Current Commentary

Rapid Deployment of a Drive-Through Prenatal Care Model in Response to the Coronavirus Disease 2019 (COVID-19) Pandemic

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Coronavirus disease 2019 (COVID-19) has been declared a public health emergency for the entire United States. Providing access to prenatal health care while limiting exposure of both obstetric health care professionals and patients to COVID-19 is challenging. Although reductions in the frequency of prenatal visits and implementation of telehealth interventions provide some options, there still remains a need for patient–health care professional visits. A drive-through prenatal care model was developed in which pregnant women would remain in their automobiles while being assessed by the health care professional, thus reducing potential patient, health care professional, and staff exposure to COVID-19. Drive-through prenatal visits would include key elements that some institutions cannot perform by tele-health encounters, such as blood pressure measurements for evaluation for hypertensive disorders of pregnancy, fetal heart rate assessment, and selected ultrasound-based measurements or observations, as well as face-to-face patient–health care professional interaction, thereby reducing patient anxiety resulting from the reduction in the number of planned clinic visits with an obstetric health care professional as well as fear of virus exposure in the clinic setting. We describe the rapid development of a drive-through prenatal care model that is projected to reduce the number of in-person clinic visits by 33% per patient compared with the traditional prenatal care paradigm, using equipment and supplies that most obstetric clinics in the United States can access.

(Obstet Gynecol 2020;136:1–4)
DOI: 10.1097/AOG.0000000000003923

Coronavirus disease 2019 (COVID-19) is currently a worldwide pandemic, with the United States reporting the highest number of confirmed cases in the world.1 Access to appropriate health care has been beset with unprecedented challenges in accommodating the additional need to minimize the risk of COVID-19 exposure. Complementary prenatal care–delivery methods have been proposed to control the proliferation of COVID-19 infections among patients, health care professionals, and staff.2 With the current pandemic, a number of proposals aimed at reducing the number of person-to-person contacts with the traditional prenatal care model have been put forth.3 Although telehealth interventions may provide some reduction in the number of person-to-person visits, these interactions can be limited by patients’ lacking access to a reliable internet signal, blood pressure monitoring or fetal heart rate measurement devices, or all of these. A small proportion of in-person visits are still necessary, more commonly in the third trimester of pregnancy, which have the potential for multiple person-to-person interactions and contact with fomites that may increase the risk of virus transmission.4 Mobile health clinics are
a model of health care delivery that have been shown to be effectively used in emergency situations when traditional health care is disrupted. This template has been shown to help not only with offering urgent care, but also with providing preventative health screenings. Our objective is to describe the development of a drive-through prenatal care clinic that allows pregnant patients to have as close to a typical outpatient “prenatal visit” as possible while remaining in their automobiles to reduce potential patient, health care professional, and staff exposure to COVID-19.

**STRATEGIC PLANNING**

On March 20, 2020, faculty in the Department of Obstetrics and Gynecology at the Baylor College of Medicine in Houston, Texas, began designing alternative options for the delivery of prenatal care in anticipation of increasing numbers of COVID-19 infections. Prenatal care at our institution is performed in outpatient clinics located in the Texas Children’s Hospital Pavilion for Women, a maternal level of care 4 facility that had 6,500 deliveries in 2019. Strategic planning was begun with representatives from physician and nursing leadership, hospital administration, and the operational-hospital logistic team. In addition to the modification of the spacing of prenatal visits and an increase in the capacity of our current telemedicine capability, a proposal for drive-through prenatal visits was investigated. Within 7 days, a drive-through model was established. First, potential physical locations for drive-through prenatal care were explored. An existing emergency department ambulance drive-through bay was identified as an optimal location owing to easy access for automobile traffic, patient privacy, low noise level, available electrical power outlets, internet access for mobile computers with the Health Insurance Portability and Accountability Act–compliant electronic medical record, and protection from the elements. Space was available for a temporary tent with air-conditioning capability if necessary for staff. Clinic schedules were designed to allow automobiles to arrive at 10-minute intervals, with up to three automobiles being in the queue at once. Staffing would be provided by one obstetric health care professional and one medical assistant with planned direct patient contact and one registered nurse and one ambulatory service representative for care coordination, order entry, and appointment scheduling. A workflow algorithm was created (Fig. 1). Twenty-four hours before patients’ scheduled appointments, they would be screened for symptoms of COVID-19 infection, with verbal consent obtained for testing and treatment if not obtained previously.

Patients would be asked to arrive suitably dressed to allow easy access to their abdomens for physical examination. On arrival for their appointments, patients would be screened for potential of COVID-19 infection by telephone. Asymptomatic patients who screen positive at that time would have a nasopharyngeal swab performed by an appropriately protected team member and asked to self-quarantine until the result was available. Symptomatic patients with symptoms suggesting requirement for admission would be directed to park their automobiles and then escorted to a testing location within the hospital and examined to determine need for admission.

Patients who screen negative would be “arrived” in the electronic medical record. A medical assistant and a health care professional (each wearing a surgical mask and using gloves) would approach the patient, who would stay in the car. Maternal temperature and blood pressure and fetal heart tones would be measured. If deemed necessary, a handheld ultrasound probe connected to a smart phone could be used to evaluate fetal heart tones, maximum vertical pocket of amniotic fluid, or fetal presentation. Common questions asked during routine prenatal visits would be addressed (eg, presence of fetal movement, signs and symptoms of preeclampsia, contractions, loss of amniotic fluid). A mobile workstation on wheels with a laptop would be available to document the encounter in the electronic prenatal medical record. Care coordination, referrals, orders, and follow-up appointments would be performed by the registered nurse and ambulatory service representative in an adjacent service bay to minimize face-to-face contact. The patient would then drive out of the visit (Fig. 1). To expedite the model development, the plan was to not perform phlebotomy service to streamline times and supplies used.
in the drive-through visit, nor to administer immunizations owing to the requirement for refrigeration to store vaccines. If any situation were encountered (such as elevated maternal blood pressure) that required further evaluation, the patient would be directed to park her vehicle and she would be escorted to the clinic or to the obstetric triage center for further evaluation.

Supplies necessary for these encounters are shown in Box 1. Traditional prenatal and postpartum care visits were evaluated, and an alternative pandemic schedule was created for patients during the course of the pregnancy (Table 1). A half-day simulation was undertaken to confirm workflow and staff requirements.

**STRENGTHS AND LIMITATIONS**

The concept of “drive-through” service is not a novel idea in many industries in the United States, such as the restaurant, banking, and grocery businesses. More recently, it has been implemented to provide mass screening for COVID-19 infection. Access to prenatal care requires reducing the health care professional’s and patient’s risk to COVID-19 exposure in conjunction with documenting key components that reduce maternal and fetal morbidity. Approaches to limiting the number of person-to-person prenatal visits and increasing the use of telehealth methodology have been suggested. By offering drive-through visits that include key elements that some institutions cannot perform by telehealth encounters, including blood pressure measurements for evaluation for hypertensive disorders of pregnancy, fetal heart rate assessment,

**Box 1. Drive-Through Prenatal Visit Equipment and Supplies**

**Facilities**
- Chairs (2)
- Tables (2)
- Hand washing stations with sanitizer on stand
- Trash can
- Privacy barrier (if needed)
- Spot cooler (if necessitated by weather)
- Signage (to direct vehicle traffic)

**Supplies**
- Personal protective equipment, available as needed and dictated by facility requirements
- Sanitizer wipes
- Ultrasound gel
- Emesis bags
- Tissues

**Equipment**
- Automated blood pressure machine with cuff
- Thermometer
- Fetal heart rate Doppler
- Handheld ultrasound probe (if available)
- Workstations on wheels with laptops (2)
- Wheelchair (as needed for emergencies)

**Table 1. Prenatal and Postpartum Care Visits**

| Visit Timing | Type of Visit | Ultrasound Examination | Comment |
|--------------|---------------|------------------------|---------|
| Gestational age (wk) | | | |
| 6–9 | In person | Viability ultrasound scan | Initial obstetric laboratory tests and physical examination |
| 12–14 | In person | Aneuploidy screening | Maternal serum alpha fetal protein |
| 16–18 | Telehealth | Anatomy ultrasound scan | 1-h GCT; anti-D immunoglobulin; vaccines; delivery consents |
| 20–22 | In person | | |
| 24–26 | Telehealth | | |
| 27–28 | In person | | |
| 30 | Telehealth | | |
| 32–34 | Drive through | | |
| 36 | In person | | |
| 37 | Drive through | | |
| 38 | Drive through | | |
| 39 | Drive through | | |
| 40 | In person | | |
| Postpartum | | | |
| 7–10 d | Drive through | | |
| 2 wk | Telehealth | | |
| 6 wk | Telehealth or in person | | |

GCT, glucose challenge test; GBS, Group B streptococcus; BP, blood pressure.
and selected ultrasound-based measurements or observations, as well as face-to-face patient–health care professional interaction, we may be able to reduce patient anxiety resulting from the reduction in the number of their planned clinic visits with an obstetric health care professional as well as fear of virus exposure in the clinic setting. Although one could have patients monitor their own blood pressure and fetal heart rate at home, supplies for home monitoring resources and ability to perform these procedures accurately may be limited, thus diminishing the feasibility of acquiring reliable home measurements.

We estimate that the current model will allow approximately 100 patient visits per week and reduce the number of in-person clinic visits by 33% per patient, compared with the traditional prenatal care paradigm. This will decrease contact with hospital personnel and minimize fomite-mediated virus transmission. Even with the implementation of pre-clinic visit COVID-19 screening methods, an asymptomatic individual who later tests positive for COVID-19 infection can enter a facility and inadvertently expose other individuals.9 Another potential benefit of this model is a reduction in the amount of personal protective equipment used in a clinic environment in institutions employing universal surgical mask use for both the health care professional and the patient during face-to-face interactions. In the drive-through prenatal care visits, the health care professional and medical assistant would be the only staff members wearing surgical masks and gloves. Patients would not be provided surgical masks because they are not entering the facility; however, it is recommended that patients wear cloth face coverings as suggested by the Centers for Disease Control and Prevention.10

Our model is, however, not without limitations. Vehicle-only options limit the program to only those with access to an automobile, excluding patients who rely on public transportation, although adaptation for “walk-up” patients could be put into practice. Additionally, not all institutions will have the physical layout to allow this concept to be operationalized. However, temporary structures, such as an outdoor commercial tent in a parking area, could be used. The generalizability (external validity) of our project may be restricted to a very specific population of health care professionals and patients. However, our model requires minimal additional resources that are typically available in most obstetric clinics across the United States, and it can be implemented in a very short period of time.

In conclusion, we suggest that, by using drive-through prenatal care visits, it is possible to reduce person-to-person interaction and contact with potential fomites, thus reducing the risk of COVID-19 infection while simultaneously providing needed prenatal care. Further research will be needed to determine the success of the implementation of our drive-through prenatal care model as well as patient satisfaction with the process; collection of outcomes data is presently ongoing.

REFERENCES
1. Worldometer. COVID-19 coronavirus pandemic: reported cases and deaths by country, territory, or conveyance. Available at: https://www.worldometers.info/coronavirus/#countries. Retrieved April 10, 2020.
2. American College of Obstetricians and Gynecologists. COVID-19 FAQs for obstetrician-gynecologists. Available at: https://www.acog.org/clinical-information/physician-faqs/covid-19-faqs-for-ob-gyns-obstetrics. Retrieved March 30, 2020.
3. Boelig RC, Saccoine G, Bellissi F, Berghella V. MFM guidance for COVID-19. Am J Obstet Gynecol MFM 2020 Mar 19 [Epub ahead of print].
4. Kraay ANM, Hayashi MAL, Hernandez-Ceron N, Spicknall IH, Eisenberg MC, Meza R, et al. Fomite-mediated transmission as a sufficient pathway: a comparative analysis across three viral pathogens. BMC Infect Dis 2018;18:540.
5. Yu SWY, Hill C, Ricks ML, Bennet J, Oriol NE. The scope and impact of mobile health clinics in the United States: a literature review. Int J Equity Health 2017;16:178.
6. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19): symptoms of coronavirus. Available at: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html. Retrieved March 30, 2020.
7. Hit MA, Ireland RD, Hoskisson RE. Strategic management cases. Competitiveness and globalization. 10th ed. Stamford, CT: South-Western Cengage Learning; 2012.
8. Kwon KT, Ko JH, Shin H, Sung M, Kim JY. Drive-through screening center for COVID-19: a safe and efficient screening system against massive community outbreak. J Korean Med Sci 2020;35:e123.
9. Breslin N, Baptiste C, Miller R, Fuchs K, Goffman D, Gyamfi-Bannerman C, et al. COVID-19 in pregnancy: early lessons. Am J Obstet Gynecol MFM 2020 Mar 27 [Epub ahead of print].
10. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19): how to protect yourself & others. Available at: https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html. Retrieved April 10, 2020.

PEER REVIEW HISTORY
Received March 31, 2020. Received in revised form April 10, 2020. Accepted April 15, 2020. Peer reviews and author correspondence are available at http://links.lww.com/AOG/B880.