

Heart Safe Motherhood at Penn Medicine (University of Pennsylvania Health System)

Website: <https://healthcareinnovation.upenn.edu/projects/heart-safe-motherhood>

Preeclampsia is a disorder of pregnancy characterized by high blood pressure and high levels of protein in the urine. Hypertension is the leading cause of maternal morbidity and mortality in the U.S., and while risk factors are known, previously no strategy existed for effective, reliable blood pressure surveillance for at-risk patients. With poor maternal outcomes on the rise in Philadelphia and across the country and new guidelines on postpartum care issued by the American College of Obstetricians and Gynecologists this spring, there is a clear call to action and an audience eager for a solution.

A Penn Medicine team, led by providers and researchers in Maternal Fetal Medicine, has designed a common-sense approach to care that answers an important challenge. Their solution, Heart Safe Motherhood (HSM), is an evidence-based care model with real-world data that's bolstering the promise of connected health, and by its focus on convenient care for women, speaks to the growing attention being paid to women as a vital demographic in the dual eras of population health and health care consumerism.

At the start of the HSM project, blood pressure monitoring required patients to attend a one-time, in-person appointment. However, professional association guidelines published by ACOG in 2014 recommended two points of monitoring: 72 hours and seven to ten days post-discharge.

As part of the project, the team developed and tested a text-based intervention for hypertension. They enrolled patients in a remote blood pressure monitoring program during the first seven days post-discharge from the Labor and Delivery floor at HUP.

Over the course of seven iterative pilots, over 30 patients were discharged with digital blood pressure monitors and sent reminders via text message to check their blood pressure twice daily. Once submitted by the patient, blood pressure results were reviewed and responded to by an Ob/Gyn physician.

After the conclusion of the pilot, the team received funding from the Penn PCORI Grant and Penn Presbyterian Harrison Fund to conduct a randomized controlled trial of the intervention. The team was recognized for their leadership with a first prize award in the American Heart Association's Philadelphia Heart Science Forum Innovation Challenge, Digital Health Category, and first place in the Council on Patient Safety in Women's Health National Improvement Challenge on Hypertension in Pregnancy.

Heart Safe Motherhood continues to make postpartum remote blood pressure monitoring easy so that providers can catch rising blood pressure earlier and keep patients safe at home.

Our journey to spread Heart Safe Motherhood has just begun. Heart Safe Motherhood can become a national model for reducing the burden of preeclampsia on maternal morbidity and mortality. Through text message-based remote monitoring, we have transformed our ability at one hospital to provide high quality, convenient, and safe care for women with pregnancy-related hypertension in the immediate postpartum period. We have developed knowledge about how to identify and enroll patients for engagement and how to capture and act on blood pressure remotely for clinical impact, providing the right care to the right patient at the right time. We have learned to think outside conventional medicine

and listen to our patients. In fact, the American College of Obstetrics and Gynecology recently acknowledged our work in their May, 2018 Committee Opinion on Redefining the postpartum visit.

Through Heart Safe Motherhood, we can transform our ability to monitor hypertension remotely. The Heart Safe Motherhood program allows us to provide patient-centered postpartum care for women with preeclampsia who are at risk of devastating complications while simultaneously engaging them in their future health.

Program Results:

Nine months ago, the team implemented Heart Safe Motherhood for patients with known pregnancy-related hypertension at the Hospital of the University of Pennsylvania. Since then, they have been able to obtain blood pressures remotely at the two time points recommended by ACOG in 80 percent of patients, intervene and start medications from home before development of morbidity, and continue to have strong patient and provider satisfaction. The team's readmission rate has dropped from 5 percent for postpartum patients monitored for hypertensive issues prior to Heart Safe Motherhood to 1 percent with the program at scale. Hypertension is no longer the leading cause of seven-day obstetrical readmissions at the Hospital of the University of Pennsylvania.

Additional proof points and tangible results include:

- Results of the pilot program showed there were no seven-day readmissions among enrolled patients, compared to a 5 percent readmission rate among women monitored through in-person visits. The percent of patients to report at least one blood pressure reading in the first week post-discharge jumped from 15 percent pre-intervention to 84 percent among all enrolled patients.
- The percent of patients to report blood pressure readings on five of seven days in the first week post-discharge jumped from 0 percent pre-intervention to 69 percent among all enrolled patients.
- At the conclusion of the RCT, the team saw the platform's ability to meet ACOG guidelines on postpartum blood monitoring leap from 0 percent to 82 percent compared to in-person office visits and seven-day readmissions from hypertension drop from 3 percent to 0 percent.

Heart Safe Motherhood is now the standard of care for obstetrics patients at HUP with plans to scale to other Penn Medicine locations in 2018. The team is also partnering with health systems, payers, and vendors to evaluate the ability to scale the program for national impact.