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A Rollout of a Blood Pressure Remote Patient Monitoring Program to Improve High-Risk Maternal Outcomes at a Pilot Clinic for Systemwide Expansion

By

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Submitted in partial fulfillment of the Requirements for the degree of

Doctor of Nursing Practice

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College of Nursing
Graduate Department

APPROVAL FOR SUCCESSFUL DEFENSE

Laura Geron has successfully defended and made the required modifications to the text of the DNP Final Scholarly Project for the Doctor of Nursing Practice during this Fall, 2021

Final Scholarly Project COMMITTEE

Dr. Mary Ellen Roberts	Date
Dr. Josephine DeVito	Date
Dr. Diana Contreras	Date

Dedication

This manuscript is dedicated to the strongest mother of five: my mom. You achieved your doctorate as we proudly watched you cross the stage to receive your degree. This is for you, mom. *A setback is a setup for a comeback.*

Acknowledgements

Thank you to my mentor, preceptor, and role model Dr. Diana Contreras for being the visionary behind this project. This could not have been done without your constant leadership, support, empowerment, shared vision, mental model, enthusiasm, and always putting patient safety of mothers and babies at the forefront. Thank you to Dr. Mary Ellen Roberts for your advisement and guidance during my residency, Dr. Halley-Boyce for your guidance, care, and support during my Health Systems Administration residency, and Dr. Maureen Byrnes for sharing your pearls of wisdom during our maternity clinical rotation that I will never forget.

Acknowledgements to the entire implementation team for the collaboration and engagement, and whose hard work and efforts made our collective vision a reality.

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Abstract

An existing virtual care platform provides an innovative means of early recognition, identification, and intervention for women with elevated blood pressures during pregnancy, known as preeclampsia. A pilot program took place at a Northeastern prenatal care clinic where patients were identified as high-risk for preeclampsia, enrolled, educated by their providers, and equipped with Bluetooth-enabled blood pressure cuffs. Through remote patient monitoring (RPM) technology, blood pressure readings could transmit from a patient's residence to a portal accessible by their clinic provider at any time.

This doctoral-level quality improvement project focuses on the identification of patients at high-risk for preeclampsia, their enrollment into the remote patient monitoring program, and engagement of both providers and patients. A series of improvements were made to the structures and processes in the duration of the three-month pilot phase leading to broad-scale launch to prenatal care clinics systemwide.

Through increased awareness of high-risk patients through appropriate flagging and participation in remote blood pressure monitoring there is finer awareness of each patient's condition, prompting personalized and immediate care by their provider. Further research will be needed to evaluate the outcomes of those who participated in the RPM program at the end of their pregnancy.

Keywords – blood pressure, preeclampsia, remote patient monitoring, high-risk patient, health equity

Background

During pregnancy, one elevated blood pressure at less than 20 weeks gestation could indicate increased risk for preterm birth and preeclampsia (Duffy, Getahun, Chen, & Fong, 2021). Preeclampsia is a treatable hypertensive disorder developed in pregnancy, occurring commonly post- twenty weeks gestation and near term. The American College of Obstetrics and Gynecology (ACOG) clearly define the diagnostic criteria for blood pressure elevation with a list of conditions for patients considered at risk for preeclampsia (Appendix B). There is value in blood pressure monitoring for timely identification and provider intervention to potentially improve outcomes for mothers and babies. Integrating RPM in the prenatal care setting has been found to support this. RPM may also promote health equity and increase access to care (Kern-Goldberger & Hirshberg, 2021).

The negative outcomes of preeclampsia are eclampsia, hemolysis, elevated liver enzymes, low platelet count (HELLP) syndrome, or death (ACOG, 2020). A third of pregnant patients with preeclampsia result in preterm delivery. To this end, the baby is at increased risk for respiratory, renal, cardiovascular disease, obesity, insulin resistance, cerebral palsy, and delayed neurological development (Rolnik, Nicolaides, & Poon, 2020).

In scope, one in twenty-five pregnant women develop preeclampsia (CDC, 2021). Signs and symptoms of preeclampsia also include proteinuria, thrombocytopenia, renal insufficiency, impaired liver function, pulmonary edema, and/or new-onset headache (ACOG, 2020). This project related to the aspect of blood pressure control.

The proceeding sections of this report delve into a description of terms, purpose, goals and objectives, and the project's significance to nursing, providers, and patients.

Definition of terms

Frequently used terms in this project are:

1. *Prenatal care:* This project takes place in a prenatal care clinic with a multidisciplinary team of certified medical assistants (CMAs), physicians, nurses, and a practice manager. Prenatal care is the most extensively used preventative care services; care is directed toward maximizing the health of pregnant women prior to delivery.
2. *Preeclampsia:* A treatable hypertensive disorder developed during pregnancy, occurring commonly post- twenty weeks gestation and near term (ACOG, 2020). The ACOG (2020) diagnostic blood pressure criteria is: "Systolic blood pressure of 140 mm Hg or more or diastolic blood pressure of 90 mm Hg or more on two occasions at least 4 hours apart after 20 weeks of gestation in a woman with a previously normal blood pressure, [or, a] systolic blood pressure of 160 mm Hg or more or diastolic blood pressure of 110 mm Hg or more."
3. *Preterm delivery:* Childbirth occurring prior to 37 weeks gestation. Preterm babies have increased chance of being born with complications requiring higher levels of neonatal care.
4. *Eclampsia:* ACOG (2020) defines this condition as "new-onset tonic-clonic, focal, or multifocal seizures in the absence of other causative conditions such as epilepsy, cerebral arterial ischemia and infarction, intracranial hemorrhage, or drug use."
5. *Remote patient monitoring (RPM):* Technology used to capture health data and provide services to patients outside of the traditional care setting.
6. *High-risk patient:* A patient with increased likelihood to develop a certain

disease, condition, or harm.

7. *Health equity:* Equal opportunity for individuals to reach their health potential.
8. *Severe Maternal Morbidity (SMM):* Outcomes of pregnancy that are preventable may negatively impact a maternal patient's health.
9. *Mortality:* Death.

Description of the project

At the time of this doctoral-level project literature review, blood pressure RPM for obstetrical intervention was limited in capacity, with major focus on low-risk patient populations. Due to a narrow lens in capture, those at high-risk may remain undetected for enrollment and increase SMM and mortality. One of the major issues that transpired from the COVID-19 pandemic was the mechanism in which patients, at low- or high- risk could be safely evaluated in prenatal clinics. The COVID-19 environment accelerated the RPM trend making more urgent the ways to address this gap.

This project evaluated and analyzed the rollout of a preexisting blood pressure RPM program, but with a wider net for capture to include high-risk patients. The pilot would then be expanded to prenatal clinics systemwide. The underlying goal was to improve quality and patient safety outcomes. Plan-do-study-act (PDSA) cycles, or a method of study that analyzes process defects and seeks a method for continual improvement were used during the implementation. Owing to the project's success, the doctoral student worked in collaboration with their mentor and expert RPM implementation team.

This expert team consisted of the OB/GYN Department Chair, virtual program director of customer operations, virtual program strategic account manager, providers, EMR analysts, IT manager, IT project manager, clinic practice manager, and the doctoral student.

Recommendations were provided by the doctoral student and the team to drive effective customizations to impact gaps and opportunities for improvement in workflow after pilot launch. Given the urgency to address the issues identified, and the merits of the outcomes of this project, the pilot launch ultimately led to system launch at four hospital sites with five prenatal care clinics.

The first aim was to determine whether high-risk patients were being identified appropriately, and the enrollment alerts were triggering for the appropriate providers, during the correct appointments. Ensuring that the triggers for enrollment worked was an imperative first step in the design.

When it was determined that the triggers worked appropriately, feedback was gathered from the providers and practice manager to understand their concerns, areas for improvement, and interest in offering the program to their eligible patients. Listening to the voice of the providers allowed opportunity to target ways to improve their workflows, and thereby enhanced engagement. In collaboration with the implementation team, opportunities voiced by the clinic stakeholders were addressed and implemented.

The engagement of the clinic team was inherent to understanding the step-by-step workflow they developed at the pilot clinic. Through understanding of the structures and processes they had in place, it became apparent where areas for improvement existed to improve the quality of care to patients and provider engagement experience.

Through the provider and the clinic team’s feedback, it became evident that technology and the EMR could close gaps and address concerns where improvements could be made. The EMR analyst team was instrumental in the EMR build and optimization during the pilot phase. The EMR analysts tweaked the rules to narrow the BPA triggers to specific appointments and

high-risk conditions, and installed order sets upon feedback to improve the structures in place. Furthermore, they were responsible for the development and creation of reports upon request. Understanding the frequency of diagnoses and conditions triggering eligibility for enrollment, and furthermore, whether evidence-based medication for prevention was ordered by the provider could be determined via such reports. Through collaboration with the EMR team it was ensured that the EMR was built effectively and efficiently for equitable capture for high-risk patient enrollment. Putting processes and structures in place where transparency of data could be determined could lead to targeted interventions for improvement and quality care.

It was critical to understand at which points in the process patients would be educated about preeclampsia and how to take their blood pressures. It was also important that providers understood their role in how to determine patient compliance through the virtual platform's reports, and the education reinforcement process as needed.

A training session was prepared and structured by the virtual program director of customer operations and EMR team to provide demos to an array of provider roles from each clinic site. Leading up to this session, there were weekly meetings with the implementation team where specific training highlights of focus were identified to include in the materials. Facilitating the creation of a tip sheet with the team at the pilot clinic was used to guide the clinic providers at each site in anticipation for program launch systemwide.

The tenets of the Donabedian Model were used to guide this project. Its foundation is that both structure and process must be securely in place to achieve intended outcomes in any quality improvement project (AHRQ, 2015). Elements of the structure involved patient, provider, and clinic team engagement, and EMR build and optimization. Process elements related to patient

education, provider education, and EMR and provider workflow. When synchronized, positive outcomes for mother, baby, and the community could be anticipated.

The success of this project related to whether a blood pressure RPM for high-risk patients was feasible based on the clinic pilot based on minimized defects in structure and process via continual quality improvements. Recommendations and future considerations were made in moving forward with RPM at this health care system, and for sustainability. During this three-month pilot period, out of 44 patients, three were reported to have experienced elevated blood pressures and were reported to have been treated in a timely manner by their provider. Notably, this project was specific to prenatal patients only; postpartum blood pressure monitoring was not in the breadth of this project or application. As pregnancy is a nine-month duration, the outcomes and long-term effects of this three-month project could not be evaluated. Ensuring that structures and processes were place may owe to the potential future viability of the program and its impact on high-risk mothers and their babies.

Purpose of the project

The purpose of this project was to determine whether a preexisting blood pressure remote patient monitoring program could be utilized by high-risk patients. The goal was to determine whether RPM could be rolled out with success at a pilot program for systemwide expansion. Risks, processes, and structures were analyzed and improved to enable change for these patients. Widening the scope of how patients could be evaluated to enroll into a blood pressure RPM program could impact health outcomes of those who may have gone previously undetected for enrollment.

Goals and objectives

The goal of this project is to determine whether a virtual program could be rolled out successfully at a pilot program and extended to clinics systemwide. To achieve this, the program required a series of optimizations to accompany the structures and processes associated with its implementation amongst the team and the EMR.

1. *Determine which conditions render as "high-risk" for preeclampsia.*
2. *Identify the mechanism of the enrollment process*
3. *Determine the appropriateness of screening of high-risk patients*
4. *Determine if high-risk patients are triggering BPA alerts*
5. *Determine the provider's engagement in enrollment*
6. *Determine if patients are enrolling into the virtual program.*
7. *Determine if alerts are triggering on the appropriate appointment visit*
8. *Determine if alerts are triggering for the appropriate providers*
9. *Gather the voice of the provider to understand identified barriers, concerns, and comments for recommendation*
10. *Collaborate with implementation team to address gaps, barriers, and opportunities to identify and minimize defects in workflow*
11. *Provide initial assistance in development of a tip sheet to prepare for systemwide rollout.*
12. *Provide recommendations for EMR reports*
13. *Evaluate if process works as intended from start to endpoint*

Significance of the project

This project is significant because preeclampsia is preventative. A review of the literature revealed that RPM programs have been shown effective in prenatal care settings leading to positive outcomes. The significance lends to the examination of obstacles in the rollout as it looked toward increased usage. The phrase “we can’t” was never a thought during this project through my mentor’s leadership. This project could facilitate the possibility of timely identification and treatment for high-risk patients through improvements in process and structure to increase access, health equity, and promptness in care.

Literature Review

A comprehensive review of the literature revealed multiple studies related to preeclampsia and leveraging remote patient monitoring to increase access to care, with limited articles on using telehealth to promote health equity. A team of medical librarians conducted a search of the literature within the past five years using key terms: “preeclampsia,” “high-risk,” “blood pressure,” “obstetrics,” “preventative care,” “prenatal care,” “telehealth,” “remote patient monitoring,” “health equity,” and “outcomes.” Results yielded 52 articles, and after independent review, 14 studies met the inclusionary criteria and were determined for review. Inclusionary criteria consisted of studies specific directly related to the topic of interest. Main themes emerged from the studies such as improved quality and care, increase in access, early intervention, and better outcomes. Blood pressure RPM in previous studies was found to be reliable, accurate, easy to use, beneficial, adequate, and found to relieve patient’s stress and anxiety. Outcomes were reduction in preeclampsia diagnoses, induction of labor, and prenatal hospital admissions were found. Patients were found to be more likely to keep their prenatal appointments, and had a positive outlook toward RPM.

Remote patient monitoring was also shown to impact health equity. Black, American Indian, and Alaskan Native women have a greater chance of developing preeclampsia as found to more commonly have those high-risk factor conditions. There is a need to remain innovative by rolling out and improving upon RPM programs in obstetrics as a means to increase equitable care. Three peer-review articles provide recommendations to using telehealth to promote health equity, which will be explored.

In a systematic review by Alves, Times, da Silva, Melo, & de Araujo Novaes (2020), 26 articles were identified to include populations of pregnant women, prenatal care, high-risk pregnancies, and homecare utilizing mobile applications and remote care related to the health of the mother and fetus. Findings yielded the benefits of reliability and accuracy when using smartphone applications for determination of care for patients remotely (Alves et al., 2020). Notably, remote monitoring in obstetrics offered improvement in outcomes, identification, and interventions at early stages in pregnancy (Alves et al., 2020). The authors had concern for usability, as the patient must engage in using the application for there to be any potential impact to the course of their care.

Another study by Abraham (2020) supported the utilization of telehealth in obstetrics. Abraham (2020) noted that the traditional prenatal care model contributes to increased costs, decreased access, and the time constraints allotted for patients to be seen by their providers, along with lack of acknowledgment of the needs of today's working, healthy pregnant woman. The costs of office visits, global vaginal delivery, and global cesarean were highlighted ($37 - $110; $1,720 - $3,146; $1,948 - $3,484, respectively). Several studies have exemplified the efficacy of reduced in-person visits, and utilization of remote monitoring as a tool to decrease barriers to access and care. Abraham (2020) contested the need for modification of the traditional

prenatal care model to one that lends in frequency of visits on the basis of the mother's complications, psychosocial needs, and consideration of telemedicine during pregnancy.

In a cross-sectional study by Ayatollahi, Abadi, & Hemmat (2019), 79 questionnaires were completed by midwives and gynecologists to determine the feasibility of remote web-based and mobile monitoring for high-risk pregnant patients. Findings revealed that midwives ($p=0.001$) and gynecologists ($p=0.003$) had consensus that use of mobile applications had greater feasibility than use of web-based technology in caring for this patient population (Ayatollahi et al., 2019). The authors concluded that mobile applications contribute to the improved quality and increased access to prenatal care for high-risk pregnant patients.

Aziz, Zork, Aubey, Baptist, D'Alton, Emeruwa, Fuchs, Goffman, Gyamfi-Bannerman, Haythe, LaSala, Madden, Miller, Miller, Monk, Moroz, Ona, Ring, Sheen, Spiegel, Simpson, Yates, & Friedman (2020) presented management recommendations for general prenatal care based on a series of queries to clinicians practicing in obstetrics who transitioned from in-person to telehealth spurred by the COVID-19 pandemic. Recommendations for high-risk hypertensive mothers in pregnancy were: 1) self-monitoring of blood pressure at home, and 2) in-person visits on a weekly basis after 36 weeks (Aziz et al., 2020). The authors concluded that virtual platforms provide potential for modified and adequate means for accessible care for high-risk mothers.

In a randomized controlled trial, 2806 low-risk pregnant patients in 57 offices participated in a program for remote monitoring of blood pressures (DeNicola, Ganju, Marko, & Sheth, 2019). For antepartum monitoring, 2,791 participants had a mean systolic pressure of 107.3 and a mean diastolic pressure of 68.9, with an average of 7.2 days interval between recordings, for a total of 38,443 readings (DeNicola et al., 2019). In the postpartum phase of care, 485 readings were recorded with an average systolic pressure of 109.8 and diastolic

pressure of 73.2 (DeNicola et al., 2019). The authors concluded the participants had frequent monitoring of their blood pressures using the RPM program (DeNicola et al., 2019). DeNicola et al. (2019) determined that the remote patient monitoring program could be a beneficial tool for remote monitoring of blood pressures for low-risk pregnant patients, and there could be potential indication for the remote monitoring of high-risk patients at a future time.

DeNicola, Grossman, Marko, Sonalkar, Tobah, Ganju, Witkop, Henderson, Butler, & Lowery (2020) sought to determine the effectiveness of telehealth implementation for the pregnant patient in a systematic review. 47 qualifying primary studies included 31,967 participants which indicated that telehealth utilization showed several improvements in outcomes related to obstetrics, including increased access in scheduling for high-risk patients (DeNicola et al., 2020).

Dorton, Veit, Kleist, Kuiper, & Malmberg (2018) evaluated the use of a remote patient blood pressure monitoring program with 21 urban, underserved obstetrical participants for appointments kept or rescheduled, messaging from end-user to provider, and socioeconomic risk factors. Findings revealed that 87.5% of appointments were kept or rescheduled, 277 correspondences were sent between the participant and clinician, and 39 socioeconomic risk factors were identified (Dorton et al., 2018). Although the practice average for attended appointments was 3.2, with the use of the RPM program, the average was 7.4. The study determined that the RPM progam could increase access for underserved populations as evidenced by the increased average in kept appointments, and percentage attended.

In a meta-analysis by Kalafat, Benlioglu, Thilaganathan, & Khalil (2020), 9 studies were identified to evaluate the use of remote blood pressure monitoring in the antenatal and postpartum period. The authors found that remote blood pressure monitoring yields in less

frequent in-person antenatal visits, 70% less prenatal admissions to the hospital, reduction in preeclampsia diagnosis by half, 45% less induction of labor, and no evident risks in maternal or fetal outcomes in comparison with solely in-person visits (Kalafat et al., 2020).

A non-randomized cohort study by Payakachat, Rhoads, McCoy, Dajani, Eswaran, & Lowery (2020) evaluated the viewpoints of 47 postpartum women diagnosed with preeclampsia on the use of telehealth in obstetrics and contact with providers at the call-center. The participants were separated in to two groups: 21 participants used remote monitoring where they recorded their vitals for the span of two weeks post-discharge, and 16 participants were made aware of remote monitoring but did not utilize it (Payakachat et al., 2020). A thirty-minute interview was conducted at the end of the participant's enrollment in the trial, indicating that for those who used remote monitoring, 100% found it assisted with condition management, 61.9% positive for daily use, 95.2% benefit, 100% ease, 100% positive outlook toward telehealth, 90.9% easy communication with the call-center, 76.2% felt it decreased their stress, and decreased 85.7% of the participants' anxiety (Payakachat et al., 2020). Barriers voiced by the participants were the sizes of the blood pressure cuffs and equipment set, the wireless feature, and stress levels (Payakachat et al., 2020). Payakachat et al. (2020) conclude that consideration of their findings could aid in the success of other prenatal and postpartum remote-monitoring programs.

A qualitative study by Van den Heuvel, Teunis, Franx, Crombag, & Bekker (2020) utilized four focus groups consisting of 22 high-risk pregnant women in secure Facebook groups: two groups who received traditional care, and two that received telehealth services during pregnancy. Outcomes of the qualitative study indicate that utilization of telehealth results in less stress, increased perception of privacy, reduced anxiety, and less travel time to appointments

(Van den Heuvel et al., 2020). The authors concluded that telemonitoring in obstetrics could benefit pregnant women who are considered high-risk (Van den Heuvel et al., 2020).

Several peer-reviewed articles highlighted ways in which telehealth could address challenges related to health equity in prenatal care. A review by Madubuonwu & Mehta (2021) stated that the three items which pose barriers to underserved populations are challenges with internet access and e-literacy, technology geared toward those with privilege, and minimized innovative solutions directed toward low-income patients. The authors recommended integrating telehealth to improve patient's quality of care, design telehealth solutions to consider impact on vulnerable populations, and increasing technology education and coverage (Madubuonwu & Mehta, 2021). Authors of an expert review recommended increasing solution-based initiatives to address health equity, and to understand that racism could be impacting health outcomes. If there is a solution to provide fair and equitable opportunity to improve the quality of care of ones' health, this should be considered.

Kern-Goldberger & Hirshberg (2021) concurred that telehealth could increase access to care for patients with preeclampsia and close the gap on racial bias. There is a need to remain innovative by rolling out and improving upon telehealth programs in obstetrics with focus on improving equitable care (Kern-Goldberger & Hirshberg, 2021). Remote patient monitoring should be utilized to increasing access and equity in health care to assist in reducing New Jersey's maternal morbidity and mortality rates. There is clear evidence in increased surveillance associated with timely intervention and escalation of care remotely to women with hypertension diagnoses.

Authors of an expert review revealed that Black women compared to white women experience preeclampsia more frequently (69.8 in 1,000 vs. 43.3 in 1,000 deliveries) (Johnson &

Louis, 2020). Black women have a greater chance of developing preeclampsia compared to White women (78% vs 53%; P=.04) (Johnson & Louis, 2020). Risk factors associated with preeclampsia, such as obesity, diabetes, and sleep disorders, are more common in women who are of Black, American Indian, and Alaskan Native race. Black women have an increased risk of mortality and have a greater chance those deaths could have been prevented than other races (Johnson & Louis, 2020). Preeclampsia doubles the likelihood of developing cardiovascular disease, typically three to five years post-delivery (Johnson & Louis, 2020).

The pregnancy-related maternal death rate of non-Hispanic Black women in pregnancy surpasses all other races and ethnicities identified in the state of New Jersey. In 2013, "the pregnancy-related maternal death rate for white women in New Jersey was 12.8 deaths per 100,000 births compared to 46.7 deaths per 100,000 births for black women" (NJ State Legislature, 2019). Future study is needed to determine the evaluation of intervention in remote monitoring targeted toward vulnerable maternal populations with identified underlying leading causes to mortality.

While the literature demonstrates the benefits of RPM for pregnant patients, areas for recommendation exist to increase accessibility, eliminate health inequity, and to extend to high-risk populations.

Project methodology

This project required understanding the pilot clinic workflow after the RPM program launch in order to evaluate the associated structures and processes for improvement and defect elimination using PDSA cycles (Appendix C).

The pilot clinic workflow from beginning to endpoint follows:

1. *Patient attends in-person obstetrics office visit*

2. *Nurse collects patient history to determine early signs and symptoms for preeclampsia*
3. *If patient is identified as at risk for preeclampsia and eligible for the program, the nurse provides the patient with brochures and promotes enrollment*
4. *Provider opens the OB encounter in EMR*
5. *Provider screens patient for high-risk conditions for preeclampsia*
6. *Provider documents identified high-risk condition(s) for preeclampsia into the EMR Problem List or in the Visit Diagnosis section*
7. *Enrollment BPA alert triggers*
8. *Provider obtains enrollment consent from the patient*
9. *Provider opens SmartSet and accepts the enrollment alert*
10. *Provider orders "Platform" and/or "BP RPM"*
11. *Provider enters patient's contact information*
12. *Provider verbally notifies nurse that the order was placed*
13. *Nurse enrolls the patient into the virtual program portal*
14. *Nurse educates the patient on blood pressure management at home*
15. *Bluetooth-enabled blood pressure cuff is received in the mail*
16. *Patient takes blood pressure remotely*
17. *Blood pressure syncs into the program portal*
18. *Nurse manually transfers blood pressures from the portal to the EMR flowsheet*
19. *Virtual program team member notifies provider if a BP is elevated*
20. *Provider intervenes*

Each of the twenty identified steps revealed an opportunity for optimization using PDSA cycles. Through collaboration with the implementation team, identified areas for improvement were recommended, addressed, and changes were made. It was anticipated that when structure and process were sound, beneficial outcomes for patients at high-risk for preeclampsia would follow.

Theoretical Framework

Nola J. Pender's Health Promotion Model (HPM) was integral to guiding the framework of this project as it pertains to preventative care and preeclampsia. The HPM underlines the importance of self-motivation of individuals to take control of their behaviors and actions to maximize their well-being (Petiprin, 2020).

One tenet of the HPM is influence of health care providers on the individual's commitment to promoting their patients' health (Petiprin, 2020). It was imperative that the OB/GYN clinic providers were educated to and understood the processes inherent to rolling out and participation in the RPM program. An informed and engaged provider is key to empowering patients to enroll and participate in the program. According to Petiprin (2020), "the greater the commitments to a specific plan of action, the more likely health-promoting behaviors are to be maintained over time." After the provider screens the patient as high-risk for preeclampsia and the provider documents the high-risk condition into the EMR, an alert should appear in the EMR for the provider to enroll the patient into blood pressure RPM. The provider is responsible for providing effective education related to the ACOG signs and symptoms of preeclampsia and how to take a blood pressure at home, once enrolled. The support of the provider could influence the sustainability of the patients' participation in the program throughout their pregnancy, and therefore, their outcomes.

Kurt Lewin's Change Theory was also pertinent to this project. The implementation of remote patient monitoring prompted a shift in practice and culture for the providers in the OB/GYN clinic. It was critical that the providers adapted to new practices in technology, workflow, and education provision to their patients. We anticipated a culture shift met with resistance, possible dismissal of the alerts for enrollment, a wish not to enroll patients simply due to habit or preference not to engage. Listening to the voice of the providers in terms of any barriers, challenges, or comments for change that they had regarding workflow or the EMR build was crucial to making improvements in the pilot phase of the project. After the unfreezing, change, and refreezing process involved in the Change Theory a gestalt in the new processes and practices took place related to provider engagement (Petiprin, 2020).

Similar concerns for issues in technology for the patient population at risk exist, as this could be a new method of engaging in their care. The patients' compliance could rely on the education as to why it is important to their health, and how to use the software and blood pressure equipment at home.

The Donabedian Model is a theoretical framework was used to support improvements in the pilot phase of the RPM program. Structures and processes were fortified through PDSA cycles and created a solid foundation for each step of this project from beginning to endpoint.

Risk Analysis

A strengths, weaknesses, opportunities, and threats (SWOT) analysis was done for the pilot phase of this project. Strengths include a collaborative team of engaged specialists to assist in the implementation of changes for improvement, shared innovative mindsets, technology, and the flexibility to finetune the processes and structures which could result in earlier diagnosis identification, timelier treatment intervention, and increased access to equitable care.

One of the major weaknesses of the program once enrolled is patient engagement. If patients do not use the application or take their blood pressures, the rollout of the program will be obsolete. The virtual application provides compliance reports which allow the provider to know the time since each patient's blood pressure was last taken. If a patient does not comply within the timeframe of greater than seven days, a virtual platform representative sends an encrypted message to the patient reminding them to take their blood pressure. The patient's provider could also send the patient a message or phone call to follow up and reinforce education to the patient if needed. The pilot program at the clinic provides the opportunity to observe what works, what does not work, barriers, provider and patient engagement and education opportunities, and appropriate EMR functionality.

External threats exist specific to COVID-19 and its variants; however, consistent with market trends and the political climate, there is increased opportunity and necessity for RPM. External environment related to COVID-19 is currently conducive to virtual programs which are covered under emergency response waivers supporting patient access, and thereby facilitating and promoting the use of digital platforms to patients more than ever. It will be critical to keep up-to-date with political waivers in regard to telehealth and market trends as the pandemic progresses.

Though technology serves as an opportunity to promote health outcomes to pregnant patients, challenges existed in terms of change in practice, culture shift, and provider and patient engagement.

The first risk factor is related to provider engagement which could jeopardize the application's innovative value. Barriers related to providers resistance to learning the new workflows and technology related to telehealth may impede access to those who may be eligible

to enroll into the program. Increased provider engagement by listening to providers' concerns and issues related to the workflow in the pilot phase may increase their participation in engaging their patients in using the application. Ensuring the providers understand expectations of their role related to the new technology appropriately is also critical. The contingency plan of action is to orient and train the providers to each process step related to enrollment and intervention. Emphasizing the value of the program in terms of health outcomes to their patients will also be impactful. Providing an educational handout to the providers will be key to the initial phase of the systemwide rollout.

The second risk is customization. Although the RPM program is innovative by default, there is no simple rollout process; innovations must be built in by learning the workflows of the clinic practice by listening to feedback from both provider and patient. The contingency plan is to ensure that each step of the structure and process related to enrollment and provider intervention are evaluated for opportunities for improvement.

The third risk is the patient's ongoing participation throughout the pregnancy. This may be influenced by the desire of use, understanding of how to use the application and blood pressure cuff, and the value of blood pressure screening to their health. Providers are responsible for promoting their patient's engagement. The key is for providers to educate and empower their patients so they are further motivated to use the application.

The final risk is sustainability. A rollout of the telehealth program may be successful; however, if the program does not have a track for continuation, it has the potential to veer to a halt. A plan must be in place to ensure that the RPM program remains built in as a feature of the clinics, in the fabric of the culture and workflows of the providers over time.

Implementation Plan

The implementation plan for this project involves understanding each step in the process from the time of the high-risk patient's first appointment, to their enrollment into the blood pressure RPM program, to potential provider intervention for medical treatment. The plan that follows outlines each step, and the PDSA cycle(s) that occurred for improvements:

1. *Patient attends in-person obstetrics office visit*

The first question asked was, did the BPAs trigger at the right visit? When the pilot first launched at the clinic, a BPA would fire for any patient visit type, and any time a chart was opened regardless of reason. In review of the EMR Analyst's BPA report over the span of two weeks, BPA alerts triggered 253 times, despite 88 patients being listed as eligible. In discussion with the providers, they voiced their experience of "alert fatigue" in part to this. It became apparent that there was a need to narrow the BPA triggering points. The providers voiced that they should only be triggering during the office visit, which was defined as the "amenorrhea visit," "first prenatal visit," or the "OB visit" as defined in the EMR. The EMR build analyst adjusted the rule in the EMR to alert only during those visit types.

2. *Nurse collects patient history to determine early signs and symptoms for preeclampsia*

Nurses are the first line of contact the patient experiences at their prenatal visit. Screening is essential to determine early in the appointment if a patient is at high-risk for preeclampsia. There was opportunity determined to provide the practice manager and nurses with a standardized list of conditions for eligibility into the RPM program. The nurse's intake assessment was essential for preliminary identification for high-risk conditions to indicate

eligibility for enrollment into the program. A list of high-risk conditions for preeclampsia was given to the nurses.

3. *If patient is identified as at risk for preeclampsia and eligible for the program, the nurse provides the patient with brochures and promotes enrollment*

If this opportunity is missed, the critical component of patient education and initial patient engagement will be lost. The providers were trained to the blood pressure RPM program by the EMR and virtual program director of customer operations to increase their engagement in the process of enrolling their patients, why the program is important to their patients, and support as to how this could improve their patients' outcomes. Ensuring the nurses are educated to the virtual program and why it is important is essential in the rollout process.

4. *Provider opens the OB encounter in EMR*

It was discovered that every time anyone of any specialty opened the patient's chart, for any reason, an alert would fire. Of those 253 BPA alerts, 221 were canceled, 27 had been "acknowledged/overridden," two had "SmartSets opened," and two were "accepted" with no action taken. Since only the provider can accept the patient into enrollment from the BPA function, any other provider may be clicking "cancel," "acknowledge/override," or "defer." The EMR build analyst adjusted this rule in the EMR to alert only the provider.

5. *Provider screens patient for high-risk conditions for preeclampsia*

During the design of the EMR workflow build, the physician providers gave their input as to which diagnostic criteria would trigger a BPA alert for enrollment. A set list of criteria was determined based on ACOG risk factors for preeclampsia. During the screening process, the physicians consistently screen the patients for eligible conditions for participation in the program after the nurse's initial screening and intake.

6. *Provider documents identified high-risk condition(s) for preeclampsia into the EMR Problem List or in the Visit Diagnosis section*

The providers should be aware as to which ACOG guidelines qualify a patient for enrollment, and where to document them into the EMR. A tip sheet was created by the practice manager and nurses, which will be given to providers to ensure that they are educated as to this step in the process, and that eligible patient's diagnoses are being appropriately captured. The tip sheet will be distributed by the practice manager to guide workflows to support standardization and sustainability in the systemwide rollout.

7. *Enrollment BPA alert triggers*

It was identified that the conditions "obesity" was not being documented, although a patient's BMI was equal to or greater than 30, which is one of the ACOG risk criterion for preeclampsia. Due to this, the enrollment BPA was not triggering and patients were not being captured for enrollment. The EMR analyst optimized the build to include a rule for the BPA of 30.0 and greater to trigger for the appropriate and most specific BMI criterion.

The physician providers also voiced their feedback that the BPA enrollment alert would trigger but they were not clear as to which condition prompted it. The EMR analyst customized the BPA alert to indicate the condition based on their request.

8. *Provider obtains enrollment consent from the patient*
9. *Provider opens SmartSet and accepts the enrollment alert*
10. *Provider orders "Platform" and/or "BP RPM"*

If the patient is to receive a blood pressure cuff, the RPM order must be ordered. If the patient is only interested in having the program software (without monitoring their blood pressures from home), only the platform should be ordered.

11. Provider enters patient's contact information

12. Provider verbally notifies nurse that the order was placed

If this step is missed, the patient will not be enrolled into the program. The patient must be enrolled into the program portal by the nurse to complete registration. To further streamline this step, the implementation team is working with the EMR analysts to integrate an automatic alert in the EMR from the provider to the nurse to notify of enrollment. In doing so, there may be less likelihood for communication to be missed; an automatic alert ensures a communication is sent.

13. Nurse enrolls the patient into the virtual program portal

In the pilot phase it was found that initially, that five out of seven patients enrolled into the program did not receive their blood pressure cuffs to their place of living. It was additionally found that 48 additional patients who were perceived to have been enrolled into the program had not been enrolled into the RPM program. It was determined that although "Platform" was being selected, "BP RPM" was not being selected in the program portal. In further review, the "add" button was not enabled on the nurse's portal interface. It was further determined that only end users who are titled "group manager" can fulfill this transaction in the portal. Each end user in the clinic had their title changed to "group manager."

14. Nurse educates the patient on blood pressure management at home

The nurses customized instructions to provide to their patients. The instructional content will be submitted to the hospital system's marketing team to design into a brochure, brand, and to make applicable to each office clinic as standardized educational material for distribution at the pilot clinic and systemwide. This step is critical for the nurse to promote self-motivation,

engagement, and teaching to ensure proper blood pressure readings are being taken by the patient.

15. Bluetooth-enabled blood pressure cuff is received in the mail

In order to receive a blood pressure cuff, the patients must have been then enrolled into the program portal by the nurse. To ensure that the blood pressure RPM monitor was sent to the patients, the nurse needed to be considered a "group manager" user in the portal. Once this was enabled, the nurses could enroll patients and they would receive their blood pressure cuffs in the mail. The virtual program director of customer operations performed a crosscheck to ensure each patient offered enrollment had received their blood pressure in the mail. A report was created by the virtual program director of customer operations to reflect the status of those who had and had not received their blood pressures after enrollment. This list was then scheduled to be distributed weekly on a weekly basis to the practice manager.

16. Patient takes blood pressure remotely

If the patient does not use their blood pressure cuff due to lack of knowledge in how to use the equipment, or lacks engagement, the program will be obsolete. The practice manager or provider can check the program portal to determine the patient's blood pressure monitoring compliance. If the provider finds that the patient is not using their blood pressure at home as evidenced by blood pressures not syncing to the portal they have the option of following up with the patient. The virtual program also has a messaging system to remind the patient to take their blood pressure if greater than seven days elapses since their last reading.

17. Blood pressure syncs into the program portal

18. Nurse manually transfers blood pressures from the portal to the EMR flowsheet

To address the amount of time it took to transfer readings from the portal into the EMR,

the practice manager requested a report could be created by the virtual program director of customer operations to easily visualize the blood pressures in a page format. After the rollout to the clinics systemwide, other clinics received the same report to facilitate a more efficient manual transfer process of blood pressure data to the EMR.

19. Virtual program team member notifies provider if a blood pressure is elevated

20. Provider intervenes

Implementation Timeline

This was a three-month project starting with the pilot launch on May 27th, 2021 and ended on August 27th, 2021 with the decision made for systemwide launch.

During the clinic pilot, the implementation team met weekly to check in and discuss identified workflow concerns. Defects in the process were identified by the team in this forum and solutions for improvement were considered and implemented on a weekly basis.

Two weeks after the rollout the voice of the providers and clinic team was gathered as to their lived workflow successes and obstacles. From this meeting much was learned about the virtual program and the provider's workflows, including any challenges, obstacles, or comments for improvement. The practice manager also provided initial information on data related to the types of diagnoses they have encountered since the launch start, and how many patients had been enrolled into the program.

One month into the rollout of the program, the EMR analyst published an EMR optimization to include new features for the provider's interface. The updates were directly based upon the feedback gathered related to patient engagement and function for provider workflow in the EMR. The team's requested reports were also published at this time, including one that provided the end-user which patients were enrolled and the conditions that rendered them as

eligible. At that point there were thirty patients enrolled into the program. Of note, as patient enrollment increased and as the blood pressure monitoring RPM was actively being used, it became clear that purchasing an application is not a plug-and-play. The system required changes to structures and processes. Albeit, these changes were feasible to make and adjustments were continually ongoing as more was learned during the rollout. The implementation team played a vital role in providing feedback, addressing changes, and working together to remove identified roadblocks.

Two months into the pilot program launch, the doctoral student started to better understand the pilot's workflow which became more formalized. The doctoral student was able to outline the workflow steps with the pilot clinic's practice manager and nursing team. Even at this time, opportunities were still being identified for improvement.

At the two-and-a-half-month mark, the team was still running into obstacles. It was reported that a third of the enrolled high-risk patients were not using their blood pressure monitoring devices at home. The virtual program director of customer operations provided demos and provided direction as to ways providers could address noncompliance through the portal and explained that the virtual program liaisons were sending message alerts to those who were noncompliant.

At the three-month mark, it was reported out that the process had worked successfully start to finish three times. Forty-four high-risk patients were enrolled into the RPM program at the clinic at that time, and there were three elevated blood pressures where provider intervention followed. A critical learning here was that the process had worked: the correct patients were identified, were compliant and engaged, had an elevated blood pressure reading captured remotely, and timely treatment was provided to them. The process from start to end worked

successfully for these individuals. It was at this point that the OB/GYN Department Chair determined that the process was working smoothly and the RPM program was ready for launch at a systemwide level. During this time the CDC (2021) released a statement related to an uptick of patients with the emerging Delta variant and the low rate of vaccinated pregnant patients in the population. Based on this emerging information, the System OB/GYN Department Chair determined that a swift rollout to the other sites was imminent. The EMR and virtual program coordinators hosted a robust virtual training session to representatives from each prenatal clinic site, and a staggered rollout began in the oncoming next two weeks. A tip sheet outlining the steps of the process was being drafted by the practice manager and lead nurse who would finalize and distribute it to the practice managers at the other sites owing to standardization and sustainability of the processes, structures, and workflows developed at the pilot clinic.

Budget

The hospital's Foundation purchased the preexisting program. The onetime purchase came with the Bluetooth-enabled blood pressure cuffs. The RPM program was available to patients at no extra cost. The clinics did not require the hire of any new team members. My role as doctoral student did not impact the budget.

Marketing Plan

Marketing is establishing awareness and promoting engagement of the stakeholders involved in patient engagement and sustainability of this project: a core function. According to the Association of National Advertisers (2021), "relationship marketing is a strategy of customer relationship management that emphasizes customer retention, satisfaction, and lifetime customer value." The marketing of the remote patient monitoring program did not occur until after it was determined that the pilot phase was successful and could be achieved systemwide.

Prior to the clinic launch, the program was marketed to the pilot clinic providers and clinic support team via a training session that took place virtually led by the virtual program and EMR coordinators. The training session doubled as an internal marketing platform showcasing the value of the program while fostering engagement amongst the stakeholders in preparation for the pilot launch.

In preparation for the systemwide rollout, a more robust cross-campus virtual training took place highlighting key learnings and demos understood from the pilot clinic extended to residents, nurses, physician providers, practice managers, and clinic support teams. During that platform, the OB/GYN Department Chair communicated the lived successes of the pilot, which underscored the tangible benefits and value of the program.

The consumer marketing team consisted of Market Managers, the Practice Operations Director, and the OB/GYN Department Chair. Several months prior to the clinic rollout, the team created initial content, including a press release and informational handouts geared toward prospective patients. The marketing plan was kept on hold until the program became more robust.

Marketing took place from the providers to eligible patients during their prenatal care appointment as to pique their interested in enrollment.

To finalize the marketing process, this project will be submitted to a journal specific to Quality & Patient Safety. As virtual care becomes more prevalent in today's healthcare climate, it will be vital to share the teamwork, collaboration, analysis, customization, and innovation required to reach success in the rollout of a digital platform.

Project Outcomes

This project achieved its principal aim: A successful rollout at the clinic for system launch. A total of 18 PDSA cycles stabilized processes and structures related to each step of the newly implemented RPM program in relation to the pilot clinic's workflow.

Three months after the launch of program, there were a total of 44 patients enrolled into the RPM program. Through EMR reports and discussions with the team, it was reported that a majority of those enrolled were eligible for the diagnostic criteria related to obesity (BMI greater than 30.0). The capture of 44 patients from the clinic and in a short timeframe allowed the presumed projection that upon expansion to larger campuses there could be a multitude of patients who could be engaged and interested in enrollment.

Another outcome of this project was providing assistance in the creation of a tip sheet, drafted by the practice manager and her team at the pilot clinic to provide as a deliverable to each site. During the systemwide virtual program training there was a request from a provider for a refresher training tool to guide the providers how to use the program. Prior to systemwide launch, this was in draft form and being finalized by the practice manager to distribute to each clinic site upon expansion.

Four reports were requested and published with the assistance of the EMR analyst team. These reports will help teams track 1) patients eligible for enrollment into the RPM program, 2) patients enrolled in the program, their diagnoses for eligibility, and whether they were ordered Aspirin, 3) patients that were deferred from enrolling, and 4) patients where the enrollment alert was canceled.

After this project ended at the three-month mark, the program continued with the structures and processes put into place and were sustained and carried out by the trained staff.

Although this project did not capture the long-term outcomes of their later pregnancy and/or postpartum health status, it could be anticipated that based on this pilot that they may be more inclined to have positive outcomes.

The ultimate outcome was achieved: The processes and structures were streamlined with minimal defects to such that the RPM program was approved to roll out systemwide. The program has extended to each of the five prenatal clinics in the health care system.

Summary

This project focused on the implementation of the RPM program in a pilot setting to best understand and optimize the processes and structures to achieve the best possible outcomes for high-risk patients. This project revealed that high-risk patients could be identified, enrolled, and treated in a timely fashion using remote patient monitoring in a streamlined process with minimal defect.

One elevated blood pressure during pregnancy could be indicative of a prenatal hypertensive complication. A majority of preexisting literature details blood pressure RPM as it pertains to low-risk patients. Low-risk patients have no past issues or medical history that make them prone to developing preeclampsia. This project sought to determine the possibility of using RPM intended for those at high-risk for this condition. Patients could have just one, or multiple health conditions which categorize them as high-risk. They may suffer from elevated blood pressures, and at worst, fatality. If a provider determines their patient is high-risk and the patient agrees to enroll into the RPM program, the signs and symptoms of preeclampsia could be detected and treated promptly.

Future study is needed to determine the health outcomes of those enrolled high-risk patients who were at the nine-month mark and postpartum, and their satisfaction using the RPM program.

Conclusion

This quality improvement project facilitated transformation of processes and structures to potentially support healthier outcomes for pregnant women and their babies. It took extraordinary teamwork, collaboration, and leadership where open communication and psychologically safety promoted innovation and change. The pilot rollout was a three-month process of learning, preparation, and optimization with multiple enhancements.

Limitations of this project were the determination of long-term patient outcomes and patient insight, implementation team member attrition, and launch date extension due to legal contracts and redlines.

Recommendations

The piloted program launch facilitated learning in a small-scale arena. Recommendations were drawn and could be extended to other facilities that wish to roll out a blood pressure remote patient monitoring program.

The first recommendation is to formalize an implementation team of stakeholders that will be involved in the rollout process. Become familiar with their roles, conduct a psychologically safe environment, listen to each other's ideas, learn from each other, and have a leader that drives the team and purpose toward the common goal. Being on a diversified team of experts was key, and it was an honor to be a part of the group.

Furthermore, anticipate obstacles. When a facility adapts a RPM platform it is not one-size-fits-all. It was essential to have a pilot, listening to the providers, and understanding barriers

and concerns to remove unforeseen roadblocks. This interaction could prompt engagement of the clinic team and may increase their willingness to promote the program to their patients. Another benefit of establishing a formalized implementation team is to prepare for opportunities to enhance and customize provider workflows, should challenges arise.

Another recommendation is to leverage technology and innovation to its fullest. Communicate ideas to the EMR analysts and IT project managers. Collaborating with the EMR build analysts to design specific reports allowed the team to pull information in bulk to determine any gaps and identify opportunities quickly.

Additionally, the recommendation of integrating the virtual portal into the medical record could increase efficiency and streamline the nurse's workflow in the manual transfer of patient blood pressures. This could reduce nursing's workload and potentially increase their satisfaction with the program.

The System OB/GYN Chair had a recommendation to include aspirin in the order sets for those who enrolled, as that is the evidence-based preventative medication for preeclampsia. The Aspirin for Evidence-Based Preeclampsia Prevention trial showed that when pregnant women at high-risk for preeclampsia prior to sixteen weeks gestation were prescribed 150mg of aspirin, the incidence of the preterm condition decreased by 62 percent (Rolnik et al., 2020). Aspirin is the evidence-based medication for prevention and could possibly owe to the future health outcomes of those patients enrolled.

Another future recommendation for this study is to determine patient satisfaction via evaluation. During the time of this project there were not enough patients enrolled into the program to gather feedback from patients. There is intent to formalize a questionnaire in future

months in both Spanish and English languages to evaluate patient experience and whether they felt the program was valuable.

Another recommendation is related to elevated BMI as it pertains to preeclampsia. The initial patients enrolled into the program were eligible due to a BMI over 30.0. There may be future implications for preventative lifestyle habits in working with this subset population of maternal patients in optimizing their health and pregnancy in relation to hypertensive disease.

As risk for preeclampsia does not end upon the moment of delivery, another recommendation for consideration is the extension of remote blood pressure monitoring into the patient's postpartum phase.

The final recommendation is to ensure that the clinic providers impacted by the systemwide launch are knowledgeable of whom to contact in case there are further quality improvements they would like to make at their clinic. Providers at each site should be aware that their workflows may differ from that of the pilot clinic, and further customization could be necessary.

Sustainability

One of the foreseen challenges for this project was sustainability. The structures and processes in place could owe to the future viability of the RPM program. Providers have a role in offering the program, enrolling their patients, educating them as to the importance of blood pressure monitoring remotely, and addressing compliance. Patients have a role in seeing value in the program, engaging, taking their blood pressures as instructed, and adhering to taking their aspirin as prescribed by their provider. The practice managers at the clinic sites have a role by monitoring use of the program and orienting new team members to the steps involved in the established workflow. As per recommendation, each clinic site's team members should be aware

of a contact in which to reach out to for any questions, concerns, or comments to further improve processes and structures. Furthermore, SMM could be tracked and evaluated to determine whether severe preeclampsia and eclampsia rates decreased at each site in the healthcare system, owing to the program's impact in quality and patient safety outcomes over time.

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Appendix A

Appendix A: IRB Exemption Acknowledgment

From: IRB.exemptions <IRB.exemptions@atlantichealth.org>
Sent: Tuesday, June 01, 2021 2:47 PM
To: Geron, Laura <Laura.Geron@atlantichealth.org>
Subject: RE: HRP-216 form
Sensitivity: Confidential

This serves as an acknowledgement that your submission was received and that based on your determination, IRB approval is not required.

Should you require IRB review and approval, please submit a full application to the IRB. For more information about the IRB review and submission process, please contact Anita Richards, MAS, CIP at (973) 660-3128.

Appendix B

Appendix B: ACOG Risk Factors for Preeclampsia

Box 1.

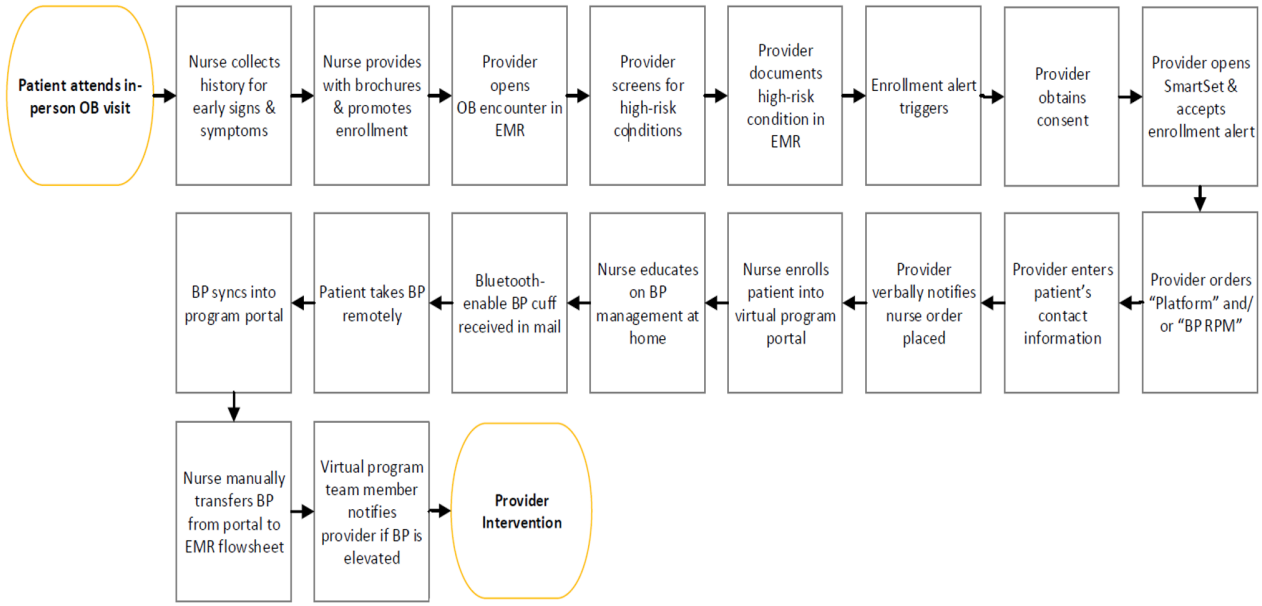
Risk Factors for Preeclampsia

Nulliparity
Multifetal gestations
Preeclampsia in a previous pregnancy
Chronic hypertension
Pregestational diabetes
Gestational diabetes
Thrombophilia
Systemic lupus erythematosus
Prepregnancy body mass index greater than 30
Antiphospholipid antibody syndrome
Maternal age 35 years or older
Kidney disease
Assisted reproductive technology
Obstructive sleep apnea

Note: Adapted from https://journals.lww.com/greenjournal/Fulltext/2020/06000/Gestational_Hypertension_and_Preeclampsia__ACOG.46.aspx. Copyright 2020 by The American College of Obstetrics and Gynecologists.

Appendix C

Appendix C: Pilot Clinic Workflow



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