and maternal (e.g., hypertensive disorders of pregnancy, cesarean) outcomes were assessed.

RESULTS: Study criteria was met by 415 patients. An inverse relationship between buprenorphine dose and the birthweight percentile was observed (r = -0.15, 95% CI, -0.25, -0.06). The birthweight percentile was 44.0%, 37.2%, and 29.2% for daily exposure to ≤8 mg, 9-16 mg, and >16 mg, respectively (p=< 0.01). FGR was identified in 73 (17.6%) pregnancies, of which 10 had severe FGR (2.4%). A subset of FGR pregnancies (n=54) received UAD measurements, of which 16 (29.6%) had UAD abnormalities: 15 (93.8%) had elevated systolic/diastolic flow and one had absent end diastolic flow. Delivery prior to 39 weeks was indicated secondary to FGR surveillance abnormalities in 19 (26.0%) pregnancies. Increasing buprenorphine dose was associated with increasing risk for NICU admission (17.0%, 25.0%, 33.5%, p=0.01) and cesarean delivery (22.7%, 33.3%, 37.4%, p=0.04). Other assessed outcomes were not affected by dose.

CONCLUSION: Increasing buprenorphine dose is associated with decreasing birthweight and increased risk for NICU admission and cesarean delivery. This is the first study to describe the rate of severe FGR and the type of umbilical artery Doppler abnormalities associated with buprenorphine. Pregnant patients taking buprenorphine require serial fetal growth assessment to detect FGR.

889 When the lights go down in the delivery room: lessons from a ransomware attack

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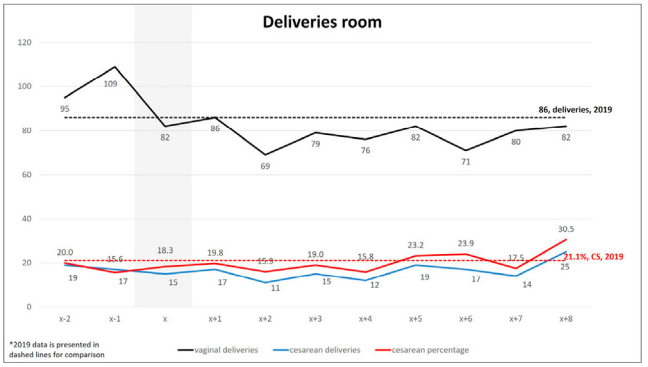
OBJECTIVE: To describe the challenges facing an obstetric division following a cyberattack that paralyzed all information technology systems including ADT (admission, discharge & transfer), EMR (electronic medical records), community patient health record (PHR) interface, radiology module, laboratories system, and employee communications network.

STUDY DESIGN: A retrospective descriptive study. Division activities, including the overall number of deliveries and cesarean sections (CS), emergency room visits, admissions, maternal-fetal medicine department occupancy, and ambulatory encounters, from two weeks prior to the attack to 8 weeks following it (a total of 11 weeks), were compared to the retrospective period in 2019 (before Covid-19). Also, we describe the challenges and the adaptations made at the hospital and division level until resuming full division activity.

RESULTS: On the day of the cyberattack, critical decisions were made. The media announced the event, calling patients not to arrive at our hospital. A senior obstetrician was stationed in the ER to ensure triage. All elective activities other than deliveries were stopped. For elective CS, risk stratification was done, and all potentially complicated surgeries (≥ 3 previous cesarean or high bleeding potential) were referred to other hospitals. For all medical encounters, formatted documents were created and kept for later archiving. Labs were done and delivered manually only when critical and blood product transfusions were decreased to a minimum. The number of deliveries, admissions, and both emergency room and ambulatory clinic visits decreased by 5-10% (overall for 11 weeks), reflecting the decrease in patient traffic. Nevertheless, in all stations, activities continued with ongoing adaptations to ensure patient safety, decision making, and workflow of patients.

CONCLUSION: Despite the obvious concerns, it is reasonable and safe to allow hospital activity even during cyberattacks. Healthcare systems at all levels should recognize the threat and have protocols for implementation once it occurs.



Service affected	Sequela	Adaptation
Obstetric emergency room (ER)	A gradual decrease in visit numbers	The media reported cyberattack calling patients to turn to other ERs; Ambulances referred patients to other ERs.
Elective procedures	All elective procedures (hospital-wide) were postponed	Risk stratification was done on all elective cesareans. Potentially complicated surgeries (≥ 3 previous cesareans or high bleeding potential) were referred to other hospitals.
Loss of electronic medical records (EMR)	No historical data on patients from outpatient clinics, or previous hospitalizations.	Within 2-3 days, a full set of word formatted documents were available for ER visits (admission or discharge), delivery room (including labor partogram, delivery/ cesarean report, newborn birth certificate, MFM admission and discharge letters, delivery ward discharge letter)
Labs	No previous or current laboratory results were available for patients in the ER or admitted.	Only critical labs were done. Tubes were tagged using handwritten stickers and were sent manually to the laboratory. Results were first reported on the phone and within a few days were printed and delivered manually to the sending department.
Blood bank services	No historical data on the blood type of recurring patients. Risk of mislabeling patient blood type with increased risk of compromise to patient safety.	Blood product transfusions were decreased to a minimum. Cases at high risk for needing blood products were referred to other hospitals. Extra caution was implemented in rare cases when blood product transfusion was needed.
Imaging	No remote access available, no historical images available	Selected imaging was done. Images were photographed using smartphones for radiological assessment.
Decision-making	Change in policies for sending labs, imaging, and /or admission	Senior physicians or senior residents were placed to allow for better triage, deferring unneeded tests and preferring ambulatory care, whenever is possible. Complicated cases (with potential risk for complications that will require complicated surgery (≥ previous 3 cesareans) or blood-product transfusion (Previa/ accrete) were deferred to other medical centers. Admission was selected for low-risk patients that could not be discharged (cervical shortening, preeclampsia without severe features, etc.)
Fetal heart rate (FHR) monitoring system	The centralized FHR monitoring system was not available.	Midwives, nurses, and physicians were instructed to enter every delivery room and sign the monitor every 20 minutes. Monitor devices were designed to operate at the highest volume.
Elective cesarean sections		Elective cesareans were allowed after risk management and case selection.
Newborn identification	No digital authentication or digital birth certificates	Was done with double verification by two midwives, written manually on stickers and tagged to newborns and mothers
High-risk pregnancy clinics	The scheduled patient's list was not available. No history or previous encounter data.	Patients were treated based on "whoever arrives". Following encounters, patients were triaged: "uncomplicated" cases were referred to other clinics. Patients were encouraged to bring hard copies of their medical records.
Archiving data	No data archiving. All data were manually written on paper.	All data was assembled in the patient's binders. The first page included the order of papers from the admission letter, diagnosis list, follow-up, labs, fetal heart monitoring, etc. Every paper included a place for the date and hour and the physician's signature

890 Body mass index and persistent hypertension in patients with hypertension disorders of pregnancy one-year postpartum

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OBJECTIVE: To determine the association between body mass index (BMI) and persistent hypertension one-year postpartum following pregnancies complicated by hypertensive disorders of pregnancy (HDP).

STUDY DESIGN: This was a retrospective cohort study of patients with HDP (defined as gestational hypertension or preeclampsia) in a

single US Midwestern academic institution from 2014 to 2018. The primary outcome was persistent hypertension at one-year postpartum, defined as systolic blood pressure (BP) ≥130 mm Hg or diastolic BP ≥80 mm Hg. Both categorical BMI (model 1) (normal, overweight, and obese) and continuous BMI (model 2) were examined as predictor variables. Descriptive statistics and logistic and linear regression analyses were run for categorical and continuous BMI respectively. Odds ratios (OR) and 95% confidence intervals (CI) were reported.

RESULTS: Out of 564 patients with HDP included in this analysis, 271 (48.1%) had persistent hypertension at one-year postpartum. Median [interquartile range (IQR)] one-year postpartum BMI was 28.3 [17.2-43.9] kg/m^2. Prevalence of persistent hypertension at one-year postpartum following HDP was higher in overweight and obese groups compared to normal weight group (Table). In multivariable logistic regression (model 1), presence of obesity (BMI≥30 kg/m^2) at one-year postpartum, compared to normal BMI category, was associated with 85% higher likelihood of persistent hypertension following HDP (OR 1.85, 95%CI 1.10-3.11). In model 2, looking at BMI as a continuous predictor variable for persistent hypertension postpartum, each unit increase in postpartum BMI was associated with 6% higher likelihood of hypertension at one-year postpartum (OR 1.06, 95%CI 1.03-1.11).

CONCLUSION: We found that BMI≥ 30 kg/m^2 at one-year postpartum following HDP was associated with 85% higher risk of persistent hypertension compared to a normal BMI. We identified a modifiable risk factor that can be targeted in future interventions designed to reduce cardiovascular disease risk following hypertensive pregnancies.

Table. Association between body mass index at one-year postpartum and persistent hypertension in patients with hypertension disorders of pregnancy one-year postpartum.

	Normal weight BMI= 18.5 - 24.9 kg/m² (N=168)	Overweight BMI=25.0 - 29.9 kg/m² (N=172)	Obese BMI≥30.0 kg/m² (N=212)	p-value
One-year postpartum hypertension				
No	101 (60.1)	91 (52.9)	90 (42.4)	0.002
Yes	67 (39.9)	81 (47.1)	122 (57.6)	
Median [Interquartile range (IQR)] systolic, mm Hg	118 (110, 128)	120 (110, 130)	122 (114, 129.5)	0.043
Median (IQR) diastolic, mm Hg	74 (66, 82)	76.5 (70, 82)	80 (72, 84)	0.002
Model 1				
One-year postpartum BMI (Categorical)				
Unadjusted odds ratio (OR) (95% CI)	Ref	1.33 (0.86-2.07)	**2.17 (1.43-3.29)**	<0.01
Adjusted OR (95% CI)	Ref	1.23 (0.72-2.12)	**1.85 (1.10-3.11)**	0.020
Model 2				
One-year postpartum BMI (Continuous)				
Unadjusted OR (95% CI)		**1.08 (1.04-1.11)**		<0.001
Adjusted OR (95% CI)		**1.06 (1.03-1.11)**		0.002

Models 1 and 2 were adjusted for type of disease (preeclampsia with or without severe features), maternal age, marital status, insurance type, parity, and gestational age at delivery

891 Drivers and deterrents of COVID-19 vaccination among a diverse, pregnant population with and without HIV

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OBJECTIVE: Vaccination for SARS-CoV-2 during pregnancy is safe, effective, and beneficial, yet uptake among pregnant people living with HIV (PLHIV) and pregnant HIV-seronegative individuals remains suboptimal, particularly among minority individuals. The objective was to understand perspectives of racial and ethnic minority pregnant PLHIV and pregnant HIV-seronegative individuals regarding receiving the COVID-19 vaccine.

STUDY DESIGN: In this qualitative investigation, a semi-structured interview guide was used to conduct in-depth interviews with pregnant (>28 weeks of gestation) or postpartum (< 6 months) PLHIV and HIV-seronegative individuals. Purposive sampling was conducted to recruit individuals with a range of vaccination experiences and to include diversity in pregnant vs. postpartum status, race/ethnicity, and insurance. Interviews addressed perspectives on receiving the COVID-19 vaccine during pregnancy, including drivers and deterrents of vaccination. Interviews were analyzed using the constant comparative method.

RESULTS: Of 33 individuals (15 PLHIV, 18 HIV-seronegative), the majority identified as non-Hispanic Black (70%) or Hispanic (27%) and 73% had received the COVID-19 vaccine. Analysis identified drivers and deterrents to vaccine uptake that were both pregnancy-specific and non-specific. Drivers included consistency in antenatal care providers, desire to protect the fetus or self, and trust in medical care providers (Table, Fig). Additional drivers for PLHIV included perceptions of increased vulnerability to COVID-19. Several themes were identified as both drivers and deterrents of vaccination (Fig), including media portrayals of COVID-19 during pregnancy and personal experiences of COVID-19. In contrast, deterrents included inconsistency in medical providers and fear of side effects.

CONCLUSION: Our analysis suggests that drivers of COVID-19 vaccination for pregnant people from minority backgrounds are similar regardless of HIV status. Public health efforts to improve vaccine uptake in pregnancy should include PLHIV and partner with clinicians for consistent and thorough vaccine messaging.

Table. Themes and subthemes addressing drivers of COVID-19 vaccination during pregnancy

Theme	Exemplary quotation
PREGNANCY SPECIFIC DRIVERS	
Consistency in antenatal care providers	I've always trusted them. This is not my only pregnancy going there...they're a really great team and every concern, every question I have, they're always there for me, so I feel like I would always go with them for any question I have.
Protection for fetus	So you don't have to shoot the baby itself you can give it to me and my body will give it to the baby. So that's the advantage of any vaccine and it's great for protecting your baby without actually having to give it to them. You can give it to me and I can protect them.
Enhanced vulnerability in pregnancy*	Well I feel like for both it helps for both [before and after pregnancy], but mainly during pregnancy because I didn't know at that time but the immune system goes down, way less, and it's like we can't even take anything during pregnancy...But as far as like sickness, we can't really take anything for it, which is why I was like trying to be precautious about like getting COVID.
Fear-based counseling*	For me it was an eye opener when I went to triage and they're like we have four girls upstairs pregnant on oxygen and they're not vaccinated and my vitals were good, my pulse was good. So I feel like if they don't want to go through that, if they're already dealing with so much, why would you want to go through all these extra symptoms? Just get the vaccine and get it over with.
Vaccine opinions of support people*	[My mom] actually talked to me about [COVID vaccine in pregnancy]. I didn't want to do the vaccine for COVID because of the reasons like they just came out with it. I didn't know how effective it was. So she was explaining to me because she's fully vaccinated, so it kinda made me feel better...it made me actually feel better even though the doctors told me.
Media portrayals of COVID during pregnancy*	I got the vaccine because of my son, and I was freaking out about COVID...I made sure, because you know you're watching TV and all you see is unvaccinated, unvaccinated people are at higher risk and they die and then you become pregnant and boom, everybody is pregnant that's dying unvaccinated. It's very depressing to watch, so you're safer than sorry.
PREGNANCY NON-SPECIFIC DRIVERS	
Trust in medical providers	I just believed in my doctors because knowing, trusting them the first time without having knowledge why not trust them this one again. So that trust that I had with them made me take it. Otherwise I wouldn't have taken it but the trust itself.... I believe they're there for the best interest of us.
Protection for self	Once I experienced that COVID was real, then I was like okay, I need to get vaccinated as soon as possible because I don't want to experience that again.
Anxiety during the pandemic*	[The COVID vaccine] does help a lot and especially with any anxiety or any worries for any COVID that's going on it is way better to get the vaccine than to actually get the COVID because with COVID it's just not really great even though I didn't have a really bad experience but it can cause, even if I did get it the second time without being vaccinated, it could have gotten way worse.
COVID diagnosis and experiences of social network*	So basically my whole family is vaccinated now but my mom, when she first got COVID she was terrible. We had to care for her but now she just got diagnosed with COVID and she's okay. I feel like the vaccine helped a lot.
Waiting for the "right time"*	I felt that it was time for me to get it.
Personal COVID diagnosis*	Yeah, they had introduced [the COVID vaccine] from the beginning and like I said I didn't want to get it until I got sick [with COVID] in August and then like I said I was super super super sick and I just was like you know as soon as I'm able to get it, I'm gonna get it because I don't feel this is compared to other people that have the vaccine.
HIV SPECIFIC DRIVERS	
Increased vulnerability to COVID	I just always get the vaccines. And then just knowing that HIV does affect your immune system, I just think it's good to get all the vaccines and be up to date with shots and stuff like that so you won't get sick or be too sick, stuff like that.

* Indicates themes that exist on a spectrum in which they can be either drivers or deterrents towards receiving the COVID-19 vaccine. Quotations shown are for examples in which this concept serves as a driver.