consideration**

All data retrieved was de-identified. This program was reviewed by the Institutional Review Board (IRB) of Beaumont Health and the University of Detroit Mercy and received a determination outcome letter of “exempt”.

**Setting and Sample**

School-based health centers are located in medically underserved areas where health disparities and health inequities exist. The pilot program was completed in the River Rouge clinic parking lot on school property, and another one was completed in the Taylor Teen clinic parking lot, which was associated with a school district but not on school property. Participants were from 10-21 years of age. Interpreter service via phone line was available but was not needed. The events were held in late July and the first week in August 2020. They were completed six days apart, one on a Thursday and then on the following Wednesday from 10:00-14:30. The service was provided in curbside fashion, with cars pulling up and parking under a 10ft by10ft tent. Safe and appropriate accommodations were made for individuals who walked to the event. The parking lots were right outside the clinic building, in case quick access to the clinic was needed.

**Data Collection**

Data management is a crucial component of a Doctorate in Nursing Practice (DNP) project and this evaluation. Data security was ensured by using an MRN linking key to a de-identified number that is placed on the survey obtained. See Appendix B for review of the survey. A database was created in SPSS version 27 with an accompanying data dictionary. Qualitative data from staff focus groups during post-event debriefing was obtained by asking questions relating to process flow, patient perception, replication, and feelings of staff collaboration. Please review table 2 and 3 below to view all data outputs and the LOGIC model in Appendix A.

**Table 2**

*Outputs/Results from LOGIC Model*

|  |
| --- |
| Data Outputs |
| * Number of children immunized * Number of immunizations given * Number of immunizations given at a regular clinic day one-year prior * Number of children after immunizations having an up to date (UTD) status per MCIR * Number of individuals (before receiving vaccines) that were delayed for vaccines greater than 6 months and greater than 12 months * Measurement of time in stations 1-2 (registration, provider, and administration of immunization)   **Parental Perception Outputs**: using a Likert scale; not at all likely (1), not likely (2), likely (3), and very likely (4).   * Did the precautions our team took help you feel more at ease? For example, outside air, under a tent, temperature checks, masks, and hand sanitizer? * Did you have concern about going inside your doctor’s office in these COVID-19 pandemic times? * Would you have delayed getting your child’s shots if this event was not possible? * Remembering that most parents of teens have taken their child to get shots before; when comparing would you say this process was safe? * Remembering that most parents of teens have taken their child to get shots before; when comparing would you say this process was easy? * Would you come again, or recommend this to someone if we offered this service again? * Did the staff make you feel welcome and answer all your questions?   **Social Determinant Survey Response**: Under these unusual COVID-19 pandemic times many people may need additional assistance or resources. Please check if you need assistance to the following questions. Check box was a yes or a no.   * Do you need resources to assist with transportation? * Do you need resources to assist with your Gas bill? * Do you need resources to assist with your water bill? * Do you need resources to assist with your electric bill? * Do you need resources to assist with shelter (housing)? * Do you need resources to assist with food? * Do you need resources to assist with signing up for Medicaid? |
|  |
|  |

**Table 3**

|  |
| --- |
| *Staff Qualitative focus group* |
| *Questions post immunization events* |
|  |
| * How was the overall process flow? * What were the positives surrounding the event? * What were the challenges to the event? * What did we not think about before the event? * How do you think participants responded? * What message did relay to our patients? * Do you see this working in other areas of the hospital or for different events? * What do we need to change? * Can we change? * If not, why? |
|  |
|  |
|  |

**Data Analysis**

A mixed methods approach was used, with both qualitative and quantitative data. Descriptive demographic statistics and time measures were completed; means were compared. Fisher’s Exact test was used to determine associations with social determinants and clinic locations.

**Results - Outputs**

***Demographics***

There were 29 children who participated, and 64 immunizations were given. Twenty participants attended the River Rouge event and nine participants attended at the Taylor location. The mean age was 14.07 (*SD* 2.672). The mean immunizations given per patient was 2.21 (*SD* 1.082). The mean total time from entrance to administration of the immunization was 21.58 minutes (*SD* 12.203).

The total percent of patients who were behind six months in their recommended immunizations schedule by the American Academy of Pediatrics and MCIR was 79%. Participants that were greater than one year behind in their recommended schedule was 69%. Post event the percentage of participants with an “Up to date” status per the American Academy of Pediatrics and MCIR was 97 %. Certain vaccinations are not required for school entrance, and one parent refused one vaccine. When examining the “MCIR Doses Administered Report,” both clinic locations showed an increase in the total number of vaccinations given from the same time frame one year prior.

***Survey Response Outputs***

|  |
| --- |
| The Results of the parent/guardian survey indicated that:   * 100% of patients and families felt the infection control precautions that the center took helped them feel more comfortable and that the process was easy and safe. * 93.1% would recommend this service to others. * 100% indicated the staff answered all of their questions. * A little over half, 51.7% felt they were concerned in this pandemic time about going into the provider’s office * 55.2% would have delayed service if this event was not possible. |

Additionally, the survey provided perspectives on family needs for social determinants. Please review Table 4 below.

**Table 4**

*Social Determinant Survey Response*

|  |  |
| --- | --- |
| Social Determinants | Total Results of Both Locations |
| * Transportation issues * Gas issues for house * Water bill issues for house * DTE (electrical) issues for house * Shelter issues * Insurance (medical) issues * Food Concerns | 13.8% Have concern  27.6% Have concern  11.1% Have concern  27.6% Have concern  6.9% Have concern  13.8% Have concern  34.5% Have concern |
|  |  |
|  |  |
|  |  |

*Note.* 48.2 percent of this population indicated that they have at least one concern about social determinants.

The Fisher exact test was completed to compare event locations and see if there was a significant difference in children being behind in the recommended regular scheduled immunizations at 6 months and one year of age. The results indicated that River Rouge patients were significantly behind at six months as compared to patients at the Taylor location (p = 0.005, 2 tailed), as well as significantly behind at 12 months (p = 0.101, 2 tailed). Patients at River Rouge had significant lags in receiving vaccines on the recommended timeline comparative to patients at Taylor.

Fisher exact tests were completed to see if there was a comparison made in the social determent needs of families/patients between the two event locations. The results indicated:

* **Transportation Needs:** There **was no** significant relationship, between location and transportation concerns (p = 0.280).
* **Water Needs:** There **was no** significant relationship, between location and water concerns (p = 0.529).
* **Housing Concerns:** There **was no** significant relationship, between location and housing concerns (p = 1.000).
* **Food insecurity**: There was **no** significant relationship between location and food insecurity (p = 0.107).
* **Health insurance needs**: There was **no** significant relationship between location and insurance needs (p = 0.280).
* **Electric Needs:** There **was** a significant relationship, between locations and electrical needs (p = 0.033). River Rouge participants had greater needs.
* **Gas Needs:** There **was** a significant relationship, between locations and gas needs (p = 0.033). River Rouge participants had greater needs.

Analysis found a significant difference between the two event locations in regard to gas and electrical; families at River Rouge had higher concerns. There were no significant differences in insurance, shelter, transportation, water, or food by location of event. Families in both communities have similar struggles with social determinants yet the River Rouge community is next to Detroit, a city with a high social vulnerability index, which may correlate with higher health inequities. Lastly, although there was no significant difference found between locations regarding food insecurity, the results indicated an overall high trend in food insecurity of 34.5%.

***Outputs of Process Activities***

Activities that focus on process and workflow enhance consistency and facilitates replication of curbside immunization events for other similar school-based clinics. Please see Table 5 below.

**Table 5**

*Process Activities*

|  |  |
| --- | --- |
| Process Activities | Outputs |
| 1. Assurance that events were scheduled approximately one week apart to incorporate any changes identified from the first event to improve implementation. 2. Pre-registration with reminders by text or direct phone calls 1-2 days prior to the events. 3. “Pop up” vaccination administration areas consistent with best evidenced-based practice. 4. Huddle prior to each event. 5. Consistency in the process flow for each patient.      1. Inclusion of a focus group debriefing before clean up on days of events. | Events were 6 days apart.  Phone calls and reminder texts were completed within 1-2 days prior to events on every scheduled patient.  Consistent with health center policy – job aides made available, emergency equipment. CDC checklist completed. Health department review of process. Clean and dirty area protocol. Mindful moment poster.  Team bonding, review process and emergency procedures and lead identified.  The process of care for each patient was consistent.  Completed before clean up on each day event held. After the first debriefing – we realized that one tent vaccine area gave more immunizations. than any other. Our next event had better patient distribution. |
|  |  |

The overall program was cost neutral; there were no additional costs beyond day-to-day operations. The staff discussed their enjoyment while working the events, which may lead to a potential in-direct savings by decreasing staff turnover and improving job longevity.

***Qualitative Outputs***

The qualitative data analysis was compiled by staff involved, which was purposive, and theme driven. A de-brief style focus group was convened following each event before clean up occurred. See table 3 for the open-ended questions. Analysis of the feedback indicated four overall themes:

1. **Replicability**: Staff felt the program could be replicated or used as platform for other events.
2. **Staff Morale:** Staff enjoyed working together, and acknowledged this event helped create a more cohesive work team.
3. **PDSA:** The focus group conducted a PDSA (plan, do, study, act). The leaders listened to staff recommendations for change and adjusted items before the second event.
   * (See figure 3). As cars pulled into the vaccination stations under the tents, they parked in the first tent spot more often than any other tent spots. As a result, this station was busier than the other stations. To fix this issue, assigned lane spots were given to the cars as they were being screened for COVID-19. This made staff happier as work duties were more equally distributed.

* The power source was unreliable leading to power outage and IT/EMR connectivity problems. A back-up plan was implemented, and the power was restored. Staff were instructed to have computers fully charged before the next event, and backup paper charts were made available to use as needed.

1. **Parent/Patient satisfaction:** The staff felt both patient and parents were pleased with the program.

**Discussion**

**Implications for Health Care Policy.** Individuals with lower incomes and communities of color have consistent disparities of health factors that are related to many decades of unfair policies and practices at many levels of government ("2020 County Health Rankings Report", 2020). Policy or legislation should protect all citizens, and a population must trust in its health care team. Healthcare policy must consider how to address the structural racism within the country, not just issues of communicable disease protection, but all of the issues of a healthy life. These policies should represent a more equitable and holistic plan to assist with the many social determinants of health.

**Implications for Quality/Safety.** An evaluation of this program from a quality and safety perspective was completed. Utilizing the LOGIC model helped implement activities to promote good infection control practices. An analysis of the survey responses revealed that 100% of the parents and guardians felt that the procedures and infection control practices utilized made them feel safe. All parents and guardians were highly satisfied with the event; 93.1% would recommend it to others, and 100% felt that staff had answered all of their questions.

Each event had a “pop up” vaccination administration set up which allowed for best practice in regard to quality and safety. Each vaccination administration set up had a clean and dirty area and followed the already approved policy on vaccine administration. Job-aides were created to help make quick decisions on needle length and proper placement of intramuscular injections in the deltoid muscle. The CDC’s “Checklist of best practices for vaccination clinics held at satellite, temporary, or off-site locations” (2017) was utilized. The local health department representative reviewed this area each morning of the events and allowed us to borrow approved vaccine coolers and data loggers (temperature monitoring systems). All persons performing injections were certified and experienced in vaccine management. Emergency medical equipment and supplies were easily accessible, including a yoga mat as a soft space to provide for a patient if lying down was necessary, as the event was on cement. A pre-event huddle was done with staff to review emergency protocols. A Mindful Moment poster was placed in the vaccination administration area to remind staff to focus and not be distracted when preparing immunizations and to stay in the moment at hand. Please review Figure 5 below.

**Figure 5**



Note.The vaccination administration set up complete with emergency equipment and clean and dirty area.

**Limitations.** This was a pilot program, and the sample size was small. This limits the statistical interpretation, and there may be concern for convenience sample bias. The vulnerable populations served in this program are known to have many health inequities and health disparities, therefore, questions arise if this type of event could be successful if replicated with another population that has different characteristics. The survey used to collect data on participant perceptions was not a standardized validated instrument. The survey was developed by the focus group with this particular project in mind. Due to the time sensitive nature, it was relevant in regard to COVID-19 and the focus group determined the survey was appropriate. In the future, further validation of this survey or an additional review of linguistic choices may be beneficial.

**Sustainability and Implications for Practice.** The timing of future events may impact participation. Scheduling the event closer to the start of the school year may yield a higher participant turnout. Additionally, the measurement of complete UTD status may be impacted by the date of event. For example, the influenza vaccine in July and August is not generally available in late summer. Literature reveals that African Americans have a high opposition to the influenza vaccine (Santibanez & Kennedy, 2016), yet, if the service is provided by trusted health care teams who have excellent teaching and counseling strategies, an enhanced uptake may be appreciated. For these reasons, and based on our informative results thus far, there is a strong rationale for future research endeavors and further innovation.

This platform for providing curbside immunizations can be shared with other school-based centers across the country. It may serve as a springboard for designing an influenza or COVID- 19 vaccination distribution event for any medical practice. People want to help in their communities, and this may serve as an occasion for nurses to volunteer, especially if hospitals are working toward the Magnet designation status. It is a great platform for inter-disciplinary collaboration. The Covid-19 pandemic has impacted the community so deeply that the value in this program is not just in immunization uptake but also to provide community supports and act as a bridge back to a trusted clinic setting.

**Dissemination/Conclusion.**  A DNP project should yield an example of the full capabilities of the doctorly prepared nurse. It showcases the full impact of nursing actions. Disseminations of the project to the date of this transcript include:

* **Detroit Free press interview** prior to curbside events
* **Channel 4 News** coverage of event
* **Radio interview** WJR
* **Beaumont Intranet – news clip** - to available to all 38,000 employees
* **Presentation** to School-Community Health Alliance of Michigan (SCHA-MI) August 2020.
* **Presentation** to Beaumont Health Patient Care Improvement Committee October 2020
* **Presentation** at the Beaumont Health 5th Annual Evidenced Based Practice and Research Virtual Conference. 2/17/21
* **Lunch and learn speaker** for the National School Based Health Alliance “2021 Spring and Summer Education series -March 16th” Dissemination of toolkit.
* **Poster board** with zoom recording for the ANA-Michigan 2021 virtual nursing conference. March 24, 2021
* **Article submitted and** accepted to Nursing Administration Quarterly. To be published in issue 45.3 Topic: The Value of Nursing theme and the article title is “Nurse-Led Model helps a community heal: Immunizations with assistance in social determinants.” The article written was authored by this writer, the chair to this project, and the organizational mentor, exemplifying high level learning and collaboration.

In conclusion, the pilot program achieved the goals originally proposed: improving immunization rates within metropolitan Detroit and the Wayne County area; assisting with social determinant concerns of a community needing to heal post-pandemic; and providing a community with access to medical care that is safe and efficient in a cost-effective manner.

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Appendix A.

LOGIC MODEL

|  |
| --- |
| Improving immunization rates with Detroit and Wayne County  Assistance with social determinants needs  Improved access to medical care that is safe, efficient and cost-effective |

|  |  |  |  |
| --- | --- | --- | --- |
| Inputs (resources) | Activities | Outputs | Effects |
| * Dedicated staff * Laptops * Stock VFC and Private Immunizations * Temp control mechanisms * Tent stations * Volunteers * Accessory budget   **Constraints**   * Outside environment * I.T. support * Need more staff * Marketing with limited budget * NPs with different Medical Director & hospital affiliations * Insufficient supply | Assurance that events were scheduled approximately one week apart  Each participant will: Go through Centralized Pre-registration before arrival and will have   * Reminder text or phone calls 1-2 days prior   Before event begins:   * “Pop up” vaccination administration area consistent with best evidenced based practice. * Physical design and stationing to provide social distancing and heightened attention to infection control * Huddle with staff prior to start of event   When arriving will drive up to car spot. A potential of 3 spots every 20 minutes.  Each car spot will have   * Check in * NP Review * Teaching and immunizations given * Then car will proceed to post immunization area   Complete a Satisfaction survey with review of social determinants  Visit time will be tracked  Linkage to resources and Medicaid sign up  Provide a box of food to each family  Staff debrief -focus group before clean up at each event | * Number of children Immunized * Number of immunizations given * Review MCIR and compare doses administered reports from past * How many fully UTD via MCIR * Measure Typical timed visit * Measure which event location served most effective * Measure satisfaction surveys * Measure how many uninsured with linkage to sign up with Medicaid * Measure how many resources linked to social determinants | * Increase health equity by providing more access to immunization      * Improved   immunization numbers during COVID -19 post pandemic   * High satisfaction rates * Improved assistance to social determinants needs * Improved linkage for Medicaid service |

*Appendix B.*

*Parent/guardian survey Curbside Immunization Event*

*Date: \_\_\_\_\_\_\_\_\_\_\_* *Code: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

1. Please answer each question as it will help us serve others in the future.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CHECK (√) ONE ANSWER FOR EACH ITEM** | NOT AT ALL LIKELY | NOT LIKELY | LIKELY | VERY LIKELY |
| Did the precautions our team took help you feel more at ease? For example, outside air, under a tent, temperature checks, masks, and sanitizer? | □ | □ | □ | □ |
| Did you have concern about going inside your doctor’s office in these COVID 19 times? | □ | □ | □ | □ |
| Would you have delayed getting your child’s shots if this event was not possible? | □ | □ | □ | □ |
| Remembering that most parents of teens have taken their child to get shots before; when comparing, would you say this process was easy? | □ | □ | □ | □ |
| Remembering that most parents of teens have taken their child to get shots before; when comparing, would you say this process was safe? | □ | □ | □ | □ |
| Would you come again, or recommend this to someone if we offered this service again? | □ | □ | □ | □ |
| Did the staff make you feel welcome and answer all your questions? | □ | □ | □ | □ |

Under these unusual COVID times many people may need additional assistance or resources. Please check if you need assistance to the following questions.

|  |  |  |
| --- | --- | --- |
| **Please check yes or no** | YES | NO |
| Do you need resources to assist with transportation? | □ | □ |
| Do you need resources to assist with Gas bill? | □ | □ |
| Do you need resources to assist with water bill? | □ | □ |
| Do you need resources to assist with electric bill (DTE)? | □ | □ |
| Do you need resources to assist with shelter (housing)? | □ | □ |
| Do you need resources to assist with food? | □ | □ |
| Do you need resources to assist with signing up for Medicaid? | □ | □ |

Appendix C.

Modified Sociological conceptual model

***Policy*:** New recommendations from Michigan regulatory agency, LARA, to provide curb-side immunizations.

***Community*:** A healthy community with a lower social vulnerability index (SVI) could handle disasters better and improve overall health of community.

***Organization*:** Beaumont’s system is founded on a culture of caring partnerships providing compassionate, extraordinary care every day.

***Providers*** are trusted-well trained and culturally competent.

***Person & Family***: People will engage in service if medical care has easy access, is affordable, culturally caring, compassionate and trustworthy.

**Appendix D.**

**Project Timeline**

|  |  |  |  |
| --- | --- | --- | --- |
| **Project Phase** | **Milestones** |  |  |
| **July** | **Aug** | **Oct** | **Nov** | **Dec** | **Jan** | **Feb** | **Mar** | **Apr** |
| Initiation | Complete review of project proposal with Chair, revisions initiated and determine appropriate team members |  |  | X |  |  |  |  |  |  |
| Planning | Secure setting and complete local context |  |  | X |  |  |  |  |  |  |
|  | Project Planning Meeting with Board |  |  |  | X |  |  |  |  |  |
|  | Project Plan Completed |  |  |  |  | X |  |  |  |  |
|  | IRB Submission | BH |  |  |  | X |  |  |  |  |
|  | IRB Approval | BH |  |  |  | X |  |  |  |  |
| Implementation | Participant recruitment | X |  |  |  |  |  |  |  |  |
|  | Training of staff member and initial introduction/educational session; Pilot begins | X | X |  |  |  |  |  |  |  |
| Evaluation | evaluation and meeting with participants |  |  |  |  |  | X | X | X |  |
|  | Data Analysis and write up |  |  |  |  |  |  | X | X | X |