

**Mayo Clinic OB Nest:
A New Prenatal Care Model**



Summary

Prenatal care is one of the key preventive health services utilized globally, yet there is large variation in the number and content of care. In the United States, the standards for prenatal care, as set by the American College of Obstetricians and Gynecologists (ACOG), involves 12 to 14 office visits during an uncomplicated pregnancy. These office visits can cause significant disruption to the expectant mother due to missed work, childcare arrangements, and transportation issues. These visits focus on identifying specific medical risks or conditions, providing interventions if needed, and reassuring patients that their pregnancy is indeed normal. In addition, this model of prenatal care is very resource-intensive, involving both nursing support and physician or midwifery services. Alternative models of prenatal care include Centering, a group-based prenatal care model focused on low-risk patients requiring additional sources of social and educational support and more recently, a variety of remote prenatal care, focused on decreasing the number of clinic appointments. Recognizing the lack of evidence in support of newer models of prenatal care, and the potential to create a novel model that more efficiently utilized existing technologies drove the exploration of alternatives for OB care delivery at Mayo Clinic.

Seeking to create a safe, more effective, and patient-driven model for prenatal care, the Division of Obstetrics partnered with the Center for Innovation at Mayo Clinic and the Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery at Mayo Clinic to create OB Nest. The OB Nest pilot study provided 150 women with low-risk pregnancies the option of reducing the number of in-person

appointments by leveraging tools to monitor their pregnancies at home, simultaneously providing them with access to on-demand medical care or advice.

Instead of the traditional 12-14 office visits, OB Nest participants were scheduled for only eight visits, with six scheduled nurse check-ins via phone or through an online forum. Women used the Mayo Clinic's patient portal to text questions or concerns outside of their scheduled check-ins and they could customize how they wanted their care provider to respond, via text, a phone call at a specific time, or an audio memo. Each expectant mother was also provided with a fetal Doppler and blood pressure cuff, and were asked to regularly send fetal heart tones and blood pressure readings to their care team.

When compared to 150 low-risk patients receiving traditional prenatal care, participants in the OB Nest program reported higher satisfaction with their prenatal care, reporting a score of 95 compared to a score of 78 in the traditional care model. The expectant mothers also reported a decrease in pregnancy-related stress in their daily lives. OB Nest further resulted in women reporting feeling more informed about their pregnancy and more empowered to make decisions about their care, compared to traditional OB medical care, with the crucial pivot anchored in each woman's ability to answer for themselves, at any time of the day, the fundamental question, "is my baby OK?"

Context

Mayo Clinic is a non-profit, multi-specialty academic medical center headquartered in Rochester, MN. that has an organizational focus on patient-centered care and health care innovation. The OB Nest project is the result of a collaboration between the Mayo Clinic Division of Obstetrics, Center for Innovation, and the Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery. The Division of Obstetrics includes a team of physicians, certified nurse midwives, nurse specialists, registered dietitians, social workers and perinatal educators who can respond to expectant mothers' health care needs. The Division of Obstetrics provides comprehensive care to mothers, including prenatal care, labor and delivery, perinatal education classes, and breast-feeding support. The Center for Innovation provides design support for interventions through consumer research and prototype testing, and the Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery provides implementation and research support for the Mayo community at large. The Mayo Clinic provided financial support throughout the OB Nest pilot implementation.

The widely-practiced American College of Obstetricians and Gynecologists (ACOG) prenatal care model offers limited opportunities for patient engagement, and there is limited evidence to support the ACOG prenatal care schedule for women with low-risk pregnancies. The ACOG prenatal care schedule is a medicalized model of care that includes 12 to 14 visits focused on identifying specific medical risks (e.g. hypertensive disorders, diabetes, etc.) and then providing care interventions as appropriate. Under the traditional care model, interactions between the patient and care team occur primarily during

Description

the medical appointment, and information is more likely to flow from provider to patient (e.g., provider informs expectant mother of all monitoring results). The visit schedule can also be perceived as burdensome by expectant mothers who must expend professional leave or plan for travel or child care.

Previous studies have demonstrated the safety and effectiveness of reduced prenatal care schedules in terms of maternal and fetal outcomes; however, the impacts of reduced care schedules on patient satisfaction were mixed. Although expectant mothers appreciated the flexibility of reduced prenatal care schedules, some participants reported that they wanted: 1) more time to talk at visits and to feel like their comments and concerns are heard; 2) to develop meaningful, trusting relationships with their care providers; and 3) to become more active participants in their care.

The goal of OB Nest was to redefine prenatal care from a medicalized model to a patient-centered model, which focuses on the needs of the expectant mother and facilitates a trusting patient-provider relationship. The OB Nest model reduces the number of in-person visits to the clinic, while providing additional communication opportunities and safety nets if an expectant mother requires immediate access to the care team.

The pilot study of OB Nest included women who were age 18 to 36 years of age, in their first trimester of pregnancy, and documented as

low-risk without a concurrent medical or obstetric complication. Key components of the OB Nest model include:

- **Reduced visit schedule:** Eight planned, in-person visits with a physician or certified nurse midwife, plus six connected care visits via phone or online portal with a nurse. Patients or providers may request additional office visits to monitor any maternal or fetal concerns. Laboratory and imaging tests occur on the same schedule as usual care. Although the visit schedule was reduced, all ACOG guidelines for care (e.g., standard ultrasound requirements, vaccinations) remained part of the OB Nest model of care.
- **Asynchronous communication:** Expectant mothers could communicate questions or concerns to the care team outside of the in-person visits via the patient portal or telephone call. A member of the nursing staff was the primary recipient of the messages. If the question was within the nurse's scope of practice, she would respond directly to the mother, and if not, the nurse would assign the task to a physician. Responses to questions varied in complexity and length; therefore, the communication system provided three methods for response: 1) schedule a call; 2) record an audio memo; and 3) write a text. The asynchronous communication system was integrated with the electronic health record for documentation purposes.
- **In-home monitoring:** Expectant mothers were provided with a fetal Doppler and a blood pressure cuff, and were asked to send OB Nest staff their fetal heart tones, and maternal blood pressure.

Impact

- **Online care community:** Expectant mothers were invited to participate in online communities that were moderated by a trained obstetric nurse. Online communities provided a forum for medical and non-medical conversations related to pregnancy, childbirth, and raising children.
- **Proactive calling:** The OB Nest nurses call patients after unplanned events like triage visits, and during the post-partum period to check on their needs and wellbeing.

An evaluation of the OB Nest pilot program among 300 expectant mothers showed improved satisfaction with care (OB Nest Satisfaction score=95% vs Usual Care Satisfaction score=78%; $P<.0001$) and decreased pregnancy-related stress (OB Nest =1.33 vs Usual Care=1.42; $P<.02$).¹ Researchers found no differences in maternal or fetal outcomes or perceived quality of care. First-time mothers and multiparous women reported similar experiences. Factors potentially contributing to these results are described below.

- **Patients were more informed about their pregnancy and, thus, more empowered to have detailed discussions with care team.** Expectant mothers were provided with tools, such as in-home monitors, the asynchronous communication opportunities, and online communities, to learn about their pregnancies and gather routine information between appointments. Thus, women were more prepared to participate in conversations and shared decision making with their providers. Also, because some basic questions

¹ Butler Tobah, YS, LeBlanc, A, Branda M, et al. (2016) OB Nest – A Novel Approach to Prenatal Care. *Obstetrics and Gynecology*. 127(5 Supplement), 7S-8S.

could be answered outside of appointments, more appointment time was available to focus on the patients' more complex questions and needs.

- **Asynchronous communication and in-home monitoring helped reduce expectant mothers' anxiety between appointments.** A common question during pregnancy is, "Is my baby ok?" and OB Nest provided two opportunities that allowed women to get an answer to this question between appointments. The asynchronous communication allowed mothers to document and communicate their concerns at any time of day. Mothers reported feeling comfortable and secure knowing that a primary responder from her care team would reply within a predictable and reliable amount of time. In-home monitoring provided additional reassurance that the fetus heartbeat was normal. Expectant parents who had experienced a previous miscarriage reported appreciation of these tools.
- **In-home monitoring and online care communities provided opportunities to share the joy of pregnancy with family, friends, and other expectant mothers.** In-home monitoring was the most popular component of the OB Nest intervention because it allowed expectant mothers to engage family and friends in the prenatal experience. For example, monitoring the fetal heart rate could be an after-dinner event with the family rather than at a medical appointment with only the expectant parents present. Other OB Nest participants reported that, because of taking their own measurements, they had more information to share with their loved ones on a regular basis. In addition, online communities

Lessons Learned

provided mothers with an opportunity to share happy anecdotes with their peers.

- **The reduced visit schedule allowed mothers to prioritize their time, including their professional leave.** For women with low-risk pregnancies, attendance at medical appointments may be frustrating because they must manage logistics (e.g., arrange child care, take time off work, travel to the medical office), only to have the physician confirm something she already knows – that the pregnancy continues to be low-risk. The reduced visit schedule allows women to save precious time and professional leave that could be used after the baby arrives. OB Nest leadership report that newly expectant mothers have heard about the potential time-savings from OB by word-of-mouth and have requested to participate in the program.

Throughout the OB Nest program, the team has captured a series of lessons and tips they offer to others working on similar programs:

- **Usage of the asynchronous communication is facilitated by the reliability of care team responses.** Expectant mothers reported feeling more comfortable and secure knowing they had a consistent member of the care team designated as their primary responder. Furthermore, mothers were more likely to use the app if they received a response within a reliable period.
- **Set clear expectations when training expectant mothers to conduct in-home monitoring, provide context on interpreting results, and provide easily accessible support.**

Without a clear understanding of how to interpret the measures, the home monitoring process could potentially cause anxiety rather than reassurance; therefore, the OB Nest team sought to provide robust support around in-home monitoring. For example, fetal heart rate can sometimes be difficult to detect. The OB Nest team noted this in educational materials and provided ad hoc support for mothers seeking more information. The OB Nest team also provided mothers with information on the normal range for fetal heart rate and blood pressure to help them interpret their results and empower them to manage their health.

- **Establish equipment management tools and processes for the in-home monitoring interventions.** In-home monitoring requires the purchase and maintenance of a large volume of equipment. Key questions for implementers to consider include: 1) Where will the equipment be stored?; 2) How will we keep track of the inventory?; and 3) How will we manage the technical support process?

Bobbie Gastout, MD, Vice President of Mayo Clinic, and **Abimbola Famuyide, MD**, Chair of the Obstetrics and Gynecology Department, were the initial innovators, along with several other physicians and team members from both the Center for Innovation at Mayo Clinic and the Center for the Science of Health Care Delivery.

Yvonne Butler Tobah, MD, Lead Clinical Physician



Yvonne S. Butler Tobah, M.D., is a practicing obstetrician-gynecologist at Mayo Clinic in Rochester, Minnesota. Dr. Butler Tobah is board certified by the American Board of Obstetrics and Gynecology and is a Fellow with the American College of Obstetricians and Gynecologists. Her interests include the

provision of health care in low-resource settings and specialized prenatal care for intermediate- to high-risk pregnancies.

Dr. Butler Tobah received her medical degree from the Michigan State University College of Human Medicine in 2007. She completed her residency in obstetrics and gynecology and was named Chief Resident at Henry Ford Health System in Detroit, Michigan in 2011. She has also worked to provide high-quality prenatal care as part of global health programs, including a post-doctoral fellowship - International Women's Health & Clinical Epidemiology in Lusaka, Zambia and two years providing obstetrics and gynecology care for women while developing the first OB/GYN postgraduate training program in Liberia.

Annie LeBlanc, Ph.D, Lead Implementation Researcher



Dr LeBlanc, former researcher at the Robert D. and Patricia E. Kern Center for the Science of Health Care Delivery, is Associate Professor in the Department of Family Medicine and Emergency Medicine, Faculty of Medicine at Laval University, QC (Canada), and Investigator at Laval University's Institute of Health and Social Services in Primary Care, QC (Canada) and the Knowledge and Evaluation Research Unit at Mayo Clinic, MN (USA). Dr LeBlanc is the Co-director of the Implementation Research, Knowledge Translation, and Health Systems Research Core of the Quebec branch of the Canadian Institute of Health Research's Strategy for Patient-Oriented Research - Support for People and Patient-Oriented Research and Trials (SPOR-SUPPORT) Unit. Dr. LeBlanc's research centers around the translation of comparative effectiveness research into practice through the design, evaluation, implementation, and sustainability of patient-centered interventions, such as shared decision making, and their impact on patient important outcomes. Of importance to the success of this work, is the engagement of stakeholders throughout each stages of the work to insure that the research processes and outcomes are focused on what really matters to patients and other stakeholders.