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W: [www.midirs.org](http://www.midirs.org)

## Search Pack P200 (2022) Coronavirus (COVID-19) in pregnancy (2022)


Updated 8 April 2022

Records on coronavirus (COVID-19) in pregnancy from 2022 only. For earlier records on this topic see P200 (2020) and P200 (2021). Includes choice and accessibility of maternal health services. Does not include records on COVID-19 vaccination in pregnancy (P201); COVID-19 in the neonate or infant feeding during the pandemic (PN193); the impact of COVID-19 on midwives (M95); COVID-19 in labour, birth and the impact on intrapartum care (L69) or the impact of COVID-19 on postnatal health and care (PN194).


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## 2022-02132

**Evaluating depression and anxiety throughout pregnancy and after birth: impact of the COVID-19 pandemic.** Zhang CXW, Okeke JC, Levitan RD, et al (2022), American Journal of Obstetrics & Gynecology MFM 4 March 2022, online

### BACKGROUND

The COVID-19 pandemic presents unique social, economic, and psychological challenges for individuals globally. Thus, women who are pregnant face unprecedented mental health challenges.

### OBJECTIVE

We sought to determine the impact of the pandemic on perinatal depression and anxiety in a longitudinal pregnancy cohort. We hypothesized increased depression and anxiety scores in women during pregnancy and after birth in the pandemic at all time points.

### STUDY DESIGN

Participants were enrolled in the Ontario Birth Study, a pregnancy cohort embedded in clinical care at Mount Sinai Hospital, Toronto, Canada. Perinatal depression and anxiety were assessed using the 2-Item Patient Health Questionnaire and 2-Item Generalized Anxiety Disorder Questionnaire in early pregnancy, whereas the Edinburgh Postnatal Depression Scale and 2-Item Generalized Anxiety Disorder Questionnaire were used in late pregnancy and after birth. Logistic regression models were created to examine the association of the pandemic with clinically elevated mental health scores in the prepandemic group vs pandemic group while adjusting for covariates.

### RESULTS

A total of 1159 survey responses from 649 participants between March 1, 2019, and February 28, 2021, were used to conduct this study. Participants were assessed in early pregnancy (n=416), in late pregnancy (n=373), and after birth (n=370). Responses received on or before February 29, 2020, were considered the "prepandemic" responses, whereas responses after the aforementioned date were considered the "pandemic" responses. Mean rank scores of depression and anxiety were significantly higher in the pandemic group (P=.02 and P=.003, respectively) in the postpartum period. There was no significant association between pandemic time and antenatal scores. However, postnatally, mothers were 2.6 times more likely to score  $\geq 13$  on the Edinburgh Postnatal Depression Scale during the pandemic than before the pandemic (95% confidence interval, 1.2–5.7; P=.02). Adjustment for ethnicity and income strengthened this association as the odds ratio increased to 3.3 (95% confidence interval, 1.4–8.0; P=.007).

### CONCLUSION

Pandemic-associated increases in depression and anxiety scores were confined to the postpartum period, highlighting a need for increased screening and interventions for perinatal mood and anxiety disorders postnatally as this pandemic continues. (Author)

**Full URL:** <https://doi.org/10.1016/j.ajogmf.2022.100605>

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## 2022-02123

**The impact of the coronavirus pandemic curfew on the psychosocial lives of pregnant women in Jordan.** Qudsieh S, Mahfouz IA, Qudsieh H, et al (2022), Midwifery vol 109, June 2022, 103317

### Objectives

Worldwide the COVID-19 pandemic has negatively affected the health and psychosocial lives of people. International guidelines recommend special attention to pregnant women during pandemics and national emergencies. This study aimed to report the impact of the COVID-19 pandemic curfew on the psychosocial lives of pregnant women in Jordan.

### Design

A cross-sectional study was conducted and included women who were pregnant during the COVID-19 curfew in Jordan, which took place between mid-March and mid-June of 2020.

### Settings

A web-based survey that was posted on various social media platforms.

### Participants

Women who at the time of the study were 18 years of age or more, were living in Jordan, and were pregnant during the curfew.

### Measurements and findings

Data collected included women's characteristics, the impact of the curfew on the pregnancy, physical activity, and psychosocial lives and the barriers to seeking healthcare, in addition to pregnancy and delivery details, and changes in nutrition and supplements intake.

A total of 877 women responded to the survey. The results showed that 21.1% of the respondents did not receive any antenatal care (ANC) during the curfew. The respondents also reported that the main barriers for seeking ANC included healthcare facilities being closed (85.2%), the need for travel permits (76.8%), financial difficulties (63.9%), and fear of catching the COVID-19 virus (60.1%). Furthermore, 93.3% reported that they had psychological stress, and 29.9% reported that they had at least one form of domestic violence. Statistically significant associations existed between various women's characteristics, obstetric, psychosocial factors, and the level of psychological stress.

### Key conclusions

The COVID-19 pandemic curfew, which was applied in Jordan, resulted in a negative impact on the psychosocial lives of pregnant women. As a result, pregnant women did not receive optimal antenatal care and experienced higher degrees of psychological stress and domestic violence.

### Implications for practice

The findings of our study may encourage national healthcare policymakers to ensure the provision of appropriate psychosocial support of pregnant women during large scale emergencies. (Author)

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**2022-02118**

**'It's always hard being a mom, but the pandemic has made everything harder': A qualitative exploration of the experiences of perinatal women during the COVID-19 pandemic.** Kinser P, Jallo N, Moyer S, et al (2022), Midwifery vol 109, June 2022, 103313

#### Background

Understanding the psychosocial impacts of the COVID-19 pandemic in vulnerable groups, such as pregnant and parenting women, is a critical research and clinical imperative. Although many survey-based perinatal health studies have contributed important information about mental health, few have given full voice about the experiences of pregnant and postpartum women during the prolonged worldwide pandemic using a qualitative approach.

#### Objective

The purpose of this study is to explore the lived experience of pregnant and postpartum women in the United States during the ongoing COVID-19 pandemic.

#### Design

Qualitative phenomenological study.

#### Setting

This study was conducted in the community, by recruiting women throughout the U.S.

#### Participants

Fifty-four pregnant and postpartum women participated in qualitative interviews.

#### Methods

Data from one-on-one semi-structured interviews were analyzed using a team-based phenomenological qualitative approach.

#### Results

Two key themes were apparent: the pandemic has shined a light on the many typical struggles of motherhood; and, there is a lack of consistent, community-based or healthcare system resources available to address the complex needs of pregnant and postpartum women, both in general and during the pandemic.

#### Conclusions

Going forward, as the world continues to deal with the current pandemic and possible future global health crises, health care systems and providers are encouraged to consider the suggestions provided by these participants: talk early and often to women about mental health; help pregnant and postpartum women create and institute a personal plan for early support of their mental health needs and create an easily accessible mental health network; conceptualize practice methods that enhance coping and resilience; practice in community-based and interdisciplinary teams (e.g., midwives, doulas, perinatal social workers/ psychotherapists) to ensure continuity of care and to foster relationships between providers and pregnant/postpartum women; and consider learning from other countries' successful perinatal healthcare practices.

#### Registration

Number (& date of first recruitment): not applicable.

#### Tweetable abstract

Pregnant and postpartum women insist that mental health care must be overhauled, stating the pandemic has highlighted inherent cracks in the system. (Author)

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## 2022-02117

**Exploring lived experiences of informal caregivers for pregnant women seeking scheduled antenatal care during the COVID-19 lockdown in China: A phenomenological study.** Zuo Y, Luo B-R, Wang L-N, et al (2022), Midwifery vol 109, June 2022, 103316

### Objective

We aimed to explore the lived experiences of informal caregivers for pregnant women seeking scheduled antenatal care during the early stage of China's COVID-19 lockdown and potential measures to address the challenges.

### Design

This is a phenomenological qualitative study.

### Setting

The study was carried out in a leading teaching hospital in Southwest China.

### Participants

We recruited 15 informal caregivers for healthy pregnant women on routine antenatal visits about six months after China launched the city-wide lockdown and other control measures for COVID-19, including 10 males and 5 females with diverse demographic backgrounds.

### Measures and findings

The research team developed a demographic form and an interview outline with key questions, conducted semi-structured interviews with the informal caregivers, and analyzed the data using the Colazzie's method. Five themes of lived experiences were revealed, i.e., increased caregiving burdens, disruption of routines in family life, lack of accurate information and knowledge, active role adjustment, and positive attitudes and coping in a difficult time. Some caregivers reacted positively to the lockdown experience and saw it as an opportunity to rethink their lives and improve family relations.

### Key conclusions

The informal caregivers experienced increased physical and psychological burdens. Strategies such as adoption of a less frequent prenatal visit schedule, use of tele-medicine technologies, and provision of accurate information and knowledge may help to ease the increased informal caregiving burdens. Psychological counseling, community services and disaster response policies specially targeting pregnant women and their informal caregivers may also be valuable resources.

### Implications for practice

Attention should be drawn to the group of informal caregivers for pregnant women during a COVID-19 lockdown, including professional assistance delivered by nursing and other related professionals. Measures are called for to minimize exposure opportunities such as adoption of a new prenatal care schedule and tele-medicine technologies. Patient education with reliable information should be provided, preferably by nursing staff and physicians. Social support efforts including professional mental counseling may added and work with other resources such as community services and policy makers. (Author)

**2022-02095**

**Influence of the COVID-19 outbreak on transportation of pregnant women in an emergency medical service system:**

**Population-based, ORION registry.** Ota K, Nishioka D, Katayama Y, et al (2022), International Journal of Gynecology & Obstetrics 5 February 2022, online

**Background**

The coronavirus disease 2019 (COVID-19), caused by Severe Acute Respiratory Syndrome Coronavirus 2, has spread rapidly across the world.

**Objective**

To assess the influence of the COVID-19 pandemic on the emergency medical service (EMS) for transportation of pregnant women by ambulance.

**Methods**

This study was a retrospective, descriptive study using the Osaka Emergency Information Research Intelligent Operation Network system, and included pregnant women transported by ambulance in Osaka Prefecture between January 1, 2018 and December 31, 2020. The main outcome of the study was difficulty in obtaining hospital acceptance for transfer of patients (difficult-to-transfer cases). We calculated the rates of difficult-to-transfer cases using univariate and multivariate analyses.

**Results**

Of the 1 346 457 total patients transported to hospitals by ambulance in Osaka Prefecture during the study period, pregnant women accounted for 2586 (909, 943, and 734, in 2018, 2019, and 2020, respectively). Logistic regression analysis revealed that pregnant women were negatively associated with difficult-to-transfer cases (adjusted OR 0.36, 95% CI 0.26–0.50). Compared with 2018, 2020 was significantly associated with difficult-to-transfer cases (adjusted OR 1.27, 95% CI 1.24–1.30).

**Conclusion**

Pregnant women were consistently associated with reduced odds for being difficult-to-transfer cases. The COVID-19 pandemic might have influenced difficult-to-transfer cases in 2020. (Author)

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## 2022-02092

**Establishing communication with relatives of admitted obstetrical patients with COVID-19 infection during COVID-19 pandemic: A quality improvement initiative.** Rana A, Sharma KA, Kulshrestha S, et al (2022), International Journal of Gynecology & Obstetrics 6 February 2022, online

### Objectives

To establish communication with relatives of obstetrical patients with coronavirus disease 2019 (COVID-19) admitted to an isolation ward by systematic use of quality improvement tools during the COVID-19 pandemic as there were many challenges in communicating with relatives.

### Methods

The study was conducted in the Department of Obstetrics and Gynecology at a tertiary-care teaching hospital based on four systematic steps of Point of Care Improvement methodology. After identifying the problem, a quality improvement team was constituted, which formed a specific aim. After root-cause analysis with fishbone tool, three Plan-Do-Study-Act (PDSA) cycles with various interventions were planned.

### Results

The outcome was measured as percentage of relatives of obstetrical patients admitted to the hospital with COVID-19 who were counseled about vital patient-related information. The baseline percentage of counseling of relatives of COVID-19-positive obstetrical patients admitted to the hospital was 14% per day. After three PDSA cycles, the target of 66.5% was achieved.

### Conclusion

Communication with the relatives of COVID-19-positive obstetrical patients admitted to isolation wards in the hospital could be easily streamlined without any additional resources using the principles of quality improvement during the COVID-19 pandemic.

### Synopsis

Synopsis The contents of this page will be used as part of issue TOC only. It will not be published as part of main article.

This quality improvement project establishes that communication with the relatives of isolated COVID-19-positive obstetrical patients could be easily streamlined without any additional resources. (Author)

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## 2022-02087

**Teenage motherhood in Africa: The epidemic in the COVID-19 pandemic.** Molek K, Bellizzi S (2022), International Journal of Gynecology & Obstetrics 15 February 2022, online

Efforts are urgently needed to increase access to sexual education and contraception, which has been proven to be effective in other contexts during the COVID-19 pandemic. (Author)

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## 2022-02081

**Maternal and neonatal outcomes of COVID-19 co-infection in pregnant women with chronic hepatitis B virus infection: A prospective cohort study.** Rajan M, Sachan S, Abhinay A, et al (2022), International Journal of Gynecology & Obstetrics 25 February 2022, online

Co-infection with COVID-19 in pregnant women with pre-existing HBV infection led to a higher proportion of preterm deliveries and lower mean birth weight. (Author)

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**2022-02002**

**Telehealth multidisciplinary prenatal consultation during the COVID-19 pandemic: enhancing patient care coordination while maintaining high provider satisfaction.** Hargis-Villanueva A, Lai K, van Leeuwen KM, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine 25 March 2022, online

#### Objective

Comprehensive fetal care centers address congenital anomalies by developing pre- and post-natal care plans in a multidisciplinary format. To reduce exposure during the Coronavirus Infectious Disease-2019 (COVID-19) pandemic, the Centers for Medicare & Medicaid Services (CMS) broadened access to telehealth services. We assessed provider satisfaction with the rapid transition from in-person prenatal visits to multidisciplinary consultations via telehealth as an adaptive response to the pandemic.

#### Methods

Patients referred to an urban academic fetal care center during the first 6 weeks of the COVID-19 pandemic underwent advanced imaging including fetal MRI, focused ultrasound, and fetal echocardiography. Subsequently, multidisciplinary telehealth consultations occurred with all providers attending virtually. Patients were given the option of attending the multidisciplinary telehealth consultation in a conference room in the hospital or from home. During these meetings, relevant images were reviewed with all participants via screen sharing through a secure video platform. Provider satisfaction with the telehealth paradigm was assessed using an electronic survey.

#### Results

Twenty-two surveys were administered with a response rate of 82%. 89% of providers were highly satisfied with the telehealth format. 72% of providers would prefer the multidisciplinary telehealth format to an in-person visit for future visits after COVID-19 restrictions are lifted. 22% of providers would leave the choice to the patient's family. One provider preferred in-person visits. Some providers noted that virtual conferences limited the ability to draw pictures, show educational materials, and provide emotional support.

#### Conclusion

Providers were overwhelmingly supportive of continuing multidisciplinary telehealth conferences for complex prenatal consultations, even after restrictions are lifted, which has led to the continuation of this model for the duration of the pandemic. Providers highlighted the convenience and improved care coordination across specialties. Further studies to examine the patient experience with virtual consultations are warranted. (Author)

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**2022-01974**

**Health disparities, COVID-19, and maternal and childbirth outcomes: a meta-epidemiological study of equity reporting in systematic reviews.** Hartwell M, Lin V, Gatewood AC, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine 13 March 2022, online

#### Background

Pregnant women with COVID-19 are at increased risk for adverse maternal and pregnancy outcomes, and birth complications. Given the health outcome disparities among pregnant women of racial and ethnic minorities and the reliance of medical practice on systematic reviews and meta-analyses (SRMAs)—as they are the apical component in the hierarchy of evidence in medical research—the primary objective of the study is to examine the inclusion of the equity reporting in SRMAs focused on pregnancy outcomes and COVID-19 using PROGRESS-Plus equity framework. PROGRESS represents equity measures of Place, Race, Occupation, Gender, Religion, Education, Social capital, and Socio-economic status.

#### Methods

We conducted a systematic search of three databases to identify SRMAs related to maternal and pregnancy outcomes related to COVID-19. We extracted whether SRMAs reported or analyzed PROGRESS-Plus components among other study characteristics.

#### Results

Nearly 85% of SRMAs did not include any equity items to account for racial or geographic disparities. Reporting of race was absent from 95% of the studies. Place was the most common PROGRESS item and maternal age was the most common PROGRESS-Plus item reported overall.

#### Conclusion

When research is performed and reported in a way that fails to address disparities, the downstream repercussions may include medical care in the form of new protocol-driven hospital management, pharmacologic interventions, and other treatment options that mirror this absence in reporting. The absence of adequate reporting widens gaps in health outcomes among at-risk groups, such as pregnant women of racial and ethnic minorities. (Author)

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## 2022-01964

**Obstetric and perinatal outcomes of pregnancies with COVID 19: a systematic review and meta-analysis.** Pérez-López FR, Savirón-Cornudella R, Chedraui P, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine 13 March 2022, online

### Objective

This meta-analysis aimed at comparing obstetric and perinatal outcomes in laboratory-tested pregnant women for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection before delivering.

### Method

We performed a comprehensive systematic review of electronic databases for studies reporting pregnant women with and without SARS-CoV-2 infection, as determined by polymerase chain reaction (PCR) before delivery, during the pandemic period published up to June 25, 2021. Results are reported as mean difference (MD) or odds ratio (OR) and their 95% confidence interval (CI).

### Results

Seventeen observational studies with low to moderate risk of bias, reported on 2,769 pregnant women with a positive SARS-CoV-2 PCR test and 13,807 with a negative test. Pregnant women with a positive PCR test delivered at an earlier gestational age (MD -0.19; 95% CI -0.36 to -0.02 weeks), smoked less (OR 0.75; 95% CI 0.61–0.94) and were associated with higher odds for preeclampsia (OR 1.30; 95% CI 1.09–1.54), NICU admissions (OR 2.37; 95% CI 1.18–4.76), stillbirths (OR 2.70; 95% CI, 1.38–5.29), and perinatal mortality (OR 3.23; 95% CI 1.23–8.52). There were no significant differences between positive and negative tested women in terms of nulliparity, multiple pregnancies, gestational diabetes, route of delivery, labor induction, preterm birth, infant birth weight, 5 min Apgar scores < 7, small-for-gestational-age infants and fetal malformations. Eleven studies included neonatal PCR SARS-CoV-2 testing which was performed on 129 infants, of which 20 were positive.

### Conclusion

Positive SARS-CoV-2 tested pregnant women had higher odds for preeclampsia/hypertensive disorders of pregnancy, NICU admissions, stillbirths and perinatal mortality. (Author)

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## 2022-01961

**Antenatal classes [written answer].** Scottish Parliament (2022), Official Report Written question S6W-07397, 17 March 2022

Maree Todd responds to a written question asked by Monica Lennon to the Scottish Government regarding which NHS boards are currently providing in-person antenatal classes. This question is asked further to answer S6W-06381 by Hamza Yousaf on 2 March 2022. (LDO)

**Full URL:** <https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-07397>

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## 2022-01937

**Antenatal classes [written answer].** Scottish Parliament (2022), Official Report Written question S6W-07219, 10 March 2022

Humza Yousaf responds to a written question asked by Monica Lennon to the Scottish Government regarding the date by which face-to-face antenatal classes that are run by NHS Scotland will resume, in light of the reported resumption of private classes. (MB)

**Full URL:** <https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-07219>

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## 2022-01936

**Antenatal classes [written answer].** Scottish Parliament (2022), Official Report Written question S6W-07397, 17 March 2022  
Maree Todd responds to a written question asked by Monica Lennon to the Scottish Government further to the answer to question S6W-06381 by Humza Yousaf on 2 March 2022, regarding which NHS boards are currently providing in-person antenatal classes. (MB)

**Full URL:** <https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-07397>

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## 2022-01925

**SARS-CoV-2 Placentitis and Intraparenchymal Thrombohematomas Among COVID-19 Infections in Pregnancy.** Huynh A, Sehn JK, Goldfarb IT, et al (2022), JAMA Network Open vol 5, no 3, March 2022, e225345

This cases series examines SARS-CoV-2 placentitis and intraparenchymal thrombohematomas among COVID-19 infections during pregnancy. (Author)

**Full URL:** <https://doi.org/10.1001/jamanetworkopen.2022.5345>

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## 2022-01923

**COVID-19 Cases and Disease Severity in Pregnancy and Neonatal Positivity Associated With Delta (B.1.617.2) and Omicron (B.1.1.529) Variant Predominance.** Adhikari EH, Macdonald L, SoRelle JA, et al (2022), JAMA (Journal of the American Medical Association) 24 March 2022, online

This study examines infections, illness severity, vaccinations, and early neonatal infections among obstetric patients during the pre-Delta, Delta, and Omicron periods of the COVID-19 pandemic. (Author)

**Full URL:** <https://doi.org/10.1001/jama.2022.4356>

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## 2022-01705

**Knowledge, attitude and practices of pregnant women related to COVID-19 infection: A cross-sectional survey in seven countries from the Global Network for Women's and Children's Health.** Naqvi F, Naqvi S, Billah SM, et al (2022), BJOG: An International Journal of Obstetrics and Gynaecology 14 February 2022, online

### Objective

We sought to understand knowledge, attitudes and practices (KAP) regarding COVID-19 in pregnant women in seven low and middle-income countries (LMIC).

### Design

Population-based prospective, observational study.

### Settings

Study sites in DRC, Kenya, Zambia, Bangladesh, India (two sites), Pakistan and Guatemala.

### Population and sample

Pregnant women in the Global Network's Maternal and Neonatal Health Registry (MNHR).

### Methods

A KAP questionnaire was administered in face-to-face interviews with pregnant women from September 2020 through October 2021 in the MNHR.

### Main outcome measures

KAP regarding COVID-19 during pregnancy.

### Results

In all, 25 260 women completed the survey. Overall, 56.8% of women named  $\geq 3$  COVID-19 symptoms, 34.3% knew  $\geq 2$  transmission modes, 51.3% knew  $\geq 3$  preventive measures and 79.7% named at least one high-risk condition. Due to COVID-19 exposure concerns, 23.8% had avoided prenatal care and 7.5% planned to avoid hospital delivery. Over half the women in the Guatemalan site and 40% in the Pakistan site reduced care seeking due to COVID-19 exposure concerns. Of the women, 24.0% were afraid of getting COVID-19 from healthcare providers. Overall, 63.3% reported wearing a mask and 29.1% planned to stay at home to reduce COVID-19 exposure risk.

### Conclusions

We found a decrease in planned antenatal and delivery care use due to COVID-19 concerns. The clinical implications of potential decreases in care are unclear, but decline in essential healthcare utilisation during pregnancy and delivery could pose challenges for maternal and newborn health. More research is needed to address the impact of COVID-19 on routine pregnancy and delivery care. (Author)

**Full URL:** <https://doi.org/10.1111/1471-0528.17122>

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**2022-01578**

**Management and implications of severe COVID-19 in pregnancy in the UK: data from the UK Obstetric Surveillance System national cohort.** Vousden N, Ramakrishnan R, Bunch K, et al (2022), *Acta Obstetrica et Gynecologica Scandinavica* vol 101, no 4, April 2022, pp 461-470

#### Introduction

There is a lack of population level data on risk factors and impact of severe COVID-19 in pregnancy. The aims of this study were to determine the characteristics, and maternal and perinatal outcomes associated with severe COVID-19 in pregnancy compared with those with mild and moderate COVID-19 and to explore the impact of timing of birth.

#### Material and methods

This was a secondary analysis of a national, prospective cohort study. All pregnant women admitted to hospital in the UK with symptomatic SARS-CoV-2 from March 1, 2020 to October 31, 2021 were included. The severity of maternal infection (need for high flow or invasive ventilation, intensive care admission or died), pregnancy and perinatal outcomes, and the impact of timing of birth were analyzed using multivariable logistic regression.

#### Results

Of 4436 pregnant women, 13.9% (n = 616) had severe infection. Women with severe infection were more likely to be aged  $\geq 30$  years (adjusted odds ratio [aOR] aged 30–39 1.48, 95% confidence interval [CI] 1.20–1.83), be overweight or obese (aOR 1.73, 95% CI 1.34–2.25 and aOR 2.52 95% CI 1.97–3.23, respectively), be of mixed ethnicity (aOR 1.93, 95% CI 1.17–3.21) or have gestational diabetes (aOR 1.43, 95% CI 1.09–1.87) compared with those with mild or moderate infection. Women with severe infection were more likely to have a pre-labor cesarean birth (aOR 8.84, 95% CI 6.61–11.83), a very or extreme preterm birth (28–31+ weeks' gestation, aOR 18.97, 95% CI 7.78–14.85; <28 weeks' gestation, aOR 12.35, 95% CI 6.34–24.05) and their babies were more likely to be stillborn (aOR 2.51, 95% CI 1.35–4.66) or admitted to a neonatal unit (aOR 11.61, 95% CI 9.28–14.52). Of 112 women with severe infection who were discharged and gave birth at a later admission, the majority gave birth  $\geq 36$  weeks (85.7%), noting that three women in this group (2.7%) had a stillbirth.

#### Conclusions

Severe COVID-19 in pregnancy increases the risk of adverse outcomes. Information to promote uptake of vaccination should specifically target those at greatest risk of severe outcomes. Decisions about timing of birth should be informed by multidisciplinary team discussion; however, our data suggest that women with severe infection who do not require early delivery have mostly good outcomes but that those with severe infection at term may warrant rapid delivery. (Author)

**Full URL:** <https://doi.org/10.1111/aogs.14329>

**2022-01480**

**Adverse Effects of COVID-19 on Perinatal Outcomes Globally.** Callister LC (2022), *MCN - American Journal of Maternal/Child Nursing* vol 47, no 2, March/April 2022, p 110

The COVID-19 pandemic has adversely affected outcomes for childbearing women and their babies around the globe, especially in low resource, low-to-middle income countries. Our global health and nursing expert, Dr. Callister, reviews some of the most recently published articles on the impact of COVID-19 on this vulnerable population. (Author)

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## 2022-01460

**Changes in rates of adverse pregnancy outcomes during the COVID-19 pandemic: a cross-sectional study in the United States, 2019–2020.** Simeone RM, Downing KF, Wallace B, et al (2022), *Journal of Perinatology* 15 February 2022, online

### Objective

Our objective was to assess differences in pregnancy outcomes during the COVID-19 pandemic compared to the previous year.

### Study design

In a cross-sectional study of delivery hospitalizations in the Premier Healthcare Database Special COVID-19 Release, we assessed differences in selected maternal and pregnancy outcomes occurring April–December in 2019 and 2020 in the United States.

### Result

Among 663,620 deliveries occurring in 2019 and 614,093 deliveries occurring in 2020, we observed an increase in in-hospital maternal death from 2019 to 2020, which was no longer statistically significant after excluding deliveries with a COVID-19 diagnosis. Intensive care unit admission and preterm birth decreased from 2019 to 2020. There was no difference in the prevalence of most other outcomes examined.

### Conclusion

The full impact of the COVID-19 pandemic on maternal and pregnancy outcomes remains to be understood. Most outcomes investigated experienced minimal change from 2019 to 2020. (Author)

Full URL: <https://doi.org/10.1038/s41372-022-01327-3>

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## 2022-01385

**A Mixed-Methods Study of Experiences During Pregnancy Among Black Women During the COVID-19 Pandemic.**

Dove-Medows E, Davis J, McCracken L, et al (2022), *The Journal of Perinatal and Neonatal Nursing* 9 February 2022, online

Pregnant women experienced disruptions in their prenatal care during the coronavirus disease-2019 (COVID-19) pandemic. While there is emerging research about the impact of COVID-19 on experiences of pregnancy, the majority of studies that have reported on prenatal care and birth during COVID-19 have not incorporated the first-person accounts of Black women. The purpose of this mixed-methods study was to explore the perspectives of Black women on prenatal care, labor, and birth during the pandemic. A total of 33 participants completed questionnaires. Fourteen of these 33 women and an additional 2 participated in qualitative interviews. Descriptive statistics and a mixed-methods analysis were employed. Participants expressed disappointment about disruptions in their experiences of pregnancy including the way their prenatal care was experienced, cancellation of planned “rites of passage,” and visitor policy restrictions during and after the birth. Forty-five percent of participants reported being worried about getting COVID-19 and (61%) about their infant getting COVID-19. Many participants experienced a sense of loss that may permeate through other aspects of their lives. Providing extra support and points of contact can help lessen feelings of isolation during the pandemic and can also offer more explanation for rapidly changing policies and procedures. (Author)

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**2022-01352**

**Tailoring the response to COVID-19: experiences of an inner city maternity unit with a virtual patient surveillance approach.**

Elsmore A, Redjepova O, Wright J, et al (2022), Journal of Obstetrics and Gynaecology 18 February 2022, online

This study outlines the characteristics and outcomes of pregnant women with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). We present the success of our 'COVID Surveillance Team' – a dedicated team of midwives and medics that regularly contact patients, identifying early any need for escalation of care. Data were collected prospectively from March to September 2020. Patients are followed up by our team for 14 days following diagnosis, via telephone. Maternal and neonatal outcomes were studied. Fifty-five women were diagnosed with COVID-19. 39/55 (70.9%) were of BAME background. 10/55 (18%) had medical comorbidities. 35/55 (63.6%) were diagnosed in the 3rd trimester, 7/55 (12.7%) were postnatal. Three women (5.4%) required critical care unit admission. One was transferred to a tertiary centre for extra-corporeal membrane oxygenation (ECMO), one patient died. Of the 43 deliveries, 28 (65.1%) underwent caesarean section. 11/45 (24.4%) of babies were born preterm. Eight babies were tested for COVID-19, one was positive. Our study demonstrates most pregnant women suffer mild illness, with no adverse outcomes for mother or neonate. We highlight the success of our COVID surveillance team, that should be considered best practice and consideration should be given for adoption by other maternity units to enhance patient safety.

**Impact Statement**

What is already known on this subject? Many studies present maternal and neonatal characteristics and outcomes of COVID-19 infection in the pregnant population, demonstrating most patients suffer mild disease with minimal adverse outcomes.

What do the results of this study add? We highlight the important work of our COVID surveillance team, and the positive impact it has had on the wellbeing and safety of our women. We believe we are the first maternity unit in the UK to adopt and report on a virtual patient surveillance approach supporting our patients and leading to increased patient safety.

What are the implications of these findings for clinical practice and/or further research? Our surveillance team has proved very successful and has been described as exemplar by NHS England and promoted as best practice. This approach could be adopted by other units, within the UK and further afield, for the benefit of women's health and safety. The team has shared their guidance and standard operating procedure with maternity units across the UK. (Author)

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**2022-01298**

**Indonesian midwives' perspectives on changes in the provision of maternity care during the COVID-19 pandemic: A qualitative study.** Hazfiarini A, Zahroh RI, Akter S, et al (2022), *Midwifery* 26 February 2022, online, 103291

Objective

To explore how COVID-19 influenced the provision of high-quality maternity care in Indonesia.

Design and methods

A qualitative descriptive study using in-depth interviews was undertaken. Thematic analysis was used to analyse data, and behaviour change frameworks (Theoretical Domain Framework (TDF) and Capability, Opportunity, and Motivation (COM-B)) were used to identify and map facilitators and barriers influencing maternity care provision during the COVID-19 pandemic.

Setting and participants

Fifteen midwives working in community maternity care facilities in Surabaya and Mataram, Indonesia were included. Surabaya is in western Indonesia, with around 56,000 births per year and a population of around 3 million. Mataram is in eastern Indonesia, with around 7,000 births per year and a population of around 500,000.

Findings

The main changes to maternity care provision during the COVID-19 pandemic were reduced frequency of antenatal and postpartum care visits, reduced support for women, including unavailability of maternity care and reduced number of antenatal care and labour companions, changes in location of provision of care, and public health changes related to COVID-19. The main factors influencing the provision of high-quality maternity care during the COVID-19 pandemic were behavioural regulation, professional role and identity, and environmental context and resources.

Key conclusions and implications for practice

Maternity care provision underwent substantial changes during the COVID-19 pandemic in Indonesia. Findings from this study can contribute to better understanding of how maternity care provision changed during the pandemic, and how positive changes can be reinforced, and negative changes can be addressed. (Author)

Full URL: <https://doi.org/10.1016/j.midw.2022.103291>

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**2022-01284**

**Increasing oxygen requirements and disease severity in pregnant individuals with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) Delta variant.** Eid J, Abdelwahab M, Caplan M, et al (2022), *American Journal of Obstetrics & Gynecology* MFM 10 March 2022, online. 100612

Correspondence piece aiming to determine whether the Delta variant of SARS-CoV-2 is associated with increased oxygen requirement and disease severity among pregnant women. Results suggest that patients with the Delta variant were more likely to require oxygen supplementation, have more severe disease and require admission to the intensive care unit. (LDO)

Full URL: <https://doi.org/10.1016/j.ajogmf.2022.100612>

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**2022-01276**

**Pregnancy: Employment [written answer].** House of Commons (2022), Hansard Written question 117055, 2 February 2022

María Caulfield responds to a written question from Annelise Dodds to the Secretary of State for Health and Social Care, regarding whether his Department intends to publish guidance for (a) employers and (b) pregnant workers on new and expectant mothers in the workplace during covid-19. (MB)

Full URL: <https://questions-statements.parliament.uk/written-questions/detail/2022-02-02/117055>

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**2022-01259**

**Influence of the COVID-19 pandemic on abortions and births in Sweden: a mixed-methods study.** Rydelius J, Edalat M, Nyman V, et al (2022), *BMJ Open* vol 12, no 2, February 2022, e054076

Introduction Although considered an essential service by the WHO, there are indications that access to induced abortion care has been restricted during the COVID-19 pandemic.

Objectives To investigate if the number of induced abortions and ongoing pregnancies changed during the first pandemic wave of COVID-19 in 2020 compared with recent years prior to the pandemic and explore possible reasons for the findings.

Design Convergent parallel mixed-methods design. Collection of quantitative data from the Swedish National Board of Health and Welfare and the Swedish Pregnancy Register, and qualitative data from interviews.

Setting and time period National data on abortions (January 2018–June 2020) and births (January 2018–March 2021). Interviews performed at the main abortion clinic, Gothenburg, Sweden, in June 2020.

Participants All women aged 15–44 years living in Sweden 2018–2020, approximately 1.9 million. 15 women who sought abortion were interviewed.

Primary and secondary outcome measures Number of abortions and births/1000 women aged 15–44 years. Themes and subthemes identified from interviews.

Results The number of abortions and ongoing pregnancies did not change significantly during the study period compared with before the pandemic started. Interview themes identified were the following: meeting with abortion care during the COVID-19 pandemic (availability, and fear of being infected and infecting others); and the impact of the COVID-19 pandemic on the abortion decision (to catch COVID-19 during pregnancy, feelings of loneliness and isolation, and social aspects).

Conclusions This study shows that the number of abortions and ongoing pregnancies remained unchanged during the first wave of the COVID-19 pandemic in 2020 in Sweden compared with before the start of the pandemic. Abortion-seeking women did not hesitate to proceed with the abortion. The women expressed a number of fears concerning both availability of care and their health, which could have been properly addressed by the authorities. (Author)

**Full URL:** <http://dx.doi.org/10.1136/bmjopen-2021-054076>

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## 2022-01142

**Impacts and effects of COVID-19 infection in pregnancy.** Sunder A, Varghese B, Darwish B, et al (2022), Saudi Medical Journal vol 43, no 1, January 2022, pp 67-74

Objectives: To explore the trimester wise significance of the primary outcome in pregnant women during coronavirus disease-19 (COVID-19) pandemic.

Methods: Retrospective observational study of pregnant women who were infected with COVID-19 from April 2020 until March 2021 at Bahrain Defense Force Hospital, Riffa, Bahrain. The study focused on the effects in relation to gestational age (GA), association with variables, severity, and treatment. A p-value of  $\leq 0.05$  was considered significant.

Results: During the study period, 74 COVID-19 cases were identified from the recorded 2944 pregnant women. The mean GA at diagnosis was  $33.5 \pm 12.2$  weeks, and the mean GA at birth was  $38.4 \pm 1.8$  weeks. Analysis of the obstetric complications revealed fetal growth restriction (FGR) had a p-value of  $< 0.001$ . According to the trimester wise analysis, between the gestational period at diagnosis and the outcome of pregnancy, significant p-value of  $< 0.01$  was found in miscarriage. There were no significant associations found in GA at diagnosis and delivery, complications in relation to maternal age and body mass index, and no maternal morbidities or mortalities.

Conclusion: In our study, FGR and miscarriage were the identified complications. However, the maternal and neonatal end result of COVID-19 was satisfactory. (Author)

Full URL: <https://doi.org/10.15537/smj.2022.43.1.20210694>

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## 2022-01110

**Home use of both pills for early medical abortion (EMA) up to 10 weeks gestation: summary of consultation responses.**

Department of Health and Social Care (2022), 10 March 2022

Presents the outcome of a consultation to ascertain opinion on whether to make permanent a temporary approval put in place by the Government during the coronavirus pandemic, to return to the pre-pandemic arrangements, or to extend the temporary approval by 12 months. The temporary approval allowed women in England to take both pills for an early medical abortion (EMA) in their own homes, up to 10 weeks' gestation, following a consultation with a clinician via the telephone or online, without the need to first attend a hospital or clinic. 70% of respondents indicated that they wish the temporary approval to end immediately, however some Health professional organisations, abortion providers and some other organisations supported the temporary measure becoming permanent. (JSM)

Full URL: <https://www.gov.uk/government/consultations/home-use-of-both-pills-for-early-medical-abortion/outcome/home-use-of-both-pills-for-early-medical-abortion-ema-up-to-10-weeks-gestation-summary-of-consultation-responses>

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**2022-01104**

**COVID-19 in pregnancy—what study designs can we use to assess the risk of congenital anomalies in relation to COVID-19 disease, treatment and vaccination?**. Dolk H, Damase-Michel C, Morris JK, et al (2022), Paediatric and Perinatal Epidemiology 2 March 2022, online

Background

The COVID-19 pandemic has accelerated pregnancy outcome research, but little attention has been given specifically to the risk of congenital anomalies (CA) and first trimester exposures.

Objectives

We reviewed the main data sources and study designs used internationally, particularly in Europe, for CA research, and their strengths and limitations for investigating COVID-19 disease, medications and vaccines.

Population

We classify research designs based on four data sources: a) spontaneous adverse event reporting, where study subjects are positive for both exposure and outcome, b) pregnancy exposure registries, where study subjects are positive for exposure, c) congenital anomaly registries, where study subjects are positive for outcome and d) population healthcare data where the entire population of births is included, irrespective of exposure and outcome.

Study Design

Each data source allows different study designs, including case series, exposed pregnancy cohorts (with external comparator), ecological studies, case-control studies and population cohort studies (with internal comparator).

Methods

The quality of data sources for CA studies is reviewed in relation to criteria including diagnostic accuracy of CA data, size of study population, inclusion of terminations of pregnancy for foetal anomaly, inclusion of first trimester COVID-19-related exposures and use of an internal comparator group. Multinational collaboration models are reviewed.

Results

Pregnancy exposure registries have been the main design for COVID-19 pregnancy studies, but lack detail regarding first trimester exposures relevant to CA, or a suitable comparator group. CA registries present opportunities for improving diagnostic accuracy in COVID-19 research, especially when linked to other data sources. Availability of inpatient hospital medication use in population healthcare data is limited. More use of ongoing mother-baby linkage systems would improve research efficiency. Multinational collaboration delivers statistical power.

Conclusions

Challenges and opportunities exist to improve research on CA in relation to the COVID-19 pandemic and future pandemics.  
(Author)

Full URL: <https://doi.org/10.1111/ppe.12840>

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**2022-01010**

**The impact of Covid-19 restrictions on depressive symptoms in low-risk and high-risk pregnant women: a cross-sectional study before and during pandemic.** Smorti M, Gemignani A, Bonassi L, et al (2022), BMC Pregnancy and Childbirth vol 22, no 191, 8 March 2022

#### Background

The COVID-19 social restrictions have increased the risk for depression compared to the previous period in Italian women with Low-Risk Pregnancy (LRP). Less is known about the impact of COVID-19 restrictions on High-Risk Pregnancy (HRP). This study aimed: 1) to explore levels of depression in women who become pregnant before and during COVID-19 pandemic, distinguishing between LRP and HRP; 2) to analyze the impact of COVID-19 restrictions on pregnancy experience in LRP and HRP.

#### Methods

A before-during COVID-19 pandemic cross-sectional study was carried out on 155 pregnant women (Mean age = 34.18), between 23 and 32 weeks of gestation. 77 women were recruited before COVID-19 pandemic (51.9% LRP; 48.1% HRP) and 78 women were recruited during COVID-19 pandemic (51.3% LRP; 48.7% HRP). HRP group was enrolled during hospitalization for high-risk pregnancy. Participants filled out Edinburgh Postnatal Depression Scale. Moreover, only COVID-19 group answered an open-ended question about the impact of restriction on pregnancy experience.

#### Results

HRP women reported higher levels of depressive symptoms than LRP. No difference emerged for COVID (before/during) but an interaction effect between COVID-19 and obstetric condition was found. The qualitative results showed the impact of restrictions on emotions and concerns.

#### Conclusion

Respect to the previous period, LRP women during COVID-19 presented an increased risk for depressive symptoms than HRP. The HRP women during COVID-19 seemed to use hospitalization as a resource to find a social support network with other pregnant women and to be reassured on the clinical ongoing of pregnancy. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-022-04515-3>

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**2022-00975**

**Adverse perinatal outcomes in a large United States birth cohort during the COVID-19 pandemic.** Litman EA, Yin Y, Nelson SJ, et al (2022), American Journal of Obstetrics & Gynecology MFM 31 January 2022, online

**BACKGROUND**

The impact of coronavirus disease 2019 (COVID-19) on adverse perinatal outcomes remains unclear.

**OBJECTIVE**

This study aimed to investigate whether COVID-19 is associated with adverse perinatal outcomes in a large national dataset and to examine the rates of adverse outcomes during the pandemic compared with the rates of adverse outcomes during the prepandemic period.

**STUDY DESIGN**

This observational cohort study included 683,905 patients, between the ages of 12 and 50, hospitalized for childbirth and abortion between January 1, 2019, and May 31, 2021. During the prepandemic period, 271,444 women were hospitalized for childbirth. During the pandemic, 308,532 women were hospitalized for childbirth, and 2708 women had COVID-19. The associations between COVID-19 and in-hospital adverse perinatal outcomes were examined using propensity score-adjusted logistic regression.

**RESULTS**

Women with COVID-19 were more likely to experience both early and late preterm birth (adjusted odds ratios, 1.38 [95% confidence interval, 1.1–1.7] and 1.62 [95% confidence interval, 1.3–1.7], respectively), preeclampsia (adjusted odds ratio, 1.2 [95% confidence interval, 1.0–1.4]), disseminated intravascular coagulopathy (adjusted odds ratio, 1.57 [95% confidence interval, 1.1–2.2]), pulmonary edema (adjusted odds ratio, 2.7 [95% confidence interval, 1.1–6.3]), and need for mechanical ventilation (adjusted odds ratio, 8.1 [95% confidence interval, 3.8–17.3]) than women without COVID-19. There was no significant difference in the prevalence of stillbirth among women with COVID-19 (16/2708) and women without COVID-19 (174/39,562) ( $P=.257$ ). There was no difference in adverse outcomes among women who delivered during the pandemic vs prepandemic period. Combined in-hospital mortality was significantly higher for women with COVID-19 (147 [95% confidence interval, 3.0–292.0] vs 2.5 [95% confidence interval, 0.0–7.5] deaths per 100,000 women). Women diagnosed with COVID-19 within 30 days before hospitalization were more likely to experience early preterm birth, placental abruption, and mechanical ventilation than women diagnosed with COVID-19 >30 days before hospitalization for childbirth (4.0% vs 2.4% for early preterm birth [adjusted odds ratio, 1.7; 95% confidence interval, 1.1–2.7]; 2.2% vs 1.2% for placental abruption [adjusted odds ratio, 1.86; 95% confidence interval, 1.0–3.4]; and 0.9% vs 0.1% for mechanical ventilation [adjusted odds ratio, 13.7; 95% confidence interval, 1.8–107.2]).

**CONCLUSION**

Women with COVID-19 had a higher prevalence of adverse perinatal outcomes and increased in-hospital mortality, with the highest risk occurring when the diagnosis was within 30 days of hospitalization, raising the possibility of a high-risk period. (Author)

**Full URL:** <https://doi.org/10.1016/j.ajogmf.2022.100577>

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**2022-00954**

**Domestic violence: an invisible pandemic.** Dey T, Thakar R (2022), The Obstetrician and Gynaecologist 24 February 2022, online

Commentary on the increase in domestic violence during the COVID-19 pandemic and the ways in which obstetricians, midwives and allied health professionals can help with early recognition and referral. (LDO)

**Full URL:** <https://doi.org/10.1111/tog.12798>

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**2022-00868**

**The role of perceived social support on pregnant women's mental health during the COVID-19 pandemic.** Corno G, Villani D, de Montigny F, et al (2022), Journal of Reproductive and Infant Psychology 23 February 2022, online

**Purpose**

The present study aimed at investigating which sources of social support best account for pregnant women's levels of psychological distress and mental well-being during the COVID-19 pandemic.

**Methods**

274 Italian and Canadian expectant mothers completed an online-based survey including measures of perceived social support (from family, significant other and friends), state anxiety, depressive symptoms, and satisfaction with life. Correlation analyses and multivariate analysis of covariance were performed to explore how social support from different sources was related to depressive symptoms, state anxiety and satisfaction with life.

**Results**

Different sources of social support contributed to explaining women's psychological distress and mental well-being. Social support both from family and friends was significantly related to women's state anxiety and depressive symptoms. Social support from friends was specifically related to women's satisfaction with life.

**Conclusion**

Our findings endorse the crucial role of perceived social support as a protective factor for pregnant women's mental health. In the context of the COVID-19 pandemic, our results suggest that support from family seems important in preventing psychological distress, whereas support from friends is also associated with mental well-being. These results may help designing future interventions aimed at improving women's perinatal mental health in life-threatening conditions. (Author)

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**2022-00849**

**Rural Residents' Perinatal Experiences During the Initial Months of the COVID-19 Pandemic: A Qualitative Study in British Columbia.** Sullivan E, Cameron A, Kornelsen J (2022), Journal of Midwifery & Women's Health 4 March 2022, online

#### Introduction

Many studies have explored the impact of the coronavirus disease 2019 (COVID-19) pandemic on perinatal health, but few have examined the effects of the pandemic on birthing families through a rural lens. Given that the COVID-19 pandemic has reinforced long-standing disparities between urban and rural communities, it is important that the significance of place on the health and wellness of rural populations is made visible.

#### Methods

In-depth interviews and focus groups with 16 participants from rural communities in British Columbia, Canada, were performed. Participants included those who had been pregnant or given birth after March 11, 2020. Data from the interviews and focus groups were analyzed using the principles of thematic analysis to understand the perinatal experiences of rural families during the initial months of the COVID-19 pandemic.

#### Results

Analysis of the data revealed 4 major themes: perceived risk of infection, navigating uncertainty, experience of care received, and resilience and silver linings. In general, participants conceptualized rural communities as safer bubbles. Exceptions included specific vectors of risk such as tourism travel and border communities. Challenges experienced by rural families including anxiety around changing health guidelines, reduced social support, and potential loss of their partners' support at births. Additional concerns specific to rural experiences added to this burden, including fear of traveling to referral centers for care and increased difficulties accessing resources.

#### Discussion

Participants reported positive, compassionate care experiences that helped to mitigate some of the added stressors of the pandemic. These findings highlight the importance of perinatal care provision that integrates physiologic and mental health supports. This study provides a foundation for a comprehensive inquiry into the experiences of rural perinatal services during COVID-19. (Author)

**Full URL:** <https://doi.org/10.1111/jmwh.13338>

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**2022-00724**

**Coronavirus: Screening [written answer].** House of Commons (2022), Hansard Written question 131322, 28 February 2022

Maggie Throup responds to a written question from Daisy Cooper to the Secretary of State for Health and Social Care, regarding what assessment his Department has made of the impact of ending free-of-charge covid-19 lateral flow tests on pregnant women. (JSM)

**Full URL:** <https://questions-statements.parliament.uk/written-questions/detail/2022-02-28/131322>

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**2022-00702**

**Feeding during therapeutic hypothermia is safe and may improve outcomes in newborns with perinatal asphyxia.** Wang X, Chen X, Zhang K, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine 13 February 2022, online

**Background:** The Coronavirus disease 2019 (COVID-19) pandemic has become worldwide, posing particularly severe challenges. Pregnancy brings changes that might make individuals more vulnerable to this viral infection. To date, the impact of COVID-19 infection on pregnancy outcomes remains controversial.

**Method:** We performed a meta-analysis to address the impact of COVID-19 infection on pregnancy outcomes. We searched the PubMed and China National Knowledge infrastructure (CNKI) databases for related articles. The odds ratio (OR) corresponding to the 95% confidence interval (95% CI) was used to define the impact of INFECTION and severity of COVID-19 on pregnancy outcomes. The statistical heterogeneity among studies was batched with the Q-test and I2 statistics.

**Results:** We collected 38 studies including 127,805 pregnancy women. Our meta-analysis revealed that pregnant women with COVID-19 have been linked to an increased risk of premature birth (OR = 1.66, 95% CI = 1.41–1.96), stillbirth (OR = 1.98, 95% CI = 1.22–3.21), pre-eclampsia (OR = 1.46, 95% CI = 1.18–1.80), and PROM (OR = 1.39, 95% CI = 1.07–1.81).

**Conclusions:** Our meta-analysis showed that infection with COVID-19 increases the risk of preterm birth, stillbirth, pre-eclampsia, and PROM. Screening and early care for pregnant women to intervene with COVID-19 is important, given the increased risk of adverse pregnancy outcomes. (Author)

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**2022-00699**

**Remdesivir use in pregnancy during the SARS-CoV-2 pandemic.** Gutierrez R, Mendez-Figueroa H, Biebighauser JG, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine 15 February 2022, online

#### Objective

To ascertain the composite maternal and neonatal outcomes in pregnant individuals with moderate, severe, or critical coronavirus disease 2019 (COVID-19) treated with remdesivir.

#### Materials and methods

This is a secondary analysis of the COVID in Pregnancy Registry in Houston, Texas. Women were included if they met the criteria of moderate, severe or critical COVID-19 illness. Composite adverse maternal outcome was defined as any of the following outcomes: placental abruption, pregnancy-related hypertension, chorioamnionitis, stroke, delivery with estimated blood loss >1000 mL, diagnosis of pulmonary embolism or deep venous thromboembolism, or maternal death. Composite adverse neonatal outcome was defined as any of the following: Apgar score  $\leq 3$  at 5 min, arterial cord pH <7.0, positive SAR-CoV-2 test, intraventricular hemorrhage, periventricular leukomalacia, stillbirth, or neonatal death. Comparative analyses between participants receiving remdesivir versus those not exposed were performed.

#### Results

A total of 994 patients were diagnosed with COVID-19 infection. Of these, 95 (9.6%) met criteria for moderate, severe, or critical disease. Forty-one percent of these patients (n = 39) received remdesivir. Baseline demographic characteristics were not different between groups. No patients reported an allergic reaction with the administration of remdesivir; however, 16.7% of the patients had the medication discontinued due to transaminitis. Patients receiving the drug were more likely to have a longer illness duration on admission, more likely to require oxygen support on arrival and have a longer hospital stay.

#### Conclusions

Remdesivir appears to be safe, well tolerated within our cohort with no cases of recorded adverse reaction. (Author)

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**2022-00698**

**Symptomatic versus asymptomatic COVID-19: does it impact placental vasculopathy?**. Ramey-Collier K, Craig AM, Hall A, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine 16 February 2022, online

This study sought to assess the impact of COVID-19 on placental vasculature in the context of maternal symptomatology – comparing asymptomatic to symptomatic pregnant patients – and disease severity – comparing pregnant patients with mild, moderate, severe, and critical COVID-19 infection. PCR-confirmed COVID-19 positive pregnant patients in a single health system who delivered between 3/2020-5/2021 included. All patients had positive COVID test and delivered during the study period. Primary outcome was incidence of any vascular malperfusion on placental pathology. Secondary outcomes were FVM and MVM on placental pathology. Placental pathology compared between symptomatic (sCOVID) and asymptomatic (aCOVID) patients. Secondary analysis of symptomatic patients, comparing placental pathology between mild disease(mCOVID) and worse disease(moderate, severe, or critical-defined by 2020 NIH guidelines) (dCOVID), also performed. Of 112 patients, 53 (47%) had symptoms. Twenty-seven (24.1%) patients had evidence of vascular malperfusion; 26 (23.2%) had MVM. When comparing aCOVID and sCOVID patients, no difference in rate of vascular malperfusion identified, nor any differences in rates of FVM or MVM. Among sCOVID patients (n = 53), 39 (74%) had mCOVID and 14 (26%) had dCOVID (moderate n = 4, severe n = 9, critical n = 1). Patients with dCOVID had earlier median delivery GA (37.4wks vs 39.2wks, p = .03). No difference in latency from diagnosis to delivery seen between mCOVID and dCOVID groups (4.4 vs 3.0wks, p = .96). Twelve (30.8%) patients had vascular malperfusion on pathology, all had mCOVID (p = .02). Eleven (28.2%) mCOVID patients had MVM; no dCOVID patients had evidence of vascular malperfusion (p = .03). No difference in FVM was found between cohorts. Symptomatic COVID-19 infection did not impact placental vasculature differently than asymptomatic infection, even when stratifying by trimester of infection. Among pregnant patients with symptomatic COVID-19, mild disease was associated with placental vascular changes on the maternal side while severe disease was not. Further studies are needed to understand the implications of these findings. (Author)

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**2022-00692**

**Maternity leave: Coronavirus [written answer]**. Northern Ireland Assembly (2022), Hansard Written question AQW 29593/17-22, 10 February 2022

The Minister for the Economy responds to a written question asked by Mr Harry Harvey, regarding whether he will outline the COVID-19 risk assessment policy in relation to maternity leave guidelines. (LDO)

**Full URL:** <http://aims.niassembly.gov.uk/questions/printquestionssummary.aspx?docid=367579>

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**2022-00689**

**Antenatal classes [written answer]**. Scottish Parliament (2022), Official Report Written question S6W-06381, 9 February 2022

Humza Yousaf responds to a written question asked by Monica Lennon to the Scottish Government regarding the date by which NHS Scotland will resume face-to-face antenatal classes, in light of the reported resumption of private classes. (LDO)

**Full URL:** <https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-06381>

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**2022-00686**

**Comparison of Sexually Transmitted Infections and Adverse Perinatal Outcomes in Underserved Pregnant Patients Before vs During the COVID-19 Pandemic in Texas.** Stafford IA, Coselli JO, Wilson DF, et al (2022), JAMA Network Open vol 5, no 2, February 2022, e220568

This cohort study assesses the rates of sexually transmitted infections (STI) and associated adverse perinatal outcomes among underserved pregnant patients during the COVID-19 pandemic in a public health system in Southeastern Texas. (Author)

**Full URL:** <https://doi.org/10.1001/jamanetworkopen.2022.0568>

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**2022-00657**

**Severity of maternal infection and perinatal outcomes during periods of SARS-CoV-2 wildtype, alpha, and delta variant dominance in the UK: prospective cohort study.** Vousden N, Ramakrishnan R, Bunch K, et al (2022), *BMJ Medicine* 28 February 2022, online

**Objective** To compare the severity of maternal infection and perinatal outcomes during periods in which wildtype, alpha variant, and delta variant of SARS-CoV-2 were dominant in the UK.

**Design** Prospective cohort study.

**Setting** 194 obstetric units across the UK, during the following periods: between 1 March and 30 November 2020 (wildtype dominance), between 1 December 2020 and 15 May 2021 (alpha variant dominance), and between 16 May and 31 October 2021 (delta variant dominance).

**Participants** 4436 pregnant women admitted to hospital with covid-19 related symptoms.

**Main outcome measures** Moderate to severe maternal SARS-CoV-2 infection (indicated by any of the following: oxygen saturation <95% on admission, need for oxygen treatment, evidence of pneumonia on imaging, admission to intensive care, or maternal death), and pregnancy and perinatal outcomes (including mode and gestation of birth, stillbirth, live birth, admission to neonatal intensive care, and neonatal death).

**Results** 1387, 1613, and 1436 pregnant women were admitted to hospital with covid-19 related symptoms during the wildtype, alpha, and delta dominance periods, respectively; of these women, 340, 585, and 614 had moderate to severe infection, respectively. The proportion of pregnant women admitted with moderate to severe infection increased during the subsequent alpha and delta dominance periods, compared with the wildtype dominance period (wildtype 24.5% v alpha 36.2% (adjusted odds ratio 1.98, 95% confidence interval 1.66% to 2.37%); wildtype 24.5% v delta 42.8% (2.66, 2.21 to 3.20)). Compared with the wildtype dominance period, women admitted during the alpha dominance period were significantly more likely to have pneumonia, require respiratory support, and be admitted to intensive care; these three risks were even greater during the delta dominance period (wildtype v delta: pneumonia, adjusted odds ratio 2.52, 95% confidence interval 2.06 to 3.09; respiratory support, 1.90, 1.52 to 2.37; and intensive care, 2.71, 2.06 to 3.56). Of 1761 women whose vaccination status was known, 38 (2.2%) had one dose and 16 (1%) had two doses before their diagnosis (of whom 14 (88%) had mild infection). The proportion of women receiving drug treatment for SARS-CoV-2 management was low, but did increase between the wildtype dominance period and the alpha and delta dominance periods (10.4% wildtype v 14.9% alpha (2.74, 2.08 to 3.60); 10.4% wildtype v 13.6% delta (2.54, 1.90 to 3.38)).

**Conclusions** While limited by the absence of variant sequencing data, these findings suggest that during the periods when the alpha and delta variants of SARS-CoV-2 were dominant, covid-19 was associated with more severe maternal infection and worse pregnancy outcomes than during the wildtype dominance period. Most women admitted with SARS-CoV-2 related symptoms were unvaccinated. Urgent action to prioritise vaccine uptake in pregnancy is essential.

**Study registration** ISRCTN40092247. (Author)

**Full URL:** <https://bmjmedicine.bmj.com/content/1/1/e000053>

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**2022-00654**

**Covid-19: Severe infection in pregnancy significantly increases risks, study shows.** Iacobucci G (2022), BMJ vol 376, 24 February 2022, o480

Severe covid-19 infection in pregnant women significantly increases the risk of harmful outcomes for mothers and babies, a study (1) has found.

1. Vousden N et al. Acta Obstetrica et Gynecologica Scandinavica, 25 February 2022, online.

<https://doi.org/10.1111/aogs.14329>.

(Author, edited)

**Full URL:** <https://doi.org/10.1136/bmj.o480>

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**2022-00641**

**COVID-19 and Pregnancy.** Walter K (2022), JAMA (Journal of the American Medical Association) vol 327, no 8, 22 February 2022, p 790

This JAMA Patient Page describes characteristics of COVID-19 among pregnant people and vaccination recommendations for people who are pregnant or breastfeeding. (Author)

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**2022-00640**

**Association of SARS-CoV-2 Infection With Serious Maternal Morbidity and Mortality From Obstetric Complications.** Metz TD, Clifton RG, Hughes BL, et al (2022), JAMA (Journal of the American Medical Association) vol 327, no 8, 22 February 2022, pp 748-759

**Importance** It remains unknown whether SARS-CoV-2 infection specifically increases the risk of serious obstetric morbidity.

**Objective** To evaluate the association of SARS-CoV-2 infection with serious maternal morbidity or mortality from common obstetric complications.

**Design, Setting, and Participants** Retrospective cohort study of 14 104 pregnant and postpartum patients delivered between March 1, 2020, and December 31, 2020 (with final follow-up to February 11, 2021), at 17 US hospitals participating in the Eunice Kennedy Shriver National Institute of Child Health and Human Development's Gestational Research Assessments of COVID-19 (GRAVID) Study. All patients with SARS-CoV-2 were included and compared with those without a positive SARS-CoV-2 test result who delivered on randomly selected dates over the same period.

**Exposures** SARS-CoV-2 infection was based on a positive nucleic acid or antigen test result. Secondary analyses further stratified those with SARS-CoV-2 infection by disease severity.

**Main Outcomes and Measures** The primary outcome was a composite of maternal death or serious morbidity related to hypertensive disorders of pregnancy, postpartum hemorrhage, or infection other than SARS-CoV-2. The main secondary outcome was cesarean birth.

**Results** Of the 14 104 included patients (mean age, 29.7 years), 2352 patients had SARS-CoV-2 infection and 11 752 did not have a positive SARS-CoV-2 test result. Compared with those without a positive SARS-CoV-2 test result, SARS-CoV-2 infection was significantly associated with the primary outcome (13.4% vs 9.2%; difference, 4.2% [95% CI, 2.8%-5.6%]; adjusted relative risk [aRR], 1.41 [95% CI, 1.23-1.61]). All 5 maternal deaths were in the SARS-CoV-2 group. SARS-CoV-2 infection was not significantly associated with cesarean birth (34.7% vs 32.4%; aRR, 1.05 [95% CI, 0.99-1.11]). Compared with those without a positive SARS-CoV-2 test result, moderate or higher COVID-19 severity (n = 586) was significantly associated with the primary outcome (26.1% vs 9.2%; difference, 16.9% [95% CI, 13.3%-20.4%]; aRR, 2.06 [95% CI, 1.73-2.46]) and the major secondary outcome of cesarean birth (45.4% vs 32.4%; difference, 12.8% [95% CI, 8.7%-16.8%]; aRR, 1.17 [95% CI, 1.07-1.28]), but mild or asymptomatic infection (n = 1766) was not significantly associated with the primary outcome (9.2% vs 9.2%; difference, 0% [95% CI, -1.4% to 1.4%]; aRR, 1.11 [95% CI, 0.94-1.32]) or cesarean birth (31.2% vs 32.4%; difference, -1.4% [95% CI, -3.6% to 0.8%]; aRR, 1.00 [95% CI, 0.93-1.07]).

**Conclusions and Relevance** Among pregnant and postpartum individuals at 17 US hospitals, SARS-CoV-2 infection was associated with an increased risk for a composite outcome of maternal mortality or serious morbidity from obstetric complications. (Author)

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**2022-00598**

**Maternity Services: Coronavirus [written answer].** House of Commons (2022), Hansard Written question 99094, 6 January 2022

Maria Caulfield responds to a written question asked by Olivia Blake to the Secretary of State for Health and Social Care, with reference to NHS guidance, Supporting pregnant women using maternity services during the coronavirus pandemic: Actions for NHS providers, published on 14 December 2020, what steps he is taking to ensure that NHS Trusts adhere to that guidance; and what steps his department is taking to support NHS trusts to follow that guidance. (LDO)

**Full URL:** <https://questions-statements.parliament.uk/written-questions/detail/2022-01-06/99094>

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**2022-00583**

**Use of single-dose tocilizumab for treatment of severe COVID-19 in pregnancy: implications for the timing of live infant vaccines.** Burkhardt I, Whittaker E (2022), Archives of Disease in Childhood 3 February 2022, online

Correspondence piece discussing the safety of live vaccines administered to infants after prenatal exposure to tocilizumab for the treatment of COVID-19 in the mother. The authors recommend delaying live vaccines until six months of age for infants who have been exposed. (LDO)

Full URL: <http://dx.doi.org/10.1136/archdischild-2021-323628>

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**2022-00525**

**Impact of the COVID pandemic on the incidence of prematurity: Critical role of gestational age and environment.** Weinberger B, Divers J, Campbell D, et al (2022), American Journal of Obstetrics & Gynecology (AJOG) 23 February 2022, online

Research letter comparing rates of extreme prematurity with and without pre-eclampsia in New York during the COVID-19 pandemic. Results demonstrate an overall decrease in the number of extreme preterm births despite an increased rate of pre-eclampsia. (LDO)

Full URL: <https://doi.org/10.1016/j.ajog.2022.02.028>

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**2022-00443**

**Industrial Health and Safety: Pregnancy [written answer].** House of Commons (2022), Hansard Written question 125552, 18 February 2022

Chloe Smith responds to a written question asked by Zarah Sultana to the Secretary of State for Health and Social Care, regarding what assessment her department has made of the implications for its policies of the recommendations of the December 2021 Maternity Action report, Unsafe and Unsupported, on workplace health and safety for pregnant women during the COVID-19 outbreak. (LDO)

Full URL: <https://questions-statements.parliament.uk/written-questions/detail/2022-02-18/125552>

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**2022-00436**

**Severe Covid-19 infection linked to increase in risk during pregnancy.** Baines E (2022), Nursing Times 24 February 2022

Pregnant women who are admitted to hospital with severe Covid-19 are at increased risk of serious birth complications, a UK study has shown. (Author)

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## 2022-00362

**Obstetric outcomes in pregnant COVID-19 women: the imbalance of von Willebrand factor and ADAMTS13 axis.** Grandone E, Vimercati A, Sorrentino F, et al (2022), BMC Pregnancy and Childbirth vol 22, no 142, 21 February 2022

### Background

Thrombotic microangiopathy has been invoked as one of the most important mechanisms of damage in COVID-19 patients. Protease ADAMTS13 is a marker of microangiopathy responsible for controlling von Willebrand multimers size. Von Willebrand factor/ADAMTS13 ratio has been found impaired in COVID-19 patients outside pregnancy.

### Methods

We prospectively investigated 90 pregnant women admitted to two tertiary academic hospitals in Italy with a laboratory-confirmed diagnosis of SARS-CoV-2 infection. Demographic, clinical information and routine laboratory data were collected at the hospital admission and until discharge. We investigated whether vonWillebrand /ADAMTS13 axis imbalance is a predictor of adverse outcomes. Logistic regression analysis, which controlled for potential confounders, was performed to evaluate the association between laboratory parameters and clinical outcomes.

### Results

Most women (55.6%) were parae, with median gestational age at admission of 39 weeks. At hospital admission, 63.3% were asymptomatic for COVID-19 and 24.4% showed more than one sign or symptom of infection. Nulliparae with group O showed Willebrand / ADA MTS-13 ratios significantly lower than non-O, whereas in multiparae this difference was not observed. Logistic regression showed that ratio von Willebrand to ADAMTS13 was significantly and independently associated with preterm delivery (OR 1.9, 95%CI 1.1–3.5).

### Conclusion

This study shows an imbalance of vonWillebrand /ADAMTS13 axis in pregnant women with COVID-19, leading to a significantly higher and independent risk of preterm delivery. Monitoring these biomarkers might support decision making process to manage and follow-up pregnancies in this setting. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-022-04405-8>

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## 2022-00293

**Potential role of neurofilament in COVID-19 and preeclampsia.** Samara A, Herlenius E, O' Brien P, et al (2022), Cell Reports. Medicine vol 3, no 1, January 2022, e100490

Neurofilament light (NFL) is a promising circulating biomarker in preeclampsia and COVID-19, even without evident neurological complications. Several pathways might contribute to the elevated serum NFL levels seen in both pathologies. Future studies will determine whether NFL is a long COVID marker and delineate NFL's role in COVID-19-associated preeclampsia. (Author)

**Full URL:** <https://doi.org/10.1016/j.xcrm.2021.100490>

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## 2022-00157

**Pregnancy and risk of COVID-19: a Norwegian registry-linkage study.** Magnus MC, Oakley L, Gjessing HK, et al (2022), BJOG: An International Journal of Obstetrics and Gynaecology vol 129, no 1, January 2022, pp 101-109

### Objective

To compare the risk of acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and contact with specialist healthcare services for coronavirus disease 2019 (COVID-19) between pregnant and non-pregnant women.

### Population or sample

All women ages 15–45 living in Norway on 1 March 2020 (n = 1 033 699).

### Methods

We linked information from the national birth, patient, communicable diseases and education databases using unique national identifiers.

### Main outcome measure

We estimated hazard ratios (HR) among pregnant compared to non-pregnant women of having a positive test for SARS-CoV-2, a diagnosis of COVID-19 in specialist healthcare, or hospitalisation with COVID-19 using Cox regression. Multivariable analyses adjusted for age, marital status, education, income, country of birth and underlying medical conditions.

### Results

Pregnant women were not more likely to be tested for or to have a positive SARS-CoV-2 test (adjusted HR 0.99; 95% CI 0.92–1.07). Pregnant women had higher risk of hospitalisation with COVID-19 (HR 4.70, 95% CI 3.51–6.30) and any type of specialist care for COVID-19 (HR 3.46, 95% CI 2.89–4.14). Pregnant women born outside Scandinavia were less likely to be tested, and at higher risk of a positive test (HR 2.37, 95% CI 2.51–8.87). Compared with pregnant Scandinavian-born women, pregnant women with minority background had a higher risk of hospitalisation with COVID-19 (HR 4.72, 95% CI 2.51–8.87).

### Conclusion

Pregnant women were not more likely to be infected with SARS-CoV-2. Still, pregnant women with COVID-19, especially those born outside of Scandinavia, were more likely to be hospitalised. (Author)

**Full URL:** <https://doi.org/10.1111/1471-0528.16969>

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## 2022-00142

**Maternal Outcomes After Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Infection in Vaccinated Compared With Unvaccinated Pregnant Patients.** Morgan JA, Biggio JR, Martin JK, et al (2022), Obstetrics & Gynecology vol 139, no 1, January 2022, pp 107-109

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccination is associated with lower odds of severe or critical coronavirus disease 2019 (COVID-19) or COVID-19 of any severity in pregnant patients during the Delta-predominant fourth SARS-CoV-2 surge. (Author)

**Full URL:** [https://journals.lww.com/greenjournal/fulltext/9900/maternal\\_outcomes\\_after\\_severe\\_acute\\_respiratory.320.aspx](https://journals.lww.com/greenjournal/fulltext/9900/maternal_outcomes_after_severe_acute_respiratory.320.aspx)

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**2022-00121**

**SARS-CoV-2 infection in pregnancy during the first wave of COVID-19 in the Netherlands: a prospective nationwide population-based cohort study (NethOSS).** Overtoom EM, Rosman AN, Zwart JJ, et al (2022), BJOG: An International Journal of Obstetrics and Gynaecology vol 129, no 1, January 2022, pp 91-100

**Objective**

To describe characteristics, risk factors and maternal, obstetric and neonatal outcomes of pregnant women infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

**Design**

Multi-centre prospective population-based cohort study.

**Setting**

Nationwide study in the Netherlands.

**Population**

Pregnant women with confirmed SARS-CoV-2 infection admitted to hospital or in home-isolation: 1 March 2020 to 31 August 2020.

**Methods**

Pregnant women with positive polymerase chain reaction or antibody tests were registered using the Netherlands Obstetrics Surveillance System (NethOSS). (Selective) testing occurred according to national guidelines. Data from the national birth registry (pregnant pre-coronavirus disease 2019 [COVID-19] cohort) and an age-matched cohort of COVID-19-positive women (National Institute for Public Health and the Environment; fertile age COVID-19 cohort) were used as reference.

**Main outcome measures**

Incidence of SARS-CoV-2 infection in pregnant women. Maternal, obstetric and neonatal outcomes including hospital and intensive care admission.

**Results**

Of 376 registered pregnant women with confirmed SARS-CoV-2 infection, 20% (74/376) were admitted to hospital, of whom 84% (62/74) were due to SARS-CoV-2; 10% (6/62) were admitted to intensive care and 15% (9/62) to obstetric high-care units. Risk factors for admission were non-European country of origin (odds ratio [OR] 1.73, 95% CI 1.01–2.96) and being overweight/obese (OR 1.86, 95% CI 1.51–3.20). No maternal or perinatal deaths occurred. Caesarean section after labour-onset was increased (OR 1.58, 95% CI 1.09–2.28). Hospital and intensive care admission were higher compared with the fertile age COVID-19 cohort (OR 6.75, 95% CI 5.18–8.81 and OR 2.52, 95% CI 1.11–5.77, respectively).

**Conclusions**

Non-European country of origin and being overweight/obese are risk factors for severe course of SARS-CoV-2 infection in pregnancy, risk of caesarean section and hospital and intensive care unit admission are increased. (Author)

**Full URL:** <https://doi.org/10.1111/1471-0528.16903>

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## 2022-00070

**Coronavirus (COVID-19): advice for pregnant employees [Last updated 14 February 2022].** Department of Health and Social Care, Health and Safety Executive (2020), London: DHSC 23 December 2020

Advice for pregnant employees on risk assessments in the workplace and occupational health during the coronavirus (COVID-19) pandemic. (Author)

Full URL: <https://www.gov.uk/government/publications/coronavirus-covid-19-advice-for-pregnant-employees>

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## 2022-00037

**Performance of diagnostic coding and laboratory testing results to measure COVID-19 during pregnancy and associations with pregnancy outcomes.** Regan AK, Arah OA, Sullivan SG (2022), Paediatric and Perinatal Epidemiology 25 January 2022, online

### Background

Large-scale evaluation of COVID-19 is likely to rely on the quality of ICD coding. However, little is known about the validity of ICD-coded COVID-19 diagnoses.

### Objectives

To evaluate the performance of diagnostic codes in detecting COVID-19 during pregnancy.

### Methods

We used data from a national cohort of 78,283 individuals with a pregnancy ending between 11 March 2020 and 31 January 2021 in the OptumLabs® Data Warehouse (OLDW). OLDW is a longitudinal, real-world data asset with de-identified administrative claims and electronic health record data. We identified all services with an ICD-10-CM diagnostic code of U07.1 and all laboratory claims records for COVID-19 diagnostic testing. We compared ICD-coded diagnoses to testing results to estimate positive and negative predictive values (PPV and NPV). To evaluate impact on risk estimation, we estimated risk of adverse pregnancy outcomes by source of exposure information.

### Results

Of 78,283 pregnancies, 5644 had a laboratory test result for COVID-19. Testing was most common among older individuals, Hispanic individuals, those with higher socioeconomic status and those with a diagnosed medical condition or pregnancy complication; 52% of COVID-19 cases was identified through ICD-coded diagnosis alone, 19% from laboratory test results alone and 29% from both sources. Agreement between ICD-coded diagnosis and laboratory testing records was high 91% (95% confidence interval [CI] 90, 92). However, the PPV of ICD-code diagnosis was low (36%; 95% CI 33, 39). We observed up to a 50% difference in risk estimates of adverse pregnancy outcomes when exposure was based on laboratory testing results or diagnostic coding alone.

### Conclusions

More than one-in-five COVID-19 cases would be missed by using ICD-coded diagnoses alone to identify COVID-19 during pregnancy. Epidemiological studies exclusively relying on diagnostic coding or laboratory testing results are likely to be affected by exposure misclassification. Research and surveillance should draw upon multiple sources of COVID-19 diagnostic information. (Author)

Full URL: <https://doi.org/10.1111/ppe.12863>

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## 2022-00033

**A review of COVID-19 therapeutics in pregnancy and lactation.** Jorgensen SCJ, Tabbara N, Burry L (2022), *Obstetric Medicine* 12 January 2022, online

Pregnant people have an elevated risk of severe COVID-19-related complications compared to their non-pregnant counterparts, underscoring the need for safe and effective therapies. In this review, we summarize published data on COVID-19 therapeutics in pregnancy and lactation to help inform clinical decision-making about their use in this population. Although no serious safety signals have been raised for many agents, data clearly have serious limitations and there are many important knowledge gaps about the safety and efficacy of key therapeutics used for COVID-19. Moving forward, diligent follow-up and documentation of outcomes in pregnant people treated with these agents will be essential to advance our understanding. Greater regulatory push and incentives are needed to ensure studies to obtain pregnancy data are expedited. (Author)

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## 2022-00012

**Anti-Spike Monoclonal Antibody Therapy in Pregnant Women With Mild-to-Moderate Coronavirus Disease 2019 (COVID-19).**

Thilagar BP, Ghosh AK, Nguyen J, et al (2022), *Obstetrics & Gynecology* 13 January 2022, online

Anti-spike monoclonal antibody therapy may be effective for pregnant women with coronavirus disease 2019 (COVID-19). (Author)

Full URL: <https://doi.org/10.1097/AOG.0000000000004700>

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## 2022-00006

**Neutralizing Monoclonal Antibodies for Coronavirus Disease 2019 (COVID-19) in Pregnancy: A Case Series.** Richley M, Rao RR, Afshar Y, et al (2022), *Obstetrics & Gynecology* vol 139, no 3, March 2022, pp 368-372

### OBJECTIVE:

To describe outcomes associated with monoclonal antibody use in pregnant persons with mild-to-moderate coronavirus disease 2019 (COVID-19).

### METHODS:

We present a retrospective case series of pregnant patients who received anti-severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) monoclonal antibody infusions at a single center from April 1, 2021, through October 16, 2021. Pregnant patients who had a positive SARS-CoV-2 polymerase chain reaction (PCR) test result and mild-to-moderate COVID-19 symptoms were eligible for monoclonal antibody infusion. Exclusion criteria for administration included need for supplemental oxygen, hospitalization due to COVID-19, and positive SARS-CoV-2 PCR test result more than 7 days before screening. All patients received either bamlanivimab plus etesevimab or casirivimab plus imdevimab based on availability and dosing instructions of the product and emerging resistance patterns in the community.

### RESULTS:

During the study period, monoclonal antibody infusions were administered to 450 individuals at our institution, of whom 15 were pregnant. Of the 15 pregnant persons receiving monoclonal antibody, six (40%) had full-vaccination status at the time of infusion. Two individuals (13%, CI 0–31%) experienced systemic reactions during the infusion, both resulting in temporary changes in the fetal heart rate tracing that recovered with maternal and intrauterine resuscitative efforts. One patient delivered after infusion for worsening maternal and fetal status; the remainder of the patients did not require admission for COVID-19.

### CONCLUSION:

In this case series, pregnant persons who received anti-SARS-CoV-2 monoclonal antibody infusions had generally favorable outcomes. (Author)

Full URL: <https://doi.org/10.1097/AOG.000000000000468>

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**2022-00003**

**Early Administration of Remdesivir and Intensive Care Unit Admission in Hospitalized Pregnant Individuals With Coronavirus Disease 2019 (COVID-19).** Eid J, Abdelwahab M, Colburn N, et al (2022), *Obstetrics & Gynecology* 8 February 2022, online

Remdesivir has been shown to shorten the time to recovery in hospitalized patients with coronavirus disease 2019 (COVID-19). Data on its use in pregnancy are limited. In this single-center retrospective cohort study, our objective was to determine whether early remdesivir use in pregnant individuals is associated with decreased risk of admission to the intensive care unit (ICU). Forty-one pregnant patients were included in this study, and outcomes were compared between those who received remdesivir less than 7 days (early group) and 7 or more days (late group) from onset of patient-reported symptoms. Early remdesivir administration was associated with improved clinical outcomes, including lower rates of ICU admission, decreased length of hospitalization, and decreased progression to critical disease in pregnant individuals hospitalized with COVID-19. (Author)

**Full URL:** <https://doi.org/10.1097/AOG.0000000000004734>

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**2021-14558**

**Adapting obstetric and neonatal services during the COVID-19 pandemic: a scoping review.** Gold S, Clarfield L, Johnstone J, et al (2022), *BMC Pregnancy and Childbirth* vol 22, no 119, 11 February 2022

**Background**

The provision of care to pregnant persons and neonates must continue through pandemics. To maintain quality of care, while minimizing physical contact during the Severe Acute Respiratory Syndrome-related Coronavirus-2 (SARS-CoV2) pandemic, hospitals and international organizations issued recommendations on maternity and neonatal care delivery and restructuring of clinical and academic services. Early in the pandemic, recommendations relied on expert opinion, and offered a one-size-fits-all set of guidelines. Our aim was to examine these recommendations and provide the rationale and context to guide clinicians, administrators, educators, and researchers, on how to adapt maternity and neonatal services during the pandemic, regardless of jurisdiction.

**Method**

Our initial database search used Medical subject headings and free-text search terms related to coronavirus infections, pregnancy and neonatology, and summarized relevant recommendations from international society guidelines. Subsequent targeted searches to December 30, 2020, included relevant publications in general medical and obstetric journals, and updated society recommendations.

**Results**

We identified 846 titles and abstracts, of which 105 English-language publications fulfilled eligibility criteria and were included in our study. A multidisciplinary team representing clinicians from various disciplines, academics, administrators and training program directors critically appraised the literature to collate recommendations by multiple jurisdictions, including a quaternary care Canadian hospital, to provide context and rationale for viable options.

**Interpretation**

There are different schools of thought regarding effective practices in obstetric and neonatal services. Our critical review presents the rationale to effectively modify services, based on the phase of the pandemic, the prevalence of infection in the population, and resource availability. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-022-04409-4>

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## 2021-14555

**Comorbidity, poverty and social vulnerability as risk factors for mortality in pregnant women with confirmed SARS-CoV-2 infection: analysis of 13 062 positive pregnancies including 176 maternal deaths in Mexico.** Torres-Torres J, Martinez-Portilla RJ, Espino-y-Sosa S, et al (2022), *Ultrasound in Obstetrics and Gynecology* vol 59, no 1, January 2022, pp 76-82

### Objective

Mortality in pregnancy due to coronavirus disease 2019 (COVID-19) is a current health priority in developing countries. Identification of clinical and sociodemographic risk factors related to mortality in pregnant women with COVID-19 could guide public policy and encourage such women to accept vaccination. We aimed to evaluate the association of comorbidities and socioeconomic determinants with COVID-19-related mortality and severe disease in pregnant women in Mexico.

### Methods

This is an ongoing nationwide prospective cohort study that includes all pregnant women with a positive reverse-transcription quantitative polymerase chain reaction result for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) from the Mexican National Registry of Coronavirus. The primary outcome was maternal death due to COVID-19. The association of comorbidities and socioeconomic characteristics with maternal death was explored using a log-binomial regression model adjusted for possible confounders.

### Results

There were 176 (1.35%) maternal deaths due to COVID-19 among 13 062 consecutive SARS-CoV-2-positive pregnant women. Maternal age, as a continuous (adjusted relative risk (aRR), 1.08 (95% CI, 1.05–1.10)) or categorical variable, was associated with maternal death due to COVID-19; women aged 35–39 years (aRR, 3.16 (95% CI, 2.34–4.26)) or 40 years or older (aRR, 4.07 (95% CI, 2.65–6.25)) had a higher risk for mortality, as compared with those aged < 35 years. Other clinical risk factors associated with maternal mortality were pre-existing diabetes (aRR, 2.66 (95% CI, 1.65–4.27)), chronic hypertension (aRR, 1.75 (95% CI, 1.02–3.00)) and obesity (aRR, 2.15 (95% CI, 1.46–3.17)). Very high social vulnerability (aRR, 1.88 (95% CI, 1.26–2.80)) and high social vulnerability (aRR, 1.49 (95% CI, 1.04–2.13)) were associated with an increased risk of maternal mortality, while very low social vulnerability was associated with a reduced risk (aRR, 0.47 (95% CI, 0.30–0.73)). Being poor or extremely poor were also risk factors for maternal mortality (aRR, 1.53 (95% CI, 1.09–2.15) and aRR, 1.83 (95% CI, 1.32–2.53), respectively).

### Conclusion

This study, which comprises the largest prospective consecutive cohort of pregnant women with COVID-19 to date, has confirmed that advanced maternal age, pre-existing diabetes, chronic hypertension, obesity, high social vulnerability and low socioeconomic status are risk factors for COVID-19-related maternal mortality. © 2021 International Society of Ultrasound in Obstetrics and Gynecology. (Author)

Full URL: <https://doi.org/10.1002/uog.24797>

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## 2021-14507

**Examining the impact of the COVID-19 pandemic on maternal mental health during pregnancy and the postnatal period.**

McIntosh GC (2022), *MIDIRS Midwifery Digest* vol 32, no 1, March 2022, pp 67-73

By exploring physiological aspects of COVID-19 and its adaptations to pregnancy, this paper will examine its prevalence and physical effects, discussing the ramifications for mental health during pregnancy and the postpartum period. (Author, edited)

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## 2021-14505

**A clearer view to COVID-19 domestic violence and abuse — gaining insight by using a visionary post-feminist lens.** Richards J (2022), MIDIRS Midwifery Digest vol 32, no 1, March 2022, pp 74-80

According to the Office for National Statistics (ONS), domestic abuse will affect 1:4 women and 1:6 men in their lifetime (ONS 2020a) (1). This paper looks at the facts — from a post-feminist perspective — and examines some of the issues, particularly in relation to routine enquiry in midwifery.

As a matter of child protection, issues highlighted in the smooth transition between hospital cot and nursery are discussed, facilitated by the midwife's pivotal role in discharge planning. The long-term repercussions of domestic violence and abuse, jeopardising the developmental health and wellbeing of the child beyond the uterus, are highlighted.

1. Office for National Statistics (ONS) (2020a). Domestic abuse victim characteristics, England and Wales: year ending March 2020. London: ONS.

<https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice/articles/domesticabusevictimcharacteristicsenglandandwales/yearendingmarch2020>.

(Author, edited)

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## 2021-14499

**Hispanic race is a risk factor for COVID-19 during pregnancy: data from an urban New York City hospital.** Elkafrawi D, Sisti G, Mercado F, et al (2022), Journal of Obstetrics and Gynaecology 12 January 2022, online

There are limited studies on predisposing factors for COVID-19 positivity in asymptomatic pregnant women. The literature published to date on asymptomatic COVID-19 pregnant carriers does not focus on pregnancy or pre-pregnancy comorbidities. We wanted to identify risk factors for COVID-19 in asymptomatic pregnant women. We performed a retrospective chart review of 263 asymptomatic pregnant women admitted to labour and delivery at New York City Health + Hospitals/Lincoln.

We analysed the association between race, body mass index (BMI), smoking, indication for admission, gravidity, parity, pre-pregnancy comorbidity, pregnancy comorbidity via uni- and multivariate statistical tests. Only Hispanic race was significant in the univariate analysis ( $p = .049$ ). At the post-hoc analysis, Hispanics had a higher proportion of COVID-19 cases compared to non-Hispanic Blacks ( $p = .019$ ). No variables were significantly associated with COVID-19 positivity in the multivariate analysis.

Hispanic race appears to be a risk factor for asymptomatic COVID-19 infection during pregnancy. We speculate that the cultural and socioeconomic reality of Hispanic women living in our community leads to more exposure opportunities and therefore, a higher infection rate.

### Impact statement

What is already known on this subject? Little is known on the role of comorbidities and risk factors that can favour COVID-19 infection during pregnancy.

What do the results of this study add? We found that Hispanic pregnant asymptomatic women had a higher rate of COVID-19 in comparison to non-Hispanic Black women. Pre-pregnancy comorbidities such as pregestational diabetes, hypertension and asthma were not associated with COVID-19 positivity.

What are the implications of these findings for clinical practice and/or further research? The reasons why the Hispanic race is more affected by COVID-19 during pregnancy is unclear. The social environment of Hispanic women living in our community, such as their tendency to live in multigenerational and multi-family households, might contribute to a higher infection rate. More resources might be dedicated in the future to Hispanic-dense neighbourhoods. (Author)

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**2021-14492**

**Acute Respiratory Failure and Mechanical Ventilation in Women With COVID-19 During Pregnancy Best Clinical Practices.**

Troiano NH, Richter A, King C (2022), The Journal of Perinatal and Neonatal Nursing vol 36, no 1, January/March 2022, pp 27-36

Symptomatic pregnant women with coronavirus disease-2019 (COVID-19) are at increased risk of severe disease and death compared with symptomatic nonpregnant females of reproductive age. Among those who become critically ill, profound acute hypoxemic respiratory failure is the dominant finding. Significant morbidity and mortality from COVID-19 are largely due to acute viral pneumonia that evolves to acute respiratory distress syndrome. Admission of these patients with critical disease to an intensive care unit and initiation of invasive mechanical ventilation may be indicated. Effective ventilatory support can be challenging in the COVID-19 patient population, even more so when the need occurs in a woman during pregnancy. Key respiratory changes during pregnancy are reviewed. Principles related to maternal-fetal oxygen transport, assessment of ventilation and oxygenation status, and oxygenation goals are also reviewed. Selected concepts related to mechanical ventilatory support for the woman with COVID-19 and acute respiratory failure during pregnancy are presented including indications for ventilatory support, noninvasive support, and invasive ventilator management. Challenges in providing care to this patient population are identified as well as strategies to address them going forward. (Author)

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**2021-14489**

**Mothers' Experiences of Pregnancy, Labor and Birth, and Postpartum During COVID-19 in the United States: Preliminary Results of a Mixed-Methods Study.**

Saleh L, Canclini S, Greer K, et al (2022), The Journal of Perinatal and Neonatal Nursing vol 36, no 1, January/March 2022, pp 55-67

The purpose of this study was to gain insight into the experiences of women who gave birth in the United States during coronavirus disease-2019 (COVID-19). A mixed-methods study was performed using online surveys and interviews. Data were analyzed using descriptive statistics and interview transcripts were analyzed by thematic analysis resulting in major themes. Participants (n = 32) were women who had given birth on or after March 13, 2020. Of the participants, 34% experienced depression, 46% experienced mild to moderate anxiety, and 28% experienced severe anxiety symptoms. Four major themes emerged: expectations versus reality, early versus late COVID-19 experience, mental distress versus mental health, and healthcare policy versus COVID-19 confusion. Experiences varied based upon geographical location, parity, and proximity to support. Short and long-term effects of COVID-19 on participants and their families were recognized. It is important to acknowledge the confusion experienced in many aspects of the birthing experience due to developing or conflicting pandemic or popular media information. Aligning expectations through providing clear, up-to-date information is helpful in decreasing mental distress. Finally, the impact of COVID-19 highlighted the critical need for professional and focused familial support and follow-up for women experiencing pregnancy-related mental health symptoms. (Author)

**Full URL:** <https://doi.org/10.1097/JPN.0000000000000624>

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**2021-14486**

**Pandemics Past, Present, and Future: What History Can Teach Us.**

Kriebs JM (2022), The Journal of Perinatal and Neonatal Nursing vol 36, no 1, January/March 2022, pp 7-10

One of the lessons of the current pandemic is that Americans have lost trust in the public health system in the United States (US) and in the health recommendations of the Federal government. History tells us that each pandemic brings new challenges and new lessons. Looking back at the history of pandemics, and at the present experience, nurses and midwives can craft responses to patient concerns and contribute to future planning that better addresses the needs of maternal-child health practices. (Author)

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2021-14290

## Obstetric interventions and pregnancy outcomes during the COVID-19 pandemic in England: A nationwide cohort study.

Gurol-Urganci I, Waite L, Webster K, et al (2022), PLoS Medicine vol 19, no 1, January 2022, e1003884

### Background

The COVID-19 pandemic has disrupted maternity services worldwide and imposed restrictions on societal behaviours. This national study aimed to compare obstetric intervention and pregnancy outcome rates in England during the pandemic and corresponding pre-pandemic calendar periods, and to assess whether differences in these rates varied according to ethnic and socioeconomic background.

### Methods and findings

We conducted a national study of singleton births in English National Health Service hospitals. We compared births during the COVID-19 pandemic period (23 March 2020 to 22 February 2021) with births during the corresponding calendar period 1 year earlier. The Hospital Episode Statistics database provided administrative hospital data about maternal characteristics, obstetric interventions (induction of labour, elective or emergency cesarean section, and instrumental birth), and outcomes (stillbirth, preterm birth, small for gestational age [SGA; birthweight < 10th centile], prolonged maternal length of stay ( $\geq 3$  days), and maternal 42-day readmission). Multi-level logistic regression models were used to compare intervention and outcome rates between the corresponding pre-pandemic and pandemic calendar periods and to test for interactions between pandemic period and ethnic and socioeconomic background. All models were adjusted for maternal characteristics including age, obstetric history, comorbidities, and COVID-19 status at birth. The study included 948,020 singleton births (maternal characteristics: median age 30 years, 41.6% primiparous, 8.3% with gestational diabetes, 2.4% with preeclampsia, and 1.6% with pre-existing diabetes or hypertension); 451,727 births occurred during the defined pandemic period. Maternal characteristics were similar in the pre-pandemic and pandemic periods. Compared to the pre-pandemic period, stillbirth rates remained similar (0.36% pandemic versus 0.37% pre-pandemic,  $p = 0.16$ ). Preterm birth and SGA birth rates were slightly lower during the pandemic (6.0% versus 6.1% for preterm births, adjusted odds ratio [aOR] 0.96, 95% CI 0.94–0.97; 5.6% versus 5.8% for SGA births, aOR 0.95, 95% CI 0.93–0.96; both  $p < 0.001$ ). Slightly higher rates of obstetric intervention were observed during the pandemic (40.4% versus 39.1% for induction of labour, aOR 1.04, 95% CI 1.03–1.05; 13.9% versus 12.9% for elective cesarean section, aOR 1.13, 95% CI 1.11–1.14; 18.4% versus 17.0% for emergency cesarean section, aOR 1.07, 95% CI 1.06–1.08; all  $p < 0.001$ ). Lower rates of prolonged maternal length of stay (16.7% versus 20.2%, aOR 0.77, 95% CI 0.76–0.78,  $p < 0.001$ ) and maternal readmission (3.0% versus 3.3%, aOR 0.88, 95% CI 0.86–0.90,  $p < 0.001$ ) were observed during the pandemic period. There was some evidence that differences in the rates of preterm birth, emergency cesarean section, and unassisted vaginal birth varied according to the mother's ethnic background but not according to her socioeconomic background. A key limitation is that multiple comparisons were made, increasing the chance of false-positive results.

### Conclusions

In this study, we found very small decreases in preterm birth and SGA birth rates and very small increases in induction of labour and elective and emergency cesarean section during the COVID-19 pandemic, with some evidence of a slightly different pattern of results in women from ethnic minority backgrounds. These changes in obstetric intervention rates and pregnancy outcomes may be linked to women's behaviour, environmental exposure, changes in maternity practice, or reduced staffing levels.

(Author)

Full URL: <https://doi.org/10.1371/journal.pmed.1003884>

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## 2021-14144

**Coronavirus: Antenatal Appointments [written answer].** Scottish Parliament (2022), Official Report Written question S6W-05853, 24 January 2022

Maree Todd responds to a written question asked by Alexander Burnett to the Scottish Government, regarding when it expects COVID-19 restrictions to be eased to allow pregnant mothers to take their young children with them when attending midwife appointments, in order to alleviate the need to find alternative childcare. (MB)

**Full URL:** <https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-05853>

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## 2021-13995

**Mental well-being during stages of COVID-19 lockdown among pregnant women and new mothers.** Overbeck G, Rasmussen IS, Siersma V, et al (2022), BMC Pregnancy and Childbirth vol 22, no 92, 1 February 2022

### Background

Pregnancy and early motherhood are sensitive times where epidemic disease outbreaks can affect mental health negatively. Countries and health care systems handled the pandemic and lockdowns differently and knowledge about how the COVID-19 pandemic affected the mental well-being of pregnant women and new mothers is limited and points in different directions.

### Aim

To investigate symptoms of anxiety and depression in a population of pregnant women and new mothers in various stages of infection pressure and lockdown during the first 15 months of the COVID-19 pandemic in Denmark.

### Methods

The study population was nested an inception cohort of women recruited in their first trimester of pregnancy. Data about mental health of the woman were obtained in relation to pregnancy and child development (first trimester, 8 weeks postpartum and 5 months postpartum), and data were analysed cross-sectionally according to calendar time (periods defined by infection rate and lock-down during the COVID-19 pandemic).

### Results

No differences in reported levels of depressive symptoms between the six examined time periods of the pandemic were observed. Specifically, symptoms remained unchanged after the first lock-down. No major changes in anxiety symptoms were observed in relation to increased infection pressure or lockdowns, but a small increase was observed during the second lockdown in women 8 weeks postpartum.

### Conclusion

No clear change in mood among pregnant women was seen between during the stages of COVID-19 pandemic in Denmark. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-021-04374-4>

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**2021-13988**

**The mental health crisis of expectant women in the UK: effects of the COVID-19 pandemic on prenatal mental health, antenatal attachment and social support.** Filippetti ML, Clarke ADF, Rigato S (2022), BMC Pregnancy and Childbirth vol 22, no 68, 26 January 2022

#### Background

Pregnancy has been shown to be times in a woman's life particularly prone to mental health issues, however a substantial percentage of mothers report subclinical perinatal mental health symptoms that go undetected. Experiences of prenatal trauma, such as the COVID-19 pandemic, may exacerbate vulnerability to negative health outcomes for pregnant women and their infants. We aimed to examine the role of: 1) anxiety, depression, and stress related to COVID-19 in predicting the quality of antenatal attachment; 2) perceived social support and COVID-19 appraisal in predicting maternal anxiety and depression.

#### Methods

A sample of 150 UK expectant women were surveyed during the COVID-19 pandemic. Questions included demographics, pregnancy details, and COVID-19 appraisal. Validated measures were used to collect self-reported maternal antenatal attachment (MAAS), symptoms of anxiety (STAI), depression (BDI-II), and stress related to the psychological impact of COVID-19 (IES-r).

#### Results

We found that the pandemic has affected UK expectant mothers' mental health by increasing prevalence of depression (47%), anxiety (60%) and stress related to the psychological impact of COVID-19 (40%). Women for whom COVID-19 had a higher psychological impact were more likely to suffer from depressive (95% HPDI = [0.04, 0.39]) and anxiety symptoms (95% HPDI = [0.40, 0.69]). High depressive symptoms were associated with reduced attachment to the unborn baby (95% HPDI [-0.46, -0.1]). Whilst women who appraised the impact of COVID-19 to be more negative showed higher levels of anxiety (HPDI = [0.15, 0.46]), higher social support acted as a protective factor and was associated with lower anxiety (95% HPDI = [-0.52, -0.21]).

#### Conclusions

The current findings demonstrate that direct experience of prenatal trauma, such as the one experienced during the COVID-19 pandemic, significantly amplifies mothers' vulnerability to mental health symptoms and impairs the formation of a positive relationship with their unborn baby. Health services should prioritise interventions strategies aimed at fostering support for pregnant women. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-022-04387-7>

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**2021-13962**

**The experience of women with recent gestational diabetes during the COVID-19 lockdown: a qualitative study from Denmark.** Jensen NH, Nielsen KK, Dahl-Petersen IK, et al (2022), BMC Pregnancy and Childbirth vol 22, no 84, 29 January 2022

**Background**

Following COVID-19 and the lockdowns, maternity care and support for women after delivery have been temporary restructured. Studies show that COVID-19 adversely impacts pregnant and peripartum women in the general population, but experiences among women in the first year after delivery/in the wider postpartum period remain unexplored. Moreover, experiences among women with recent gestational diabetes mellitus (GDM) are lacking; though it is a group with a potential high need for support after delivery. The aim of our study was to investigate (i) how women with recent GDM experienced COVID-19 and the first lockdown in Denmark, and (ii) the women's risk perception and health literacy in terms of interaction with the healthcare system in relation to COVID-19.

**Methods**

We performed a qualitative study among 11 women with recent GDM (infants aged 2-11 months old). Semi-structured interviews were conducted in April-May 2020 by telephone or Skype for Business, when Denmark was under lockdown. We analysed data using a thematic qualitative content analysis.

**Results**

Three themes emerged: i) Everyday life and family well-being, ii) Worries about COVID-19 and iii) Health literacy: Health information and access to healthcare. The women were generally not worried about their own or their infant's risk of COVID-19. The lockdown had a negative impact on everyday life e.g. routines, loneliness, breastfeeding uncertainties and worries for the infant's social well-being; but better family dynamics were also described. It was challenging to maintain healthy behaviours and thus the women described worries for the risk of type 2 diabetes and GDM in subsequent pregnancies. The women missed peer support and face-to-face visits from health visitors and found it difficult to navigate the restructured care with online/telephone set-ups.

**Conclusions**

COVID-19 and the lockdown affected everyday life among women with recent GDM both positively and negatively. Our findings suggest a need for care that are responsive to psychological and social aspects of health throughout the COVID-19 pandemic and support to limit worries about adaptation to motherhood and the infant's social well-being. Communication focusing on the importance and relevance of contacting healthcare providers should also be strengthened. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-022-04424-5>

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## 2021-13961

**Effects of the COVID-19 pandemic on perinatal outcomes: a retrospective cohort study from Turkey.** Yalçın SS, Boran P, Tezel B, et al (2022), BMC Pregnancy and Childbirth vol 22, no 51, 20 January 2022

### Background

Lockdowns, pregnant women's fear from hospitalization in addition to uncertainties about appropriate birthing practices at the beginning of the pandemic may have affected the health outcomes of mother-infant couples. We aimed to explore whether pregnancy outcomes including the rates of cesarean delivery (CS), preterm, and low birth weight (LBW) births have changed during the pandemic period compared with the pre-pandemic period.

### Methods

We applied a population-based retrospective cohort, before-after approach in 2020 vs. similar calendar months in 2019 for five periods [Jan-Feb (pre-pandemic); March–May (1st wave and lockdown); June–August; September–October; November–December (2nd wave and lockdown)]. The data was modelled through multiple logistic regressions using key outcomes; CS, preterm, and LBW births as the dependent variables, and adjustments were made for independent variables in SPSS software. We evaluated the modification of years by periods by adding interaction term (yearXperiod) to the model.

### Results

The rate of CS in hospital births increased from 57.7% in 2019 to 60.2% in 2020. CS rates were significantly increased during the 3rd and 4th periods. The overall preterm rate was 11%. When singleton pregnancies were considered, adjusted multivariable analyses showed a decrease in preterm proportions during all time periods with respect to the pre-pandemic period. The percentage of LBW was 7.7% during the pandemic period and was found to be significantly reduced compared to the pre-pandemic period. There was a significant reduction in LBW rates in all periods except the second lockdown period.

### Conclusions

Our findings suggested significant reductions in preterm and LBW births possibly due to the indirect effects of the pandemic. Moreover, strategies need to be considered to address the increased CS rates and shifting of maternity service utilization to private facilities. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-021-04349-5>

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## 2021-13958

**Effect of initial COVID-19 outbreak during first trimester on pregnancy outcome in Wuxi, China.** Liu Y, Dai M, Tang S (2022), BMC Pregnancy and Childbirth vol 22, no 54, 21 January 2022

### Background

A hospital-based retrospective study was conducted to examine the effect of initial COVID-19 outbreak during first trimester on pregnancy outcome in Wuxi, China.

### Methods

Women who delivered children at our hospital during June 2020 to July 2020 (control group), and October 2020 to December 2020 (exposure group) were recruited in the present study. All of the participants were not infected with COVID-19. The last menstrual period (LMP) of the exposure group was between January 24th, 2020 and March 12th, 2020, whilst in the control group, the LMP was between May 12th and October 31st, 2019.

### Results

There were 1,456 women in the exposure group and 1,816 women in the control group. Women in the exposure group were more susceptible to hypertension during pregnancy (HDP,  $P = 0.004$ ,  $OR[95\%CI] = 1.90[1.22-2.95]$ ) and gestational diabetes mellitus (GDM,  $P = 0.008$ ,  $OR[95\%CI] = 1.31[1.08-1.60]$ ) compared to those in the control group. Mothers diagnosed with HDP were more likely to deliver premature infants, leading to a higher rate of low birth weight (all  $P < 0.05$ ). The other common outcomes of pregnancy showed no statistical differences between the two groups.

### Conclusions

The initial COVID-19 outbreak might increase the incidence rates of HDP and GDM among pregnant women whose first trimesters were during that period, resulting in higher percentages of premature delivery and low birth weight. These results should be confirmed by studies from other hospitals or cities. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-022-04395-7>

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**2021-13857**

**Companionship for women/birthing people using antenatal and intrapartum care in England during COVID-19: a mixed-methods analysis of national and organisational responses and perspectives.** Thomson G, Balaam M-C, Harris RN, et al (2022), *BMJ Open* vol 12, no 1, January 2022, e051965

Objectives To explore stakeholders' and national organisational perspectives on companionship for women/birthing people using antenatal and intrapartum care in England during COVID-19, as part of the Achieving Safe and Personalised maternity care In Response to Epidemics (ASPIRE) COVID-19 UK study.

Setting Maternity care provision in England.

Participants Interviews were held with 26 national governmental, professional and service-user organisation leads (July–December 2020). Other data included public-facing outputs logged from 25 maternity Trusts (September/October 2020) and data extracted from 78 documents from eight key governmental, professional and service-user organisations that informed national maternity care guidance and policy (February–December 2020).

Results Six themes emerged: 'Postcode lottery of care' highlights variations in companionship and visiting practices between trusts/locations, 'Confusion and stress around 'rules'' relates to a lack of and variable information concerning companionship/visiting, 'Unintended consequences' concerns the negative impacts of restricted companionship or visiting on women/birthing people and staff, 'Need for flexibility' highlights concerns about applying companionship and visiting policies irrespective of need, 'Acceptable' time for support' highlights variations in when and if companionship was 'allowed' antenatally and intrapartum and 'Loss of human rights for gain in infection control' emphasises how a predominant focus on infection control was at a cost to psychological safety and human rights.

Conclusions Policies concerning companionship and visiting have been inconsistently applied within English maternity services during the COVID-19 pandemic. In some cases, policies were not justified by the level of risk, and were applied indiscriminately regardless of need. There is an urgent need to determine how to sensitively and flexibly balance risks and benefits and optimise outcomes during the current and future crisis situations. (Author)

Full URL: <http://dx.doi.org/10.1136/bmjopen-2021-051965>

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**2021-13835**

**A real-world assessment of tolerability and treatment outcomes of COVID-19 monoclonal antibodies administered in pregnancy.** Chang MH, Cowman K, Guo Y, et al (2022), *American Journal of Obstetrics & Gynecology (AJOG)* 20 January 2022, online Research letter aiming to evaluate the tolerability of monoclonal antibodies for treatment of COVID-19 in pregnancy and to assess subjective improvement in symptoms. Results indicate that monoclonal antibodies are well tolerated and should be considered in pregnancy. (LDO)

Full URL: <https://doi.org/10.1016/j.ajog.2022.01.018>

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**2021-13830**

**Changes and geographic variation in rates of preterm birth and stillbirth during the prepandemic period and COVID-19 pandemic, according to health insurance claims in the United States, April–June 2019 and April–June 2020.** Chen J, Ferre C, Ouyang L, et al (2022), *American Journal of Obstetrics & Gynecology MFM* vol 4, no 1, January 2022, 100508

Research letter comparing premature birth and stillbirth rates between the pre-pandemic period and COVID-19 lockdown period in the United States. Results show a 0.4% decrease in premature birth and no changes in stillbirth rates during the COVID-19 pandemic. (LDO)

Full URL: <https://doi.org/10.1016/j.ajogmf.2021.100508>

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## 2021-13814

**COVID-19 pandemic and population-level pregnancy and neonatal outcomes in general population: A living systematic review and meta-analysis (Update#2: November 20, 2021).** Yang J, D'Souza R, Kharrat A, et al (2022), *Acta Obstetrica et Gynecologica Scandinavica* vol 101, no 3, March 2022, pp 273-292

### Introduction

Conflicting reports of increases and decreases in rates of preterm birth (PTB) and stillbirth in the general population during the coronavirus disease 2019 (COVID-19) pandemic have surfaced. The objective of our study was to conduct a living systematic review and meta-analyses of studies reporting pregnancy and neonatal outcomes by comparing the pandemic and pre-pandemic periods.

### Material and methods

We searched the PubMed and Embase databases and reference lists of articles published up until November 20, 2021, and included English language studies that compared outcomes between the COVID-19 pandemic time period with pre-pandemic time periods. Risk of bias was assessed using the Newcastle-Ottawa scale. We conducted random-effects meta-analysis using the inverse variance method.

### Results

Fifty-two studies with low-to-moderate risk of bias, reporting on 2 372 521 pregnancies during the pandemic period and 28 518 300 pregnancies during the pre-pandemic period, were included. There was significant reduction in unadjusted estimates of PTB (43 studies, unadjusted odds ratio [uaOR] 0.95, 95% CI 0.93–0.98), but not in adjusted estimates (five studies, adjusted OR [aOR] 0.94, 95% CI 0.74–1.19). This reduction was noted in studies from single centers/health areas (29 studies, uaOR 0.90, 95% CI 0.85–0.94) but not in regional/national studies (14 studies, uaOR 0.99, 95% CI 0.99–1.01). There was reduction in spontaneous PTB (nine studies, uaOR 0.91, 95% CI 0.88–0.94) but not in induced PTB (eight studies, uaOR 0.90, 95% CI 0.79–1.01). There was no difference in the odds of stillbirth between the pandemic and pre-pandemic time periods (32 studies, uaOR 1.07, 95% CI 0.97–1.18 and three studies, aOR 1.18, 95% CI 0.86–1.63). There was an increase in mean birthweight during the pandemic period compared with the pre-pandemic period (nine studies, mean difference 21 g, 95% CI 13–30 g). The odds of maternal mortality were increased (five studies, uaOR 1.15, 95% CI 1.05–1.26); however, only unadjusted estimates were available, and the result was mostly influenced by one study from Mexico. There was significant publication bias for the outcome of PTB.

### Conclusions

The COVID-19 pandemic may be associated with a reduction in PTB; however, referral bias cannot be excluded. There was no statistically significant difference in stillbirths between pandemic and pre-pandemic periods. (Author)

Full URL: <https://doi.org/10.1111/aogs.14318>

## 2021-13805

**SARS-CoV-2 infection and a subsequent secondary atrophy/atresia of one of the umbilical arteries.** Ignatov PN, Neykova KN (2022), *The Journal of Maternal-Fetal and Neonatal Medicine* 23 January 2022, online

We conducted a retrospective study among patients who visited two tertiary clinical settings between April 2020 and July 2021. Diagnosis of a single umbilical artery (SUA) was made on four patients during the 18th-23rd week fetal anatomy scan after the previous 11th-13th week scan records proved affirmative for the presence of two umbilical arteries (UAs). (Author, edited)

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## 2021-13698

**Severe COVID-19 in pregnancy is almost exclusively limited to unvaccinated women – time for policies to change.** Engjom H, van den Akker T, Aabakke A, et al (2022), The Lancet Regional Health - Europe 26 January 2022, online

Commentary piece analysing data from the International Network of Obstetric Survey Systems (INOSS) collected in the United Kingdom (UK), the Netherlands, Norway, Denmark, Finland and Italy between May and December 2021. Results show that at least 80% of pregnant women admitted to critical care with COVID-19 were unvaccinated across the six countries, including 98% of pregnant women in the UK. (LDO)

**Full URL:** <https://doi.org/10.1016/j.lanepe.2022.100313>

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## 2021-13621

**Spontaneous Intracerebral Hemorrhage (ICH) associated with pregnancy and SARS-CoV-2 infection: a case report.** Dini P, Aminimoghaddam S, Mirzaasgari Z, et al (2022), BMC Pregnancy and Childbirth vol 22, no 14, 6 January 2022

### Background

Coronavirus Disease 2019 (COVID-19) is predominately known as a respiratory disease associated with pneumonia, acute respiratory distress syndrome and multiorgan failure. However, extra-pulmonary complications of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) are increasingly being recognized. In this regard, some studies implied the hemostatic and vascular involvements in patients with SARS-CoV-2 infection.

### Case presentation

We describe a case of spontaneous Intracerebral Hemorrhage (ICH) in a pregnant patient with COVID-19 and history of cesarean section a week before the occurrence of ICH. The patient underwent emergent craniotomy with acceptable outcome. Hemorrhagic events, including ICH, may happen during COVID-19 infection with several possible mechanisms.

### Conclusion

COVID-19 patients, especially high-risk groups, are at a risk of intracranial hemorrhage. Therefore, close follow-up must be maintained and hemorrhagic events must be kept in mind in these cases. (Author)

**Full URL:** <https://doi.org/10.1186/s12884-021-04345-9>

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## 2021-13581

**Mind the Gap: COVID-19 highlights the research void in pregnancy.** Dangel A, Yu V, Liang C, et al (2022), American Journal of Obstetrics & Gynecology MFM 12 January 2022, online

Discusses the lack of research involving pregnant women and suggests that the COVID-19 pandemic can be used as an opportunity to evaluate the research landscape. (LDO)

**Full URL:** <https://doi.org/10.1016/j.ajogmf.2022.100566>

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## 2021-13570

**Twin-to-twin transfusion syndrome and coronavirus disease 2019: impact on diagnosis, referral, eligibility for fetoscopic laser therapy, and outcomes.** López-Briones H, Villalobos-Gómez R, Chávez-González E, et al (2022), *AJOG Global Reports* vol 2, no 1, February 2022, 100040

### Background

Due to the progressive nature of twin-to-twin transfusion syndrome (TTTS), hindering on health care access during the coronavirus disease (COVID-19) pandemic may lead to delayed diagnosis and referral to fetal surgery centers, which may have repercussions on outcomes.

### Objective

To assess the clinical impact of the COVID-19 pandemic on pregnancies complicated with TTTS.

### Study Design

A retrospective cohort of consecutive monochorionic diamniotic twin pregnancies complicated with TTTS evaluated in our national referral fetal surgery center at Queretaro, Mexico for possible surgical fetoscopy was constructed. Maternal-fetal characteristics and perinatal outcomes of cases evaluated during the first year of the World Health Organization's COVID-19 pandemic declaration (11 March 2020- 10 March 2021) were retrospectively compared with cases evaluated during the same period in the previous year (11 March 2019 – 10 March 2020).

### Results

109 consecutive TTTS cases were evaluated during the 2-year study period, 54 during the COVID-19 pandemic and 55 in the previous year. In the former group, a higher proportion of cases with fetal surveillance interval longer than 2 weeks (70.4% vs. 47.3%,  $p=0.01$ ), TTTS complications precluding laser therapy such as intrauterine fetal demise, preterm rupture of membranes, or cervical dilatation with prolapsed amniotic membranes (18.5% vs. 1.8%,  $p<0.01$ ), advanced TTTS (53.7% vs. 36.4%,  $p=0.07$ ), preoperative short cervix (25.9% vs. 10.9%,  $p<0.05$ ), and lower overall perinatal survival (56.9% vs. 80.0%,  $p=0.01$  of at least one twin; and 39.2% vs. 56.4%,  $p=0.08$  of both twins, respectively) were observed. A significantly lower number of cases were selected for fetoscopic laser therapy during the pandemic period (75.9% vs. 92.7%,  $p=0.01$ ), with similar postoperative outcomes seen in both study periods.

### Conclusion

In pregnancies with TTTS, the COVID-19 pandemic has shown an adverse impact involving suboptimal fetal surveillance, advanced stages at diagnosis, poorer survival rates, and higher number of complications that preclude fetoscopic laser therapy. (Author)

**Full URL:** <https://doi.org/10.1016/j.xagr.2021.100040>

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## 2021-13520

**Covid-19: Severe complications during pregnancy are more common in unvaccinated women, study finds.** Mahase E (2022), *BMJ* vol 376, no 8322, 17 January 2022, o117

Unvaccinated women accounted for 77% of SARS-CoV-2 infections that have occurred during pregnancy in Scotland and 98% of infections that led to a critical care admission, a study has found (1).

1. Stock SJ et al. *Nature Medicine*, 13 January 2022, online. <https://doi.org/10.1038/s41591-021-01666-2>.

(Author, edited)

**Full URL:** <https://doi.org/10.1136/bmj.o117>

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## 2021-13447

**Impact of COVID-19 on pregnancy worry in the United States.** Burgess A, Breman RB, Roane LA, et al (2022), Birth 7 January 2022, online

### Background

Several recent studies confirm that the COVID-19 pandemic has increased symptoms of stress, anxiety, and depression in pregnant persons around world. In this study, we aimed to uncover the impact of COVID-19 on worry during pregnancy.

### Methods

This study used a cross-sectional descriptive research design. A link to a survey was emailed to users of the Ovia Pregnancy app. Participants (N = 253) completed the survey, which included the Cambridge Worry in Pregnancy Scale, and answered several free text questions. The free-text questions were included to capture worries not listed on the scale and to allow participants the opportunity to more clearly describe COVID-19-related worries. Descriptive statistics were reported, and content analysis performed to determine themes.

### Results

Overall, respondents reported they were quite or very worried about having their partner with them at birth (31.7%, n = 80), giving birth (28.2%; n = 71), and something being wrong with the baby (27.3%; n = 69). Results on worries also differed by participants' race, parity, and trimester. When comparing White to other racial groups, other racial groups had statistically significantly higher median scores for questions on worries about employment (P = .001), going to the hospital (P = .002), and internal examinations (P = .03). Content analysis revealed isolation, loss of support, anxiety/stress, and grief as major themes.

### Discussion

The worry, isolation, loss of support, anxiety, and grief reported by pregnant persons during the COVID-19 pandemic may impact maternal pre- and postnatal mental health and are not borne equally. Birthing persons of color appear disproportionately impacted. Prenatally, maternity care providers should assess for worry and provide individualized education and resources to pregnant patients, centering individuals and communities made most vulnerable by structural inequality. (Author)

Full URL: <https://doi.org/10.1111/birt.12608>

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## 2021-13441

**Covid in pregnancy linked to birth-related complications.** Anon (2022), BBC News 13 January 2022

A new study (1) has linked Covid-19 to complications during pregnancy.

1. Stock SJ. Nature Medicine, 13 January 2022, online. <https://doi.org/10.1038/s41591-021-01666-2>.

(Author, edited)

Full URL: <https://www.bbc.co.uk/news/uk-scotland-59986452>

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## 2021-13440

**SARS-CoV-2 infection and COVID-19 vaccination rates in pregnant women in Scotland.** Stock SJ, Carruthers J, Calvert C, et al (2022), Nature Medicine 13 January 2022, online

Population-level data on COVID-19 vaccine uptake in pregnancy and SARS-CoV-2 infection outcomes are lacking. We describe COVID-19 vaccine uptake and SARS-CoV-2 infection in pregnant women in Scotland, using whole-population data from a national, prospective cohort. Between the start of a COVID-19 vaccine program in Scotland, on 8 December 2020 and 31 October 2021, 25,917 COVID-19 vaccinations were given to 18,457 pregnant women. Vaccine coverage was substantially lower in pregnant women than in the general female population of 18–44 years; 32.3% of women giving birth in October 2021 had two doses of vaccine compared to 77.4% in all women. The extended perinatal mortality rate for women who gave birth within 28 d of a COVID-19 diagnosis was 22.6 per 1,000 births (95% CI 12.9–38.5; pandemic background rate 5.6 per 1,000 births; 452 out of 80,456; 95% CI 5.1–6.2). Overall, 77.4% (3,833 out of 4,950; 95% CI 76.2–78.6) of SARS-CoV-2 infections, 90.9% (748 out of 823; 95% CI 88.7–92.7) of SARS-CoV-2 associated with hospital admission and 98% (102 out of 104; 95% CI 92.5–99.7) of SARS-CoV-2 associated with critical care admission, as well as all baby deaths, occurred in pregnant women who were unvaccinated at the time of COVID-19 diagnosis. Addressing low vaccine uptake rates in pregnant women is imperative to protect the health of women and babies in the ongoing pandemic. (Author)

**Full URL:** <https://doi.org/10.1038/s41591-021-01666-2>

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**2021-13078**

**Systematic review and meta-analysis of COVID-19 maternal and neonatal clinical features and pregnancy outcomes up to June 3, 2021.** Marchand G, Patil AS, Masoud AT, et al (2022), *AJOG Global Reports* vol 2, no 1, February 2022, 100049

#### Objectives

COVID-19 is a rapidly changing and developing emergency that requires constant re-evaluation of available data. We report a systematic review and meta analysis based on all published high quality data up to and including June 3rd 2021 on the maternal and neonatal outcomes in pregnant women infected with the Coronavirus Disease 2019 (COVID-19).

#### Data Sources

PubMed, SCOPUS, MEDLINE, ClinicalTrials.gov, and Web of Science databases were queried from inception up to June 3rd 2021.

#### Study Eligibility Criteria

We included all clinical studies (prospective and retrospective cohort studies, case-control studies, case series, and rapid communications) that reported data on any maternal and neonatal outcomes of pregnant women with COVID-19.

#### Study Appraisal and Synthesis Methods

Data were analyzed as pooled proportions or odds ratios (OR) and 95% confidence intervals (95% CI) in meta-analysis models.

#### Results

We included 111 studies enrolling 42754 COVID-19-positive pregnant women. From COVID-19-positive pregnant women, the incidence rate of cesarean section was 53.2% (95% CI: 48%–58.4%), 41.5% (95% CI: 36.3%–46.8%) for spontaneous vaginal delivery and 6.4% (95% CI: 4.5%–9.2%) for operative delivery. The rate of some adverse neonatal events was relatively high in mothers infected with COVID-19 including premature delivery (16.7%, 95% CI: 12.8%–21.5%), and low birthweight (16.7%, 95% CI: 12.8%–21.5%). Vertical transmission (3.5%, 95% CI: 2.7%–4.7%), neonatal death (3%, 95% CI: 2%–4%), stillbirth (1.9%, 95% CI: 1.5–2.4%) and maternal mortality (0.012% 95% CI: 0.010–0.014%) were rare adverse events. Mean birth weight was 3069.7g, 95% CI: 3009.7g–3129.8g). In the comparative analysis, COVID-19 significantly increased the risk of premature delivery (OR= 1.48, [95% CI; 1.22, 1.8]), preeclampsia (OR= 1.6, [95% CI; 1.2, 2.1]), stillbirth (OR= 2.36, [95% CI 1.24, 4.462]), neonatal mortality (OR= 3.35, [95% CI; 1.07, 10.5]), and maternal mortality (OR= 3.08, [95% CI; 1.5, 6.3]). Pooled analyses were homogenous, with mild heterogeneity in premature delivery and preeclampsia outcomes.

#### Conclusion

Data must be interpreted with caution as limited data is available and no complete assessment of bias is possible at this time. Our data suggests that pregnant women who test positive for COVID-19 seem to be at higher risk for lower birth weights and premature delivery. There is no evidence at this time of the sharply increased maternal mortality that was seen with both the previous 2002 Middle East Respiratory Syndrome (MERS) and 2003 Severe Acute Respiratory Syndrome (SARS) pandemics.  
(Author)

**Full URL:** <https://doi.org/10.1016/j.xagr.2021.100049>

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## 2021-09872

**Attitudes Toward COVID-19 Illness and COVID-19 Vaccination among Pregnant Women: A Cross-Sectional Multicenter Study during August–December 2020.** Battarbee AN, Stockwell MS, Varner M, et al (2022), American Journal of Perinatology vol 39, no 1, January 2022, pp 75-83

**Objective** The aim of the study was to evaluate pregnant women's attitudes toward COVID-19 illness and vaccination and identify factors associated with vaccine acceptability.

**Study Design** This was a cross-sectional survey among pregnant women enrolled in a prospective COVID-19 cohort study in Salt Lake City, UT, Birmingham, AL, and New York, NY, from August 9 to December 10, 2020. Women were eligible if they were 18 to 50 years old and <28 weeks of gestation. Upon enrollment, women completed surveys regarding concerns about COVID-19 illness and likelihood of getting COVID-19 vaccine if one were available during pregnancy. Vaccine acceptability was defined as a response of “very likely” or “somewhat likely” on a 4-point Likert scale. Factors associated with vaccine acceptability were assessed with multivariable logistic regression.

**Results** Of 939 pregnant women eligible for the main cohort study, 915 (97%) consented to participate. Among these 915 women, 39% self-identified as White, 23% Black, 33% Hispanic, and 4% Other. Sixty-two percent received an influenza vaccine last season. Seventy-two percent worried about getting sick with COVID-19. If they were to get sick, 92% worried about harm to their pregnancy and 80% about harm to themselves. Only 41% reported they would get a vaccine. Of women who were unlikely to get vaccinated, the most frequently cited concern was vaccine safety for their pregnancy (82%). Non-Hispanic Black and Hispanic women had lower odds of accepting a vaccine compared with non-Hispanic White women (adjusted odds ratios [aOR] 0.4, 95% CI 0.2–0.6 for both). Receipt of influenza vaccine during the previous season was associated with higher odds of vaccine acceptability (aOR 2.1, 95% CI 1.5–3.0).

**Conclusion** Although most pregnant women worried about COVID-19 illness, <50% were willing to get vaccinated during pregnancy. Racial and ethnic disparities in plans to accept COVID-19 vaccine highlight the need to prioritize strategies to address perceived barriers among groups at high risk for COVID-19. (Author)

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## 2021-09843

**The lethal effect of the second wave of COVID-19 on pregnant women: a matter of concern.** Khoiwal K, Agarwal A, Mittal A, et al (2022), International Journal of Gynecology & Obstetrics vol 156, no 1, January 2022, pp 178-181

The lethal second wave of COVID-19 hit pregnant women terribly with regards to disease severity, requirement of invasive ventilation, and maternal mortality. (Author)

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## 2021-09741

**SARS-CoV-2 and hypertensive disease in pregnancy.** Madden N, Emeruwa UN, Polin M, et al (2022), American Journal of Obstetrics & Gynecology MFM vol 4, no 1, January 2022, 100496

Correspondence piece aiming to evaluate differences in rates of hypertensive disorders of pregnancy (HDP) and hypertensive disease severity in SARS-CoV-2 patients. Results show that those with SARS-CoV-2 had significantly higher rates of HDP, including gestational hypertension and pre-eclampsia. (LDO)

**Full URL:** <https://doi.org/10.1016/j.ajogmf.2021.100496>

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## 2021-09737

**Neighborhood deprivation and preterm delivery during the coronavirus 2019 pandemic.** Fisher SA, Sakowicz A, Barnard C, et al (2022), American Journal of Obstetrics & Gynecology MFM vol 4, no 1, January 2022, 100493

### Background

Prior studies have reported decreases in preterm delivery (PTD) incidence during the coronavirus 2019 (COVID-19) pandemic, however findings are inconsistent. Given wide disparities in the pandemic's impact across communities, neighborhood deprivation may explain observed variation in the relationship between the COVID-19 pandemic and preterm delivery.

### Objective

To characterize changes in the incidence of PTD during the COVID-19 pandemic with attention to effect modification introduced by neighborhood hardship.

### Study Design

This retrospective cohort study included all pregnant patients who delivered at an urban tertiary care hospital during the pandemic (April-November 2020) or pre-pandemic (April-November 2019). We compared the incidence of PTD, spontaneous PTD, and medically indicated PTD prior to 37 weeks' gestation across epochs. Planned analyses stratified the cohorts by neighborhood deprivation metrics defined by residential zip code, including median neighborhood household income and hardship index (a composite index including dependency, educational attainment, unemployment, poverty, per capita income, and crowded housing). The Breslow-Day test for homogeneity assessed the association of delivery epoch and neighborhood deprivation with PTD outcome.

### Results

Of 16,544 eligible deliveries, 8.7% occurred preterm. Incidences of PTD (8.4% vs. 9.0%,  $p=0.17$ ), spontaneous PTD (5.0 vs 5.4%,  $p=0.27$ ), and medically indicated PTD (3.2% v 3.5%,  $p=0.47$ ) were similar between the pandemic and pre-pandemic epochs. However, PTD (OR 0.78, 95% CI 0.64-0.96) and spontaneous PTD (OR 0.76, 95% CI 0.59-0.99) decreased from the pre-pandemic to pandemic epoch in those living in neighborhoods <50th percentile for median income (Breslow-Day  $p$ -values 0.047 and 0.036, respectively). Similarly, PTD (OR 0.78, 95% CI 0.64-0.97) and spontaneous PTD (OR 0.74, 95% CI 0.57-0.98) decreased for those inhabiting neighborhoods in the highest-hardship quartile (Breslow-Day  $p$ -values 0.045 and 0.029, respectively).

### Conclusion

Populations residing in socioeconomically disadvantaged neighborhoods experienced reductions in preterm delivery during the COVID-19 pandemic. Neighborhood-level social determinants of health offer insight into the complex etiologies that contribute to preterm delivery, and provide opportunities for public health, equity-focused prevention strategies. (Author)

Full URL: <https://doi.org/10.1016/j.ajogmf.2021.100493>

## 2021-09403

**Worse Outcomes of Pregnancy in COVID-19 Infection during Parturition may be due to Referral Bias: Analysis in a Prospective Cohort of 963 pregnancies.** Mohini, Ahmed S, Kasarla V, et al (2022), American Journal of Obstetrics & Gynecology (AJOG) vol 226, no 1, January 2022, pp 144-145.e3

Research letter analysing a prospective cohort of pregnancies to determine if high risk of severe COVID-19 in referral centres was confounded due to other risk factors. Results indicate that COVID-19 infection does not pose additional risk to pregnancy outcomes on its own. (LDO)

Full URL: <https://doi.org/10.1016/j.ajog.2021.08.058>

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**2021-09398**

**Increasing severity of COVID-19 in pregnancy with Delta (B.1.617.2) variant surge.** Adhikari EH, SoRelle JA, McIntire DD, et al (2022), American Journal of Obstetrics & Gynecology (AJOG) vol 226, no 1, January 2022, pp 149-151

Research letter reporting trends in illness severity among obstetric patients with COVID-19 in the context of the Delta variant. Results indicate increasing rates of hospitalisation and morbidity and highlight the need for prevention measures such as vaccination. (LDO)

**Full URL:** <https://doi.org/10.1016/j.ajog.2021.09.008>

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**2021-08901**

**Coronavirus disease 2019 and pregnancy is déjà vu all over again.** Rasmussen SA, Jamieson DJ (2022), BJOG: An International Journal of Obstetrics and Gynaecology vol 129, no 2, January 2022, pp 188-191

Commentary on public health emergencies in the last two decades including H1N1 influenza, Ebola virus, Zika virus, SARS and COVID-19. Highlights the need for strategies to address future emergencies and pandemics, particularly for vulnerable groups such as pregnant women. (LDO)

**Full URL:** <https://doi.org/10.1111/1471-0528.16859>

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**2021-07624**

**SARS-COV-2 infection during pregnancy and risk of preeclampsia: a systematic review and meta-analysis.** Conde-Agudelo A, Romero R (2022), American Journal of Obstetrics & Gynecology (AJOG) vol 226, no 1, January 2022, pp 68-89.e3

#### OBJECTIVE

To examine the relationship between severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection during pregnancy and the risk of preeclampsia.

#### DATA SOURCES

MEDLINE, EMBASE, POPLINE, CINAHL, LILACS, and WHO COVID-19, Chinese, and preprint databases (all from December 1, 2019 to May 31, 2021). Google Scholar, bibliographies, and conference proceedings were also searched.

#### STUDY ELIGIBILITY CRITERIA

Observational studies that assessed the association between SARS-CoV-2 infection during pregnancy and preeclampsia and that reported unadjusted and/or adjusted risk estimates and 95% confidence intervals (CIs) or data to calculate them.

#### STUDY APPRAISAL AND SYNTHESIS METHODS

The primary outcome was preeclampsia. Secondary outcomes included preeclampsia with severe features, preeclampsia without severe features, eclampsia, and the hemolysis, elevated liver enzymes, and low platelet count (HELLP) syndrome. Two reviewers independently reviewed studies for inclusion, assessed their risk of bias, and extracted data. Pooled unadjusted and adjusted odds ratios (ORs) with 95% CIs, and 95% prediction interval were calculated. Heterogeneity was quantified with the I<sup>2</sup> statistic, where I<sup>2</sup> ≥30% indicated substantial heterogeneity. Subgroup and sensitivity analyses were performed for testing the robustness of the overall findings.

#### RESULTS

Twenty-eight studies that included 790,954 pregnant women, among which 15,524 were diagnosed with SARS-CoV-2 infection, met the inclusion criteria. The meta-analysis of unadjusted ORs showed that the odds of developing preeclampsia were significantly higher among pregnant women with SARS-CoV-2 infection than among those without SARS-CoV-2 infection (7.0% vs 4.8%; pooled OR 1.62, 95% CI 1.45-1.82; P <0.00001; I<sup>2</sup>=17%; 26 studies; 95% prediction interval of the OR, 1.28-2.05). The meta-analysis of adjusted ORs also showed that SARS-CoV-2 infection during pregnancy was associated with a significant increase in the odds of preeclampsia (pooled OR 1.58, 95% CI 1.39-1.80; P <0.0001; I<sup>2</sup>=0%; 11 studies). There was a statistically significant increase in the odds of preeclampsia with severe features (OR 1.76, 95% CI 1.18-2.63; I<sup>2</sup>=58%; 7 studies), eclampsia (OR 1.97, 95% CI 1.01-3.84; I<sup>2</sup>=0%, 3 studies), and HELLP syndrome (OR 2.10, 95% CI 1.48-2.97; 1 study) among pregnant women with SARS-CoV-2 infection, as compared to those without the infection. Overall, the direction and magnitude of the effect of SARS-CoV-2 infection during pregnancy on preeclampsia was consistent across most pre-specified subgroup and sensitivity analyses. Both asymptomatic and symptomatic SARS-CoV-2 infections significantly increased the odds of preeclampsia although it was higher among patients with symptomatic illness (OR 2.11, 95% CI 1.59-2.81) than among those with asymptomatic illness (OR 1.59, 95% CI 1.21-2.10).

#### CONCLUSIONS

SARS-CoV-2 during pregnancy is associated with higher odds of preeclampsia. (Author)

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**The Royal College of Midwives Trust**  
10-18 Union Street  
London  
SE1 1SZ



**Open 24 hours a day, 7 days a week**  
T: 0300 303 0444  
F: +44 20 7312 3536  
E: info@rcm.org.uk  
W: www.rcm.org.uk



**Chief Executive:**  
Gill Walton,  
MA, PGDip, BSc Hons, RM  
**President:**  
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**Patron:**  
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