



INTERNATIONAL FEDERATION OF FERTILITY SOCIETIES

Fédération internationale des sociétés de fertilité

Federación internacional de sociedades de fertilidad

IFFS Sars-CoV-2 Literature MONITORING REPORT

July 2020 update
An IFFS – Merck collaboration

Date of preparation: July 2020



iffsreproduction.org

Report Objective



This literature monitoring report has been developed as a scientific collaboration between Merck and IFFS, to provide an overview of the emerging situation around COVID-19 and Reproductive Health-related topics. It highlights the publications and/or discussions regarding the global SARS-CoV-2 pandemic and fertility/conception/pregnancy/lactation, to help colleagues keep updated in developments in the literature from November 2019 to July 2020.

Table of Contents



Sections	Slide number
Literature monitoring report introduction	4
• Effects on Human Gametes/Reproductive function	5
• SARS-CoV-2 and Assisted Reproductive Technology (ART)	9
• Pregnancy, maternal-fetal and new-born related outcomes	12
• Pregnancy outcomes and management	12-22
• Vertical transmission and management	23-28
• New-born child and management	29-31

SARS-CoV-2 taskforce – literature monitoring report

Date of Search: 01 November 2019 – 20 July 2020



- The following slides highlight the publications and/or discussion regarding the global SARS-CoV-2 pandemic and fertility/conception/pregnancy/lactation topics to help colleagues keep updated on developments in the literature.
- The following key search terms were used: (“SARS-CoV-2” OR COVID-19 OR Coronavirus OR Coronavirus-2019 OR Covid 19 OR coronavirus 2019) AND (Fertility OR pregnancy OR follicular stimulation' OR 'follicular development OR follicular maturation OR follicular growth OR ovulation trigger OR ovulation induction OR ovarian stimulation OR controlled ovarian stimulation OR mild stimulation OR Reproductive medicine OR IVF OR in-vitro fertilisation OR in vitro fertilization OR IUI OR intrauterine insemination OR ICSI OR intracytoplasmic sperm injection OR reproduction OR assisted reproduction OR assisted reproduction technology OR infertility therapy OR reproductive technologies OR embryo transfer OR ET OR time to pregnancy OR time to live birth OR cumulative live birth rate OR cumulative pregnancy rate OR miscarriage OR maternal health OR maternal safety OR mother OR new-born OR baby OR new-born baby OR reproductive outcome OR birth)
- Publications that are covered in “Document from the Cochrane Institute” are not included or if an article highlighted as an Epub in this report will not be included in subsequent reports when it is published in print. Also, due to large amount of published information, only search results with above mentioned search hedge have been included.
- Publications may be eligible for inclusion in multiple sections and are usually included once in their most relevant section. However, some articles may be deemed significantly relevant across multiple topics. In these instances, publications may be duplicated in order to avoid these articles being overlooked by those focusing in only one area. Because of the rapidly evolving events surrounding the COVID-19, the presented information may have changed since the date of search mentioned in this document.

Effects on Human Gametes/Reproductive Function



No.	Publication	Notes
1	<p>Absence of SARS-CoV-2 in Semen of a COVID-19 Patient Cohort. Guo L, et al. Andrology. 2020 Jun 29;10.1111/andr.12848. doi: 10.1111/andr.12848. Online ahead of print.</p>	<p>23 male patients with COVID-19 were recruited. Semen characteristics and the viral RNA load in semen from these patients in the acute and recovery phases of SARS-CoV-2 infection were assessed. All patients tested negative for SARS-CoV-2 RNA in semen specimens. Among them, the virus had been cleared in 11 patients, as they tested negative. The remaining 12 patients tested negative for SARS-CoV-2 RNA in semen samples, but were positive in sputum and fecal specimens.</p>
2	<p>Assessment of SARS-CoV-2 in human semen-a cohort study. Holtmann N, et al. Fertil Steril. 2020 May 29;S0015-0282(20)30519-7. doi: 10.1016/j.fertnstert.2020.05.028. Online ahead of print.</p>	<p>18 semen samples from recovered men were obtained 8-54 days after absence of symptoms, 14 from control subjects, and 2 from patients with an active COVID-19 infection. No RNA was detected in the semen, including semen samples from two patients with an acute COVID-19 infection. Subjects with a moderate infection showed an impairment of sperm quality. Mild COVID-19 infection is not likely to affect testis and epididymis function. Semen parameters seemed impaired after a moderate infection. SARS-CoV-2 RNA could not be detected in semen of recovered and acute COVID-19-positive men. This suggests no viral transmission during sexual contact and assisted reproductive techniques.</p>
3	<p>Coronavirus disease-19 and fertility: viral host entry protein expression in male and female reproductive tissues. Stanley KE, et al. Fertil Steril. 2020 Jul;114(1):33-43. doi: 10.1016/j.fertnstert.2020.05.001. Epub 2020 May 8.</p>	<p>Coexpression of ACE2 and TMPRSS2 was not detected in testicular cells, including sperm. A subpopulation of oocytes in nonhuman primate ovarian tissue was found to express ACE2 and TMPRSS2, but co-expression was not observed in ovarian somatic cells. RNA expression of TMPRSS2 in 18 samples of human cumulus cells was shown to be low or absent. These analyses suggest that SARS-CoV-2 infection is unlikely to have long-term effects on male and female reproductive function. Results imply that procedures in which oocytes are collected and fertilized in vitro are associated with very little risk of viral transmission from gametes to embryos.</p>
4	<p>Could SARS-CoV-2 affect male fertility? Vishvkarma R, Rajender S. Andrologia. 2020 Jun 23;e13712. doi: 10.1111/and.13712. Online ahead of print.</p>	<p>Systematic review looking at expression studies of ACE2 in testicular tissue and semen samples. The presence of ACE2 on almost all testicular cells and the report of a significant impact of previous SARS coronavirus on testes suggest that SARS-CoV-2 is highly likely to affect testicular tissue, semen parameters and male fertility.</p>

Effects on Human Gametes/Reproductive Function



No.	Publication	Notes
5	<p><u>No evidence of severe acute respiratory syndrome-coronavirus 2 in semen of males recovering from coronavirus disease 2019.</u> Pan F, et al. Fertil Steril. 2020 Jun;113(6):1135-1139. doi: 10.1016/j.fertnstert.2020.04.024. Epub 2020 Apr 17.</p>	<p>In 34 adult males, 6 patients (19%) demonstrated scrotal discomfort suggestive of viral orchitis around the time of COVID-19 confirmation. SARS-CoV-2 was not detected in semen after a median of 31 days from COVID-19 diagnosis. Single-cell transcriptome analysis demonstrates sparse expression of ACE2 and TMPRSS2, with almost no overlapping gene expression. SARS-CoV-2 was not detected in the semen of patients recovering from COVID-19 1 month after COVID-19 diagnosis. ACE-2-mediated viral entry of SARS-CoV-2 into target host cells is unlikely to occur within the human testicle based on ACE2 and TMPRSS2 expression.</p>
6	<p><u>The ACE2 expression in Sertoli cells and germ cells may cause male reproductive disorder after SARS-CoV-2 infection.</u> Shen Q, et al. J Cell Mol Med . 2020 Jun 28;10.1111/jcmm.15541. doi: 10.1111/jcmm.15541. Online ahead of print.</p>	<p>mRNA expression of ACE2 analysed in germ and somatic cells. Rates of positive ACE2 expression was higher in testes infertile men than fertile men, which indicates that SARS-CoV-2 may cause reproductive disorders through pathway activated by ACE2 and the men with reproductive disorder may more easily be infected by SARS-CoV-2. The expression level of ACE2 was related to the age, and the mid-aged with higher positive rate than young men testicular cells. Taken together, this research provides a biological background of the potential route for infection of SARS-CoV-2 and may enable rapid deciphering male-related reproductive disorders induced by COVID-19.</p>
7	<p><u>Potential influence of COVID-19/ACE2 on the female reproductive system.</u> Jing Y, et al. Mol Hum Reprod. 2020 May 4 : gaaa030. Published online 2020 May 4. doi: 10.1093/molehr/gaaa030</p>	<p>Evidence suggests that ACE2 is widely expressed in the ovary, uterus, vagina and placenta. Therefore, the possibility of mother-to-child and sexual transmission also exists. Ang II, ACE2 and Ang-(1-7) regulate follicle development and ovulation, modulate luteal angiogenesis and degeneration, and also influence the regular changes in endometrial tissue and embryo development. Taking these functions into account, 2019-nCoV may disturb the female reproductive functions through regulating ACE2.</p>
8	<p><u>Potential risks of SARS-CoV-2 infection on reproductive health.</u> Li R, et al. Reprod Biomed Online. 2020 Jul; 41(1): 89–95.</p>	<p>The potential pathogenicity of COVID-19 may influence testicular and ovarian function, and sperm and oocyte quality. Contraception is recommended not only during the antiviral treatment, but also after treatment (for not less than 8 months). However, there is no evidence to support the termination of pregnancy without medical indicators.</p>

6 **DISCLAIMER: Because of the rapidly evolving events surrounding the COVID-19, the presented information may have changed since the date of search mentioned in this document.**

Last updated
22/07/2020

Effects on Human Gametes/Reproductive Function



No.	Publication	Notes
9	<u>Could COVID-19 have an impact on male fertility?</u> Illiano E, Trama F, Costantini E. Andrologia. 2020 Jul;52(6):e13654. doi: 10.1111/and.13654. Epub 2020 May 21.	ACE2 is expressed in the testes, particularly in Leydig and Sertoli cells. This could give the potential for targeting by SARS-CoV-2 and an inflammatory response. This must be studied and evaluated to ensure proper management of fertility in COVID-19 patients.
10	<u>ACE2 Receptor Expression in Testes: Implications in COVID-19 Pathogenesis.</u> Verma S, Saksena S, Sadri-Ardekan H. Biology of Reproduction, , ioaa080, https://doi.org/10.1093/biolre/ioaa080	Expression of ACE2, receptor of SARS-CoV-2 is high in the testes, therefore SARS-CoV-2 infection and its association with male reproductive health should be investigated in male COVID-19 patients
11	<u>Prior and Novel Coronaviruses, COVID-19, and Human Reproduction: What Is Known?</u> Segars J, Katler Q, McQueen DB, et al. Fertil Steril. 2020 Apr 16 doi: 10.1016/j.fertnstert.2020.04.025 [Epub ahead of print]	This is a review on reproductive outcomes, effect on gametes and pregnancy outcomes. The authors stated that, "There are limited data regarding the impact of SARS-CoV-2 on human reproduction as the virus is novel and has only recently infected humans. To date, there have been no reports of the virus in the female reproductive tract, in vaginal secretions, in amniotic fluid or in peritoneal fluid. Although there is nothing to suggest that female or male gametes would be impacted directly by infection with SARS-CoV-2 or other coronaviruses, there is evidence that fever can impact spermatogenesis. Therefore, male fertility may be diminished for 72-90 days following COVID-19 due to decreased sperm concentration and motility." Additional studies are needed to assess effects of SARS-CoV-2 infection on male and female fertility.
12	<u>Does COVID-19 affect male fertility?</u> Abobaker A, Raba AA. World J Urol. 2020 Apr 21. doi: 10.1007/s00345-020-03208-w. [Epub ahead of print]	The testis express ACE2, the receptor of SARS-CoV-2, presenting a possible target of infection. Damage is theoretically possible through direct viral infection or secondary inflammation, and males may be at risk of testicular damage.
13	<u>Potential influence of COVID-19/ACE2 on the female reproductive system</u> Yan Jing, Li RunQian, Wang HaoRan et al Molecular Human Reproduction, gaaa030, https://doi.org/10.1093/molehr/gaaa030	The available evidence suggests that ACE2 is widely expressed in the ovary, uterus, vagina and placenta. Therefore, authors stated, " we believe that apart from droplets and contact transmission, the possibility of mother-to-child and sexual transmission also exists. Ang II, ACE2 and Ang-(1-7) regulate follicle development and ovulation, modulate luteal angiogenesis and degeneration, and also influence the regular changes in endometrial tissue and embryo development. Taking these functions into account, 2019-nCoV may disturb the female reproductive functions through regulating ACE2."

Effects on Human Gametes/Reproductive Function



No.	Publication	Notes
14	Coronavirus Disease 2019 (COVID-19) and men's reproductive health Eisenberg ML. Fertility and Sterility. 2020 Apr 13. doi://doi.org/10.1016/j.fertnstert.2020.04.039	Addressed potential for testicular manifestations. No SARS-CoV-2 was detected in semen of the 34 men tested. Scrotal discomfort was reported in 17.6% of subjects. Semen quality appeared unaffected, but more data needed to confirm.
15	Clinical Characteristics and Results of Semen Tests Among Men With Coronavirus Disease 2019 Diangeng Li, Meiling Jin, Pengtao Bao et al JAMA Netw Open. 2020;3(5):e208292. doi:10.1001/jamanetworkopen.2020.8292	Study in patients from China evaluated the semen of 38 COVID-19 patients; 15.8% of these patients had results positive for SARS-CoV-2 in the semen. The six patients with SARS-CoV-2-positive semen collected their samples 6-16 days after the onset of symptoms. Four of 15 patients (26.7%) were categorized in the "acute stage of infection," while two of 23 patients (8.7%) were categorized to be in the "recovery" phase
16	No evidence of SARS-CoV-2 in semen of males recovering from COVID-19 Pan F, Xiao X, Guo J, Song Y, Li H, Patel DP, et al. Fertility and Sterility (2020), doi: https://doi.org/10.1016/j.fertnstert.2020.04.024	SARS-CoV-2 virus does not appear to be present in the semen of SARS-CoV-2 positive men (N=34) when tested a mean/median 31 days (range 8-75 days) after serum positive testing. ACE2-mediated viral entry of SARS-CoV-2 into target host cells is unlikely to occur within the human testicle based on ACE2 and TMPRSS2 expression. The long-term effects of SARS-CoV-2 on male reproductive function remain unknown.
18	Study of SARS-CoV-2 in semen and urine samples of a volunteer with positive naso-pharyngeal swab. Paoli D, Pallotti F, Colangelo S, et al. Journal of Endocrinological Investigation. https://doi.org/10.1007/s40618-020-01261-1	A patient who tested positive for the virus was tested. Eight days after diagnosis he provided semen and urine samples. Both were negative, although was a mild case and the test was several days after diagnosis.
19	Absence of 2019 Novel Coronavirus in Semen and Testes of COVID-19 Patients Song C, Wang Y, Li W, et al. Biol Reprod. 2020 Jun 23;103(1):4-6. doi: 10.1093/biolre/ioaa050.	Letter to editor. Study of 13 men diagnosed with COVID-19. Semen tests on all patients were negative for the virus. It appears unlikely that the virus is found in semen or the testes, although more data is needed to confirm.

SARS-CoV-2 and Assisted Reproductive Technology (ART)



No.	Publication	Notes
1	<p>Assisted reproduction and thromboembolic risk in the COVID-19 pandemic. Fabreguesa F, Peñarrubiab J. Reprod Biomed Online. 2020 Jun 25. doi: 10.1016/j.rbmo.2020.06.013 [Epub ahead of print]</p>	<p>One of the main determining factors of the poor prognosis in COVID-19 infected patients is the development of coagulopathy. Moreover, it is well known that assisted reproductive technology procedures confer a risk of thromboembolic complications. In the present context, any risk of hyperstimulation should be avoided. GnRH agonist triggering should be mandatory in high-responder patients and/or those with COVID-19 infection. In addition, endometrial preparation for frozen-thawed embryo transfers should use the transdermal route in order to minimize the higher thrombotic risk associated with the oral route.</p>
2	<p>COVID-19 and ART: the view of the Italian Society of Fertility and Sterility and Reproductive Medicine. Vaiarelli A, et al. Reprod Biomed Online. 2020 Jun;40(6):755-759. doi: 10.1016/j.rbmo.2020.04.003. Epub 2020 Apr 8.</p>	<p>Article outlining the position of the Italian Society of Fertility and Sterility and Reproductive Medicine (SIFES-MR) in outlining ART priorities during and after this emergency. Time to egg collection and drop-out rates are critical parameters for scheduling treatments once the curve of infections has peaked and plateaued in each country. Urgent oocyte collection for oncology patients must be guaranteed, and oocyte retrievals for women of advanced maternal age and/or reduced ovarian reserve cannot be postponed indefinitely.</p>
3	<p>COVID-19 should be a novel indication for fertility preservation. Gerber S, et al. JBRA Assisted Reproduction 2020;24(3): DOI: 10.5935/1518-0557.20200048</p>	<p>While there is a lack of evidence around COVID-19 and reproductive outcomes and vertical transmission, recommendations have generally advised to avoid pregnancy and stop fertility treatment. Due to uncertainty around the duration of the pandemic, we cannot say when clinics will be able to offer routine basis treatment for infertile couples looking for treatment. Delaying ART may mean those with reduced ovarian reserve, older patients or those with financial problems are unable to conceive after the end of the pandemic. The authors recommend that COVID-19 could be a new indication for fertility preservation for a determined deadline, until complete return of assisted reproduction treatments in regular basis.</p>

SARS-CoV-2 and Assisted Reproductive Technology (ART)



No.	Publication	Notes
4	COVID-19 and assisted reproductive technology services: repercussions for patients and proposal for individualized clinical management. Alvigi C, Esteves SC, Orvieto R, et al. Reprod Biol Endocrinol. 2020; 18: 45.	A prolonged suspension of ART services would be detrimental to patients , although care must be taken when reopening services. Recommendations are given, including excluding infected patients and allowing ART for eligible patients. Treatment should be considered depending on patients Poseidon group to identify the most suitable patients.
5	Management of ART and COVID-19: Infertility in times of pandemic. What now? Souza MDCB, Nakagawa H, Taitson PF, et al. JBRA Assist Reprod. 2020 Jul 14;24(3):231-232. doi: 10.5935/1518-0557.20200031	Summary of the recommendations from several guidelines and organisations. Most generally advise pausing or suspending treatment where possible until new research is available.
6	COVID-19 and ART: the view of the Italian Society of Fertility and Sterility and Reproductive Medicine Vaiarelli A, Bulletti C, Cimadomo D, et al. Reproductive BioMedicine Online 2020 Apr 8; doi: https://doi.org/10.1016/j.rbmo.2020.04.003	Article from the Italian Society of Fertility and Sterility and Reproductive Medicine outlining their recommendations. It generally recommends delaying pregnancy during the outbreak where possible, but in patients where this will affect their chances of conception, cryopreservation is recommended for soon after the peak of infections.
7	COVID-19: lessons from the Italian reproductive medical experience La Marca A, Niederberger C, Pellicer A, et al. Fertil Steril. 2020 Mar 25. pii: S0015-0282(20)30297-1. doi: 10.1016/j.fertnstert.2020.03.021. [Epub ahead of print]	Summary of experiences in reproductive medicine in Italy. Treatment should be postponed in those who have been in contact with infected patients. Those suspected to be infected should be isolated.

SARS-CoV-2 and Assisted Reproductive Technology (ART)



No.	Publication	Notes
8	A global recommendation for restrictive provision of fertility treatments during the COVID-19 pandemic Rodriguez-Wallberg K.A., Wikander I Acta Obstetrica et Gynecologica Scandinavica 2020 99:5 (569-570)	An editorial discussing the recommendations of different organizations
9	Joint Statement on Re-introduction of Hospital and Office-based Procedures in the COVID-19 Climate for the Practicing Gynecologist International Gynecologic Cancer Society	Society of Gynaecologic Oncology adapted American College of Surgeons (ACS) tiered ranking list to develop guidance for urogynecologic and benign gynecologic surgeons. The system is meant to help surgeons and their health care systems decide who should undergo surgeries and does not list all elective surgeries in each tier.
10	SARS-CoV-2 pandemic and repercussions for male infertility patients: a proposal for the individualized provision of andrological services Esteves S.C., Lombardo F., Garrido N., Alvarez J., Zini A., Colpi G.M., Kirkman-Brown J., Lewis S.E., Björndahl L., Majzoub A., Cho C.-L., Vendeira P., Hallak J., Amar E., Cocuzza M., Bento F.C., Figueira R.C., Sciorio R., Laursen R.J., Metwalley A.M., Jindal S.K., Parekattil S., Ramasamy R., Alviggi C., Humaidan P., Yovich J.L., Agarwal A. [Article in Press] Andrology 2020	An opinion paper proposing to modify the current recommendations regarding sperm banking to be expanded to other groups of vulnerable male infertility patients (e.g., azoospermic men and cryptozoospermic) undergoing medical or surgical treatment to improve sperm quantity and quality, as well as males of reproductive age affected by inflammatory and systemic autoimmune diseases who are about to start treatment with gonadotoxic drugs or who are under remission.
11	After corona: there is life after the pandemic Tesarik J. [Article in Press] Reproductive BioMedicine Online 2020 Cited by: 0	Author discusses the impact of COVID-19 on pregnancy and vertical transmission on the basis of available data and strategy for ART. The author stated, "Assisted reproductive technology (ART) makes it possible to separate fertilization and pregnancy in time. Whereas pregnant women infected with coronavirus may have an increased risk of adverse neonatal outcomes, gametes do not transmit COVID-19. Thus, performing ovarian stimulation and fertilization without delay, freezing the resulting embryos and delaying embryo transfer until the end of the pandemic appears to be the best strategy at present."

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
1	<p>COVID-19 (coronavirus disease) - Fertility and Pregnancy Perinatal outcomes in COVID-19 infection. Cochrane Gynaecology and Fertility</p>	<p>Excel sheet Perinatal outcomes in COVID-19 infection.* Document from the Cochrane institute, collating data from various institutes on perinatal and maternal outcomes including the detection of SAR-CoV-2 in various swabs and body fluids like urine, breast milk etc.</p>
2	<p>Coronavirus Disease 2019 (COVID-19): A Systematic Review of Pregnancy and the Possibility of Vertical Transmission. Ashraf AA, et al. J Reprod Infertil . Jul-Sep 2020;21(3):157-168.</p>	<p>Systematic review of 21 articles with 90 pregnant patients and 92 neonates born to mothers infected with COVID-19. 3 mothers were admitted to ICU and required mechanical ventilation; among them, one died, and one was on extracorporeal membrane oxygenation. 86 neonates were tested for the possibility of vertical transmission; 4 were positive. Out of 92 neonates, one died, and one was born dead. 19 patients reported having no symptoms, while breathing problems and pneumonia were reported as the most common neonatal complications. There were no differences in the clinical characteristics of pregnant women and non-pregnant COVID-19 patients. COVID-19 infection caused higher incidence of fetal distress and premature labour in pregnant women.</p>
3	<p>Coronavirus disease 2019 during pregnancy: a systematic review of reported cases. Gatta AND, et al. Am J Obstet Gynecol. 2020 Jul;223(1):36-41. doi: 10.1016/j.ajog.2020.04.013. Epub 2020 Apr 18.</p>	<p>6 studies involving 51 pregnant women were eligible for the systematic review. 3 pregnancies were ongoing; of the remaining 48 pregnant women, 46 gave birth by caesarean delivery, and 2 gave birth vaginally, 1 stillbirth and 1 neonatal death were reported. Although vertical transmission of severe acute respiratory syndrome coronavirus 2 infection has been excluded thus far and the outcome for mothers and neonates has been generally good, the high rate of preterm delivery by caesarean delivery is a reason for concern. Caesarean delivery was typically an elective surgical intervention, and it is reasonable to question whether caesarean delivery for pregnant patients with coronavirus disease 2019 was warranted. COVID-19 associated with respiratory insufficiency in late pregnancies certainly creates a complex clinical scenario.</p>

*Individual publications presented in the excel sheet by Cochrane are not included in this report to avoid duplication. However, reviews discussed in this report may include some individual cases or cases series discussed in Cochrane sheet.

DISCLAIMER: Because of the rapidly evolving events surrounding the COVID-19, the presented information may have changed since the date of search mentioned in this document.

Last updated
22/07/2020

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
4	<p>Coronavirus disease 2019 in pregnant women: a report based on 116 cases. Yan J, et al. Am J Obstet Gynecol. 2020 Jul;223(1):111.e1-111.e14. doi: 10.1016/j.ajog.2020.04.014. Epub 2020 Apr 23.</p>	<p>Clinical records retrospectively reviewed for 116 pregnant women with COVID-19 from 25 hospitals in China. SARS-CoV-2 infection during pregnancy is not associated with an increased risk of spontaneous abortion and spontaneous preterm birth. No evidence of vertical transmission when the infection manifests during the third trimester of pregnancy.</p>
5	<p>COVID-19 and pregnancy: a review of current knowledge. Dana PM, et al. Infez Med. 2020 Jun 1;28(suppl 1):46-51.</p>	<p>Clinical findings in pregnant women with COVID-19 are not significantly different compared to other patients. Pregnant women with COVID-19 are not at a higher risk of developing critical pneumonia compared to non-pregnant women. There has been no sign of vertical infection in infants, but maternal infection can cause serious problems such as preterm labour and fetal distress.</p>
6	<p>COVID-19 in pregnancy was associated with maternal morbidity and preterm birth. Sentilhes L, et al. Am J Obstet Gynecol. 2020 Jun 15;S0002-9378(20)30639-6. doi: 10.1016/j.ajog.2020.06.022.</p>	<p>Outcomes of 54 pregnant women with confirmed (n=38) and suspected (n=16) COVID-19 infection were studied. 32 had an ongoing pregnancy, one a miscarriage, and 21 live births. Preterm deliveries were medically indicated for their COVID-19-related condition for 23.8% of patients who gave birth. Oxygen support was required for 24.1%. Of these, three, aged 35 years or older with positive COVID-19 RT-PCR, had respiratory failure requiring indicated delivery before 29 weeks' gestation. COVID-19 in pregnancy was associated with maternal morbidity and preterm birth.</p>
7	<p>COVID-19 in Pregnant Women and Neonates: A Systematic Review of the Literature with Quality Assessment of the Studies. Trippella G, et al. Pathogens . 2020 Jun 18;9(6):485. doi: 10.3390/pathogens9060485.</p>	<p>A review of the literature was performed. 37 studies involving 275 pregnant women with COVID-19 and 248 neonates were included. Only 10 were admitted in the ICU, and one died. Two stillbirths were reported; the incidence of prematurity was 28%. 16 tested positive for SARS-CoV-2 by RT-PCR, and 9 of them were born from mothers infected during pregnancy. All the affected neonates recovered. SARS-CoV-2 was not detected in amniotic fluid, vaginal/cervical fluids, placenta tissue, and breast milk samples. SARS-CoV-2 infection in pregnant women appeared associated with a low morbidity and mortality rate. The outcomes of neonates born from infected women were mainly favourable, although neonates at risk should be closely monitored.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes



Pregnancy outcomes and management

No.	Publication	Notes
8	<p><u>Effects of COVID-19 Infection during Pregnancy and Neonatal Prognosis: What Is the Evidence?</u> De Sousa AFL, et al. Int J Environ Res Public Health. 2020 Jun 11;17(11):4176. doi: 10.3390/ijerph17114176.</p>	<p>Systematic literature review to study the effects of COVID-19 infection during pregnancy, and the neonatal prognosis. 755 pregnant women and 598 infants were assessed. 65% of pregnant women had C-sections. 82% of infants were tested for SARS-CoV-2, of which 2% tested positive. Potential worsening of the clinical conditions of pregnant women infected with SARS-CoV-2, whether the infection is associated with comorbidities or not cannot be excluded. We recommend relentless monitoring of all pregnant women in addition to testing them before delivery or the first contact with newborns.</p>
9	<p><u>Maternal mortality and COVID-19</u> Takemoto M.L.S., Menezes M.O., Andreucci C.B., Knobel R., Sousa L.A.R., Katz L., Fonseca E.B., Magalhães C.G., Oliveira W.K., Rezende-Filho J., Melo A.S.O., Amorim M.M.R. [In Process] Journal of Maternal-Fetal and Neonatal Medicine 2020 (1-7)</p>	<p>Systematic study to collect and analyze data from different sources to have a general overview of COVID-19-related maternal deaths in Brazil, as well as to compare data with worldwide reports. Twenty COVID-19 related maternal deaths were reported and the mean maternal age was 31, 5 (range 20-43) years. Onset of symptoms was reported on pregnancy for 12 cases (60.0%), on postpartum for 3 cases (15.0%), during the cesarean section for 1 case (5.0%), and there were 4 missing data (20.0%). In most cases, death occurred in the postpartum period (16/20 – 80.0%).</p>
10	<p><u>Pregnancy and COVID-19: a systematic review of maternal, obstetric and neonatal outcomes.</u> Trocado V, et al. J Matern Fetal Neonatal Med. 2020 Jul 7;1-13. doi: 10.1080/14767058.2020.1781809.</p>	<p>Systematic review of 8 studies involving 95 pregnant women and 51 neonates. 26% of women had a history of epidemiological exposure to SARS-CoV-2. The most common symptoms presented were fever (55%), cough (38%) and fatigue (11%). In 50 deliveries, 94% were caesarean sections and 35% were preterm births. Of the 51 neonates, 20% had low birth weight and 1 tested positive for Sars-CoV-2. There was 1 neonatal death, not related to the viral infection, and no cases of severe neonatal asphyxia.</p>
11	<p><u>Rates of Maternal and Perinatal Mortality and Vertical Transmission in Pregnancies Complicated by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-Co-V-2) Infection: A Systematic Review.</u> Juntley BJB, et al. Obstet Gynecol. 2020 Jun 9. doi: 10.1097/AOG.0000000000004010. Online ahead of print.</p>	<p>Systematic review of 99 articles. 13 included 538 pregnancies complicated by SARS-CoV-2 infection, with reported outcomes on 435 (80.9%) deliveries. ICU admission occurred in 3.0% of cases (8/263). No maternal deaths were reported. The preterm birth rate was 20.1%, the caesarean delivery rate was 84.7%. No vertical transmission was reported and the neonatal death rate was 0.3%. The preterm birth rate of 20% and the caesarean delivery rate exceeding 80% seems related to geographic practice patterns.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
12	<p><u>COVID-19 Pneumonia and Pregnancy; A Systematic Review and Meta-Analysis.</u> Kasraeian M, Zare M, Vafaei H, et al. The Journal of Maternal-Fetal & Neonatal Medicine. 2020. DOI: https://doi.org/10.1080/14767058.2020.1763952</p>	<p>Meta-analysis on 87 pregnant women. Almost 65% of the patients reported a history of exposure to an infected person, 78% suffered from mild or moderate COVID-19, 99.9% had successful termination, 86% had cough, and 68% had fever. The overall proportions of vertical transmission, still birth, and neonatal death were zero. No evidence of vertical transmission has been suggested at least in late pregnancy. No hazards have been detected for fetuses or neonates. Most patients suffered from mild or moderate COVID-19 pneumonia with no pregnancy loss, proposing a similar pattern of the clinical characteristics of COVID-19 pneumonia to that of other adult populations.</p>
13	<p><u>Effects of Coronavirus Disease 2019 (COVID-19) on Maternal, Perinatal and Neonatal Outcomes: A Systematic Review.</u> Juan J, Gil MM, Rong Z, et al. Ultrasound Obstet Gynecol . 2020 May 19. doi: 10.1002/uog.22088.</p>	<p>A total of 20 pregnant patients with laboratory-confirmed COVID-19 were included. All six and 22 cases that had nucleic-acid testing in vaginal mucus and breast milk samples, respectively, were negative for SARS-CoV-2. Only 4 cases of spontaneous miscarriage or abortion were reported. In the consecutive case series, 219/295 women had delivered at the time of reporting, and the majority of these had caesarean section. Only 8 neonates had birth weight <2500 g and nearly one-third of cases were transferred to the neonatal intensive care unit. There was one case each of neonatal asphyxia and neonatal death. In 155 neonates that had nucleic-acid testing in throat swab, all, except three cases, were negative for SARS-CoV-2. There were 7 maternal deaths, 4 intrauterine fetal deaths (one with twin pregnancy) and two neonatal deaths (twin pregnancy) reported in a non-consecutive case series of nine cases with severe COVID-19. From the case reports, two maternal deaths, one neonatal death and two cases of neonatal SARS-CoV-2 infection were reported.</p>
14	<p><u>Impact of COVID-19 Infection on Pregnancy Outcomes and the Risk of Maternal-To-Neonatal Intrapartum Transmission of COVID-19 During Natural Birth.</u> Khan S, Peng L, Siddique R, et al. Infect Control Hosp Epidemiol. 2020 Jun;41(6):748-750. doi: 10.1017/ice.2020.84.</p>	<p>Case report study of 3 pregnant women with laboratory confirmed COVID-19. All 3 had vaginal deliveries, only 1 patient delivered a preterm baby. The preterm baby tested negative for SARS-CoV-2, which suggests that the preterm delivery was not caused by vertical transmission of SARS-CoV-2. No neonatal death or stillbirth was observed.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
15	<p><u>Effects of SARS-CoV-2 Infection on Pregnant Women and Their Infants: A Retrospective Study in Wuhan, China.</u> Yang H, Hu B, Zhan S, et al. Archives of Pathology & Laboratory Medicine In-Press. https://doi.org/10.5858/arpa.2020-0232-SA</p>	<p>Twenty-seven laboratory or clinically confirmed SARS-CoV-2 infection pregnant women (4 early pregnancies included) and 24 neonates born to the 23 late pregnant mothers were analysed. No major complication were reported among the studied cohort, though one serious case and one perinatal infection were observed.</p>
16	<p><u>SARS-CoV-2 Infection in Pregnancy – a Review of the Current Literature and Possible Impact on Maternal and Neonatal Outcome.</u> Stumpfe F, Titzmann, Schneider MO, et al. Geburtsh Frauenheilk 2020; 80: 380–390.</p>	<p>The clinical course of COVID-19 disease may be complicated by pregnancy which could be associated with a higher mortality rate. Also transmission from mother to child in utero is unlikely. Breastfeeding is possible once infection has been excluded or the disease declared cured.</p>
17	<p><u>Coronavirus disease 2019 (COVID-19) and pregnancy: a systematic review</u> Yang Z., Wang M., Zhu Z., Liu Y. [Article in Press] J. Matern.-Fetal Neonatal Med. 2020</p>	<p>Summarizes the available evidence on maternal, fetal, and neonatal outcomes of pregnant women infected with Coronavirus Disease 2019 published from 1 January 2020 to 26 March 2020. In total, 18 studies comprising 114 pregnant women were included in the review. 91% of patients had cesarean delivery due to various indications. In terms of fetal and neonatal outcomes, there were reports of stillbirth (1.2%), neonatal death (1.2%), preterm birth (21.3%), low birth weight (<2500 g, 5.3%), fetal distress (10.7%), and neonatal asphyxia (1.2%). Although, there are reports of neonatal infection, but no direct evidence of intrauterine vertical transmission has been found.</p>
18	<p><u>Characteristics and outcomes of pregnant women hospitalised with confirmed SARS-CoV-2 infection in the UK: a national cohort study using the UK Obstetric Surveillance System (UKOSS)</u> Marian Knight, Kathryn Bunch, Nicola Vousden, Edward Morris, Nigel Simpson, Christopher Gale, Patrick O'Brien, Maria Quigley, Peter Brocklehurst, Jennifer J Kurinczuk doi: https://doi.org/10.1101/2020.05.08.20089268</p>	<p>Prospective national population-based cohort study with 427 pregnant women admitted to hospital with confirmed Sars-CoV-2 infection between 01/03/2020 and 14/04/2020. 694 comparison women who gave birth between 01/11/2017 and 31/10/2018. Most pregnant women hospitalised with SARS-CoV-2 were in the late second or third trimester, supporting guidance for continued social distancing measures in later pregnancy. Most had good outcomes and transmission of SARS-CoV-2 to infants was uncommon.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
19	<p>Risks of Novel Coronavirus Disease (COVID-19) in Pregnancy; a Narrative Review Panahi L, Amiri M, Pouy S. Arch Acad Emerg Med. 2020 Mar 23;8(1):e34. eCollection 2020.</p>	<p>Review of 13 articles, considering possibility of vertical transmission, studying 37 mothers and 38 newborns. Six mothers had premature delivery. No reports of vertical transmission reported, with all babies healthy, with Apgar of 8– 10. Clinical symptoms of pregnancy women the same as non-pregnant cases. Due to uncertainties around data, it is necessary to monitor suspected pregnant women before and after delivery.</p>
20	<p>A systematic scoping review of COVID-19 during pregnancy and childbirth Elshafeey F, Magdi R, Hindi N, et al. Int J Gynaecol Obstet. 2020 Jul;150(1):47-52. doi: 10.1002/ijgo.13182. Epub 2020 May 17.</p>	<p>In 33 studies looking at 385 women with COVID-19 infection, 17 women were admitted to intensive care. Results were:</p> <ul style="list-style-type: none"> • one maternal mortality • 69.4% of births were by caesarean • For 256 neonates recorded, there were 2 stillbirths and one neonatal death <p>Authors concluded that, “COVID-19 infection during pregnancy probably has a clinical presentation and severity resembling that in non-pregnant adults. It is probably not associated with poor maternal or perinatal outcomes.”</p>
21	<p>Maternal and Perinatal Outcomes with COVID-19: a systematic review of 108 pregnancies Zaigham M, Andersson O. Acta Obstet Gynecol Scand. 2020 Jul;99(7):823-829. doi: 10.1111/aogs.13867. Epub 2020 Apr 20.</p>	<p>Systematic review, looking at presentations and outcomes of 108 pregnancies with COVID-19. Severe maternal morbidity was reported, and careful monitoring of pregnancies is needed. Most reports described women presenting in the third trimester with fever (68%) and coughing (34%). Lymphocytopenia (59%) with elevated C-reactive protein (70%) was observed and 91% of the women were delivered by cesarean section. Three maternal intensive care unit admissions were noted but no maternal deaths. One neonatal death and one intrauterine death were also reported. Vertical transmission could not be ruled out.</p>
22	<p>Why are pregnant women susceptible to COVID-19? An immunological viewpoint Liu H, Wang LL, Zhao SJ, et al. J Reprod Immunol. 2020 Mar 19;139:103122. doi: 10.1016/j.jri.2020.103122. [Epub ahead of print]</p>	<p>Discusses 18 mothers diagnosed with COVID-19. Five minute Apgar scores of new-borns were between 8 and 10. 10 births were before 37 weeks, suggesting possible risk of preterm delivery. All neonates were negative for the virus, although one neonate died.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
23	<p><u>Coronavirus disease 2019 infection among asymptomatic and symptomatic pregnant women: two weeks of confirmed presentations to an affiliated pair of New York City hospitals</u> Breslin N., Baptiste C., Gyamfi-Bannerman C., Miller R., Martinez R., Bernstein K., Ring L., Landau R., Purisch S., Friedman A.M., Fuchs K., Sutton D., Andrikopoulou M., Rupley D., Sheen J.-J., Aubey J., Zork N., Moroz L., Mourad M., Wapner R., Simpson L.L., D'Alton M.E., Gofman D. [Article in Press] American Journal of Obstetrics and Gynecology MFM 2020 Article Number 100118</p>	<p>A retrospective review of clinical documentation for 43 pregnant women who tested positive for COVID-19 using SARS-CoV-2 PCR nasopharyngeal swab. Records related to neonates born to these COVID-19 positive mothers were also reviewed. Of 43, 10 patients (71.4%) developed symptoms of coronavirus disease 2019 over the course of their delivery admission or early after postpartum discharge. Of the other 29 patients (67.4%) who presented with symptomatic coronavirus disease 2019, 3 women ultimately required antenatal admission for viral symptoms, and another patient re-presented with worsening respiratory status requiring oxygen supplementation 6 days postpartum after a successful labor induction. There were no confirmed cases of coronavirus disease 2019 detected in neonates upon initial testing on the first day of life.</p>
24	<p><u>Coronavirus in pregnancy and delivery: rapid review</u> Mullins E, Evans D, Viner RM, et al. Ultrasound Obstet Gynecol. 2020 Mar 17. doi: 10.1002/uog.22014. [Epub ahead of print]</p>	<p>Review of available literature. From reports of 32 women COVID-19 pregnant women, delivering 30 babies, seven (22%) were asymptomatic and two (6%) were admitted to the intensive care unit (ICU), one of whom remained on extracorporeal membrane oxygenation. No maternal deaths have been reported to date. Delivery was by Cesarean section in 27 cases and by vaginal delivery in two, and 15 (47%) delivered preterm. There was one stillbirth and one neonatal death. In 25 babies, no cases of vertical transmission were reported; 15 were reported as being tested with reverse transcription polymerase chain reaction after delivery.</p>
25	<p><u>An Analysis of 38 Pregnant Women with COVID-19, Their Newborn Infants, and Maternal-Fetal Transmission of SARS-CoV-2: Maternal Coronavirus Infections and Pregnancy Outcomes</u> Schwartz DA. Arch Pathol Lab Med. 2020 Mar 17. doi: 10.5858/arpa.2020-0901-SA.</p>	<p>Review of 38 cases of COVID-19 in pregnancies. No deaths and intrauterine transmission were reported and all neonatal specimens were also negative.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
26	<u>Maternal and neonatal outcomes of pregnant women with COVID-19 pneumonia: a case-control study</u> Li N, Han L, Peng M, et al. Clinical Infectious Diseases doi: 10.1093/cid/ciaa352	Severe maternal and neonatal complications were not observed in pregnant women with COVID-19 pneumonia who had vaginal delivery or caesarean section. Mild respiratory symptoms of pregnant women with COVID-19 pneumonia highlight the need of effective screening on admission.
27	<u>Novel Coronavirus Infection in Newborn Babies Under 28 Days in China</u> Zhang ZJ, Yu XJ, Fu T, et al. Eur Respir J. 2020 Apr 8. pii: 2000697. doi: 10.1183/13993003.00697-2020. [Epub ahead of print]	Study of 4 cases of COVID-19 infection in newborns. Symptoms were mild and outcomes less severe as compared to adults. There was a lack of evidence for intrauterine vertical transmission.
28	<u>COVID-19 Obstetrics Task Force, Lombardy, Italy: executive management summary and short report of outcome.</u> Ferrazzi EM, Frigerio L, Cetin I, et al. Int J Gynaecol Obstet. 2020 Apr 8. doi: 10.1002/ijgo.13162. [Epub ahead of print]	Summary of the experience of a hospital in Italy. Strict management was put in place, with a triage based on symptoms established, with PPE worn by staff and mothers, including during breastfeeding. 42 pregnant women were diagnosed with COVID-19, accounting for 0.6% of the expected 7,000 deliveries in the region over the time period. 43% of deliveries were by caesarean, with 2 cases of spontaneous preterm delivery.
29	<u>Management of pregnant women infected with COVID-19.</u> Luo Y, Yin K. Lancet Infect Dis. 2020 Mar 24. pii: S1473-3099(20)30191-2. doi: 10.1016/S1473-3099(20)30191-2. [Epub ahead of print]	Authors report the clinical features and obstetric and neonatal outcomes of pregnancy with COVID-19 pneumonia in Wuhan, China. Seven pregnant women with COVID-19 pneumonia were assessed and the onset symptoms were similar to those reported in non-pregnant adults with COVID-19. All patients received oxygen therapy and antiviral treatment in isolation. All patients had caesarean section after consultation with a multidisciplinary team and the outcomes of the pregnant women and neonates were good. Three neonates were tested SARS-CoV-2. One was found to be infected with COVID-19 36 hours after birth.
30	<u>Global interim guidance on coronavirus disease 2019 (COVID-19) during pregnancy and puerperium from FIGO and allied partners: Information for healthcare professionals.</u> Poon LC, Yang H, Kapur A, et al. Int J Gynaecol Obstet. 2020 Jun;149(3):273-286. doi: 10.1002/ijgo.13156.	Guidelines from FIGO for management of pregnancy and puerperium with COVID-19, and providing guidance on medical treatment of pregnant women with COVID-19.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
31	<u>ISUOG Consensus Statement on rationalization of early-pregnancy care and provision of ultrasonography in context of SARS-CoV-2</u> Bourne T, Kyriacou C, Coomarasamy A, et al. Ultrasound Obstet Gynecol. 2020 Jun;55(6):871-878. doi: 10.1002/uog.22046.	ISUOG consensus report for management of early pregnancy complications by early-pregnancy care providers during the COVID-19 pandemic.
32	<u>Clinical manifestations and outcome of SARS-CoV-2 infection during pregnancy.</u> Liu Y, Chen H, Tang K, et al. J Infect. 2020 Mar 4. pii: S0163-4453(20)30109-2. doi: 10.1016/j.jinf.2020.02.028. [Epub ahead of print]	Description of epidemiology and clinical characteristics of COVID-19 infection during pregnancy.
33	<u>Preparing an obstetric unit in the heart of the epidemic strike of COVID-19: quick reorganization tips</u> Capanna F, Haydar A, McCarey C, et al. J Matern Fetal Neonatal Med. 2020 Mar 29:1-11. doi: 10.1080/14767058.2020.1749258. [Epub ahead of print]	Review suggesting key points of strategies to implement to prepare obstetric units in the emergency situation
34	<u>Guidelines for pregnant women with suspected SARS-CoV-2 infection</u> Favre G, Pomar L, Qi X, et al. Lancet Infect Dis. 2020 Mar 3. pii: S1473-3099(20)30157-2. doi: 10.1016/S1473-3099(20)30157-2. [Epub ahead of print]	Short review summarising care for pregnant women and newborns with and curing the COVID-19 pandemic.
35	<u>ISUOG Interim Guidance on 2019 novel coronavirus infection during pregnancy and puerperium: information for healthcare professionals</u> Poon LC, Yang H, Lee JCS, et al. Ultrasound Obstet Gynecol. 2020 Mar 11. doi: 10.1002/uog.22013. [Epub ahead of print]	Guidance from the ISUOG on COVID-19 infection during pregnancy, covering diagnosis and management of patients.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
36	<u>A global recommendation for restrictive provision of fertility treatments during the COVID-19 pandemic</u> Rodriguez-Wallberg KA, Wikander I. Acta Obstet Gynecol Scand. 2020 Apr 8. doi: 10.1111/aogs.13851. [Epub ahead of print]	Short editorial outlining recommendations from global organisations, acknowledging the lack of evidence and the differences in advice.
£7	<u>Coronavirus Disease 2019 (COVID-19) Pandemic and Pregnancy</u> Dashraath P, Jing Lin Jeslyn W, Mei Xian Karen L, et al. Am J Obstet Gynecol. 2020 Jun;222(6):521-531. doi: 10.1016/j.ajog.2020.03.021.	Large review of COVID-19 in pregnancy, discussing diagnostic methods, treatment options as well as methods to keep care providers safe while continuing to provide care.
38	<u>Safe Delivery for COVID-19 Infected Pregnancies</u> Qi H, Luo X, Zheng Y, et al. BJOG. 2020 Mar 26. doi: 10.1111/1471-0528.16231. [Epub ahead of print]	Recommendations guidelines for safe delivery during COVID-19 pandemic in infected mothers.
39	<u>COVID-19 infection among asymptomatic and symptomatic pregnant women: Two weeks of confirmed presentations to an affiliated pair of New York City hospitals</u> Breslin N, Baptiste C, Gyamfi-Bannerman C, et al. Am J Obstet Gynecol MFM. 2020 Apr 9 : 100118. doi: 10.1016/j.ajogmf.2020.100118 [Epub ahead of print]	In a series of 43 COVID-19-positive pregnant women identified over a two-week period, infection was often asymptomatic, still supporting a role for universal testing of pregnant women being admitted to the Labor Unit. 86% of the women has mild disease, similar to non-pregnant adults.
40	<u>Coronavirus Disease 2019 (COVID-19) and pregnancy: what obstetricians need to know</u> Rasmussen SA, Smulian JC, Lednicky JA, et al Am J Obstet Gynecol. 2020 May;222(5):415-426. doi: 10.1016/j.ajog.2020.02.017.	Principles of management of coronavirus disease 2019 in pregnancy include early isolation, aggressive infection control procedures, oxygen therapy, avoidance of fluid overload, consideration of empiric antibiotics (secondary to bacterial infection risk), laboratory testing for the virus and coinfection, fetal and uterine contraction monitoring, early mechanical ventilation for progressive respiratory failure, individualized delivery planning, and a team-based approach with multispecialty consultations.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Pregnancy outcomes and management



No.	Publication	Notes
41	<u>Placental Pathology in Covid-19 Positive Mothers: Preliminary Findings.</u> Baergen RN, Heller D Pediatr Dev Pathol. 2020 May-Jun;23(3):177-180. doi: 10.1177/1093526620925569.	This study describes the pathology and clinical information on 20 placentas whose mother tested positive for the novel Coronavirus (2019-nCoV) cases. Ten of the 20 cases showed some evidence of fetal vascular malperfusion or fetal vascular thrombosis. The significance of these findings is unclear and needs further study.
42	<u>Covid-19 and pregnancy.</u> BMJ 2020;369:m1672	The aim of the guideline is to support health professionals to provide safe care for pregnant women, whether they have suspected or confirmed covid-19, or are asymptomatic.
43	<u>Breastfeeding and Coronavirus Disease-2019. Ad interim indications of the Italian Society of Neonatology endorsed by the Union of European Neonatal & Perinatal Societies</u> Davanzo R, Moro G, Sandri F, et al. Matern Child Nutr. 2020 Apr 3:e13010. doi: 10.1111/mcn.13010. [Epub ahead of print]	Review of breastfeeding guidelines, from the Italian Society for Neonatology, for pregnancies during COVID-19, including for infected and non-infected mothers.
44	<u>Evidence and possible mechanisms of rare maternal-fetal transmission of SARS-CoV-2.</u> Egloff C, Vauloup-Fellous C, Picone O, et al. J Clin Virol. 2020 Jul;128:104447. doi: 10.1016/j.jcv.2020.104447. Epub 2020 May 18.	In 179 new-borns tested for SARS-CoV-2 at birth from mothers with COVID-19, transmission was suspected in 8 cases, 5 with positive nasopharyngeal SARS-CoV-2 RT-PCR and 3 with SARS-CoV-2 IgM. According to these data, the transmission risk is probably very low.
45	<u>Lack of Viral Transmission to Preterm Newborn From a COVID-19 Positive Breastfeeding Mother at 11 Days Postpartum.</u> Perrone S, Giordano M, Meoli A, et al. J Med Virol . 2020 May 21. doi: 10.1002/jmv.26037. Online ahead of print.	During stay in hospital, infected mother and healthcare caregivers followed recommended hygiene measures. In this setting, no horizontal transmission occurred. RT-PCR assay for SARS-CoV-2 performed on breast milk during mother febrile peak was negative.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Vertical transmission and management



No.	Publication	Notes
46	<u>Does the maternal-fetal transmission of SARS-CoV-2 occur during pregnancy?</u> Elósegui JJH, et al. Rev Clin Esp. 2020 Jun 5;S0014-2565(20)30156-9. doi: 10.1016/j.rce.2020.06.001.	Four pregnant patients with mild acute COVID-19 symptoms in the second trimester of pregnancy were studied. RT-PCR was used to investigate the presence of SARS-CoV-2 nucleic acids in vaginal discharge and amniotic fluid. No evidence of the virus was found, suggesting there is no laboratory evidence to suggest a possible passage of SARS-CoV-2 from the infected mother to the amniotic fluid.
47	<u>Evidence for and against vertical transmission for severe acute respiratory syndrome coronavirus 2.</u> Lamouroux A, et al. Am J Obstet Gynecol. 2020 Jul;223(1):91.e1-91.e4. doi: 10.1016/j.ajog.2020.04.039.	Issues regarding vertical transmission of SARS-CoV-2 are emerging. 12 articles were reviewed that reported on 68 deliveries and 71 neonates with maternal infection in the third trimester of pregnancy. To determine whether infection occurred congenitally or perinatally, perinatal exposure, mode of delivery, and time interval from delivery to the diagnosis of neonatal infection were considered. Neonates with severe acute respiratory syndrome coronavirus 2 infection are usually asymptomatic. In 4 cases, a diagnostic test for severe acute respiratory syndrome coronavirus 2 infection was performed within 48 hours of life. Furthermore, detection rates of RT-PCR and the interpretation of IgM and IgG antibodies levels in cord and neonatal blood were discussed in relation with the immaturity of the fetal and neonatal immune system.
48	<u>Incidence of SARS-CoV-2 vertical transmission: a meta-analysis.</u> Goh XL, et al. Arch Dis Child Fetal Neonatal Ed . 2020 Jun 25;fetalneonatal-2020-319791.	Seventeen studies were included in this meta-analysis. Four hundred and two COVID-19-positive mothers delivered 405 newborns, of which 330 newborns underwent early RT-PCR tests. Nine of 330 newborns tested positive for SARS-CoV-2. The average pooled incidence of vertical transmission was 16 per 1000 newborns ((95% CI 3.40 to 73.11). Therefore, current evidence shows that the risk of vertical transmission of SARS-CoV-2 is low.
49	<u>Maternal transmission of SARS-COV-2 to the neonate, and possible routes for such transmission: A systematic review and critical analysis.</u> Walker KF, et al. BJOG. 2020 Jun 12;10.1111/1471-0528.16362. doi: 10.1111/1471-0528.16362.	49 studies which included 666 neonates and 655 women was included in this review. 28/666 (4%) neonates had confirmed COVID-19 infection postnatally. Of the 291 women who delivered vaginally, 8/292 (2.7%) neonates were positive. Of the 364 women who had a Caesarean birth, 20/374 (5.3%) neonates were positive. Of the 28 neonates with confirmed COVID-19 infection, 7 were breast fed, 3 formula fed, 1 was given expressed breast milk and in 17 neonates the method of infant feeding was not reported. Neonatal COVID-19 infection is uncommon, uncommonly symptomatic, and the rate of infection is no greater when the baby is born vaginally, breastfed or allowed contact with the mother.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Vertical transmission and management



No.	Publication	Notes
50	<p>Vertical transmission and materno-fetal outcomes in 13 patients with coronavirus disease 2019. Masmajan S, et al. Clin Microbiol Infect. 2020 Jul 8 doi: 10.1016/j.cmi.2020.06.035 [Epub ahead of print]</p>	<p>In a retrospective case series, 13 women with SARS-CoV-2 infection during pregnancy were identified (12 with positive nasopharyngeal PCR and one who was symptomatic with positive serology but three negative PCRs). None of the placenta, cord blood or neonate nasopharyngeal swabs were positive for SARS-CoV-2. These results and the high proportion of negative results among newborn infants from infected mothers could indicate that maternal–placental–foetal infection seems to be rare and that vertical transmission is difficult to prove. 2 of 13 (84%) women had a caesarean section.</p>
51	<p>Vertical transmission of SARS-CoV-2 infection and preterm birth. Pulinx B, et al. Eur J Clin Microbiol Infect Dis. 2020 Jul 13 : 1–5. doi: 10.1007/s10096-020-03964-y [Epub ahead of print]</p>	<p>Case report of the first case of SARS-CoV-2 detection in both amniotic fluid and placental tissue from preterm fetuses born to a SARS-CoV-2-positive mother. A known SARS-CoV-2-positive woman gave preterm birth to two fetuses at Week 24 with SARS-CoV-2 positive testing in placental tissue and amniotic fluid. The placental histological examinations showed chronic intervillitis and extensive intervillous fibrin depositions with ischemic necrosis of the surrounding villi. The fetal death of fetus one was diagnosed and fetus two showed fetal heart rate decelerations. Due to unstoppable labor, the patient gave preterm birth to two fetuses with prepartal intrauterine death of both.</p>
52	<p>Vertical transmission risk of SARS-CoV-2 infection in the third trimester: a systematic scoping review. Thomas P, et al. J Matern Fetal Neonatal Med. 2020 Jul 1;1-8. doi: 10.1080/14767058.2020.1786055.</p>	<p>18 studies consisting of 157 mothers and 160 neonates were included in this review. Currently, there is no conclusive evidence to suggest that vertical transmission of SARS-CoV-2 occurs. Amongst 81 (69%) neonates who were tested for SARS-CoV-2, 5 (6%) had a positive result. However, amongst these 5 neonates, the earliest test was performed at 16 h after birth, and only 1 neonate was positive when they were later re-tested. However, this neonate initially tested negative at birth, suggesting that the SARS-CoV-2 infection was likely hospital-acquired rather than vertically transmitted. 13 (8%) neonates had complications or symptoms. Finding suggest that vertical transmission did not occur.</p>
53	<p>Adverse outcomes in SAR-CoV-2 (COVID-19) and SARS virus related pregnancies with probable vertical transmission. Bahadur G, et al. JBRA Assist Reprod. 2020 Jul-Sep; 24(3): 351–357.</p>	<p>Most publications studied small numbers of babies. Out of 10 babies positive for the virus, 3 were positive for IgG/IgM antibodies. As IgM do not cross placenta, appears these babies acquired infection in utero. In 11 studies looking at placentas, on 3 from second and third trimesters were infected, with evidence of infiltration of inflammatory cells, increased intervillous fibrin deposition, no vasculopathy and localisation of virus to syncytiotrophoblast cells. Viral transmission from the maternal to the fetal side could be accomplished via canonical (ACE2) or alternative (CD147) receptors present in the placenta to which SARS-CoV2 can bind. Risk of vertical transmission appears low but remains a potential.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Vertical transmission and management



No.	Publication	Notes
54	<p>Vertical transmission of COVID-19: SARS-CoV-2 RNA on the fetal side of the placenta in pregnancies with COVID-19 positive mothers and neonates at birth. Patanè L, Morotti D, Giunta MR, et al. American Journal of Obstetrics & Gynecology MFM. Available online 18 May 2020, 100145</p>	Of the 22 neonates born, 2 tested positive for SARS-CoV-2. Both recovered and were discharged. The virus was also detected in the placentas of the mothers of the infected neonates. These findings support the possibility for vertical transmission.
55	<p>The SARS-CoV-2 receptor ACE2 expression of maternal-fetal interface and fetal organs by single-cell transcriptome study Li M., Chen L., Zhang J., Xiong C., Li X. PLoS ONE 2020 15:4 Article Number e0230295</p>	The authors concluded, “This study demonstrates the expression of SARS-CoV-2 receptors in human maternal-fetal interface and the main fetal organs. Both the vertical transmission and the placenta dysfunction/abortion caused by SARS-CoV-2 need to be further carefully investigated in clinical practice.”
56	<p>Single-Cell RNA Expression Profiling of ACE2 and AXL in the Human Maternal–Fetal Interface Zheng Q.-L., Duan T., Jin L.-P. Reproductive and Developmental Medicine 2020 4:1 (7-10)</p>	This study provides a possible infection route and mechanism for the SARS-CoV-2-infected mother-to-fetus transmission disease, which could be informative for future therapeutic strategy development
57	<p>Intrauterine vertical transmission of SARS-CoV-2: what we know so far. Wang C, Zhou YH, Yang HX, et al. Ultrasound Obstet Gynecol. 2020 Apr 7. doi: 10.1002/uog.22045. [Epub ahead of print]</p>	Review of knowledge of risk of intrauterine transmission. While several studies have investigated the possibility, data is mixed and cannot be conclusively defined without further high quality research.
58	<p>Vertical Transmission of Coronavirus Disease 19 (COVID-19) from Infected Pregnant Mothers to Neonates: A Review. Karimi-Zarchi M, Neamatzadeh H, Dastgheib SA, et al. Fetal Pediatr Pathol. 2020 Jun;39(3):246-250. doi: 10.1080/15513815.2020.1747120. Epub 2020 Apr 2.</p>	Review of 31 pregnancies and births. No cases of vertical transmission reported, with no infection detected in neonates or placentas. Two mothers died; paper concluded mothers may be at an increased risk for more severe complications.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Vertical transmission and management



No.	Publication	Notes
59	Perinatal aspects on the covid-19 pandemic: a practical resource for perinatal-neonatal specialists Mimouni F, Lakshminrusimha S, Pearlman SA et al. J. Perinatol. doi: 10.1038/s41372-020-0665-6. Epub 2020 Apr 10.	Summarises available data, and concludes that vertical transmission is unlikely. Whether pregnancy is a risk factor for severe disease is unknown, as are details about the severity in neonates.
60	Evidence of mother-newborn infection with COVID-19. Sun M, Xu G, Yang Y, et al. Br J Anaesth. 2020 Apr 28. doi: 10.1016/j.bja.2020.04.066 [Epub	Report of 3 mothers diagnosed with COVID-19, with neonates delivered by caesarean. Each neonate was only handled by staff wearing full PPE. Two babies tested positive for SARS-CoV-2; the third was diagnosed with COVID-19. Although the method of infection is unclear, vertical transmission cannot be ruled out.
61	Lack of vertical transmission of severe acute respiratory syndrome coronavirus 2, China. Li Y, Zhao R, Zheng S, et al. Emerg Infect Dis. 2020 Jun;26(6):1335-1336. doi: 10.3201/eid2606.200287. Epub 2020 Jun 17.	Case report of neonate delivered by caesarean to mother with COVID-19. Sputum sample was positive, however, urine, faeces, amniotic fluid, cord blood and placenta were negative for SARS-CoV-2. All samples from the neonate were negative, suggesting vertical transmission unlikely.
62	Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) Vertical Transmission in Neonates Born to Mothers With Coronavirus Disease 2019 (COVID-19) Pneumonia Hu X, Gao J, Luo X, et al. Obstet Gynecol. 2020 Apr 24. doi: 10.1097/AOG.0000000000003926. [Epub ahead of print]	Of seven births from mothers with COVID-19 that were all isolated immediately after birth, one tested positive for SARS-CoV-2 infection. RT-PCR of throat swabs, blood, faeces and urine were negative for the rest of the neonates.
63	Severe COVID-19 during Pregnancy and Possible Vertical Transmission Alzamora MC, Paredes T, Caceres D, et al. Am J Perinatol. 2020 Jun;37(8):861-865. doi: 10.1055/s-0040-1710050. Epub 2020 Apr 18.	Case study of a pregnant COVID-19 patient requiring mechanical ventilation. Baby was delivered by caesarean delivery. The neonate tested positive for SARS-COV-2 on first day of life, suggesting the potential for vertical transmission.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Vertical transmission and management



No.	Publication	Notes
64	<p>Clinical characteristics and intrauterine vertical transmission potential of COVID-19 infection in nine pregnant women: a retrospective review of medical records Chen H, Guo J, Wang C, et al. Lancet. 2020 Mar 7;395(10226):809-815. doi: 10.1016/S0140-6736(20)30360-3.</p>	Review of nine cases of pregnancies with COVID-19, reviewing clinical characteristics, which were similar as non-pregnant cases, with no evidence for intrauterine infection.
65	<p>Possible Vertical Transmission of SARS-CoV-2 From an Infected Mother to Her Newborn Dong L, Tian J, He S, et al. JAMA. 2020 Mar 26. doi: 10.1001/jama.2020.4621. [Epub ahead of print]</p>	Case report of a mother infected with COVID-19, and a neonate born who had increased antibody levels and elevated cytokine, although tests for COVID-19 using PCR were negative. Vertical transmission cannot be excluded.
66	<p>Vertical Transmission of Severe Acute Respiratory Syndrome Coronavirus 2: A Systematic Review. Yang Z, Liu Y. Am J Perinatol. 2020. doi: 10.1055/s-0040-1712161.</p>	There is currently no direct evidence to support intrauterine vertical transmission of SARS-CoV-2. Additional RT-PCR tests on amniotic fluid, placenta, and cord blood are needed to ascertain the possibility of intrauterine vertical transmission.
67	<p>Detection of SARS-COV-2 in Placental and Fetal Membrane Samples Penfield CA, Brubaker SG, Limaye MA et al. Am J Obstet Gynecol MFM. 2020 May 8:100133. doi: 10.1016/j.ajogmf.2020.100133. [Epub ahead of print]</p>	This is the first study to demonstrate the presence of SARS-CoV-2 RNA in placental or membrane samples. While there were no clinical signs of vertical transmission, our findings raise the possibility of intrapartum viral exposure.
68	<p>Fetal Diagnosis and Therapy during the COVID-19 Pandemic: Guidance on Behalf of the International Fetal Medicine and Surgery Society. Deprest J, Choolani M, Chervenak F et al. Fetal Diagn Ther. 2020 May 6:1-10. doi: 10.1159/000508254. [Epub ahead of print]</p>	There is, to date, minimal, unconfirmed evidence of spontaneous vertical transmission, though it may theoretically be increased with some procedures. Knowing a mother's preoperative SARS-CoV-2 status would enable us to avoid or defer certain procedures while she is contagious and to protect health care workers appropriately. Some fetal conditions may alternatively be managed neonatally.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Vertical transmission and management



No.	Publication	Notes
69	<p><u>SARS-CoV-2: Is it the newest spark in the TORCH?</u> Muldoon K.M., Fowler K.B., Pesch M.H., Schleiss M.R. Journal of Clinical Virology 2020 127 Article Number 104372</p>	<p>Authors stated that there is not enough information on outcomes of COVID-19 on pregnancy and neonates, hence, “Research regarding the potential routes of acquisition of SARS-CoV-2 infection in the prenatal and perinatal setting is of a high public health priority. Vaccines targeting women of reproductive age, and in particular pregnant patients, should be evaluated in clinical trials and should include the endpoints of neonatal infection and disease.”</p>
70	<p><u>Analysis of Maternal Coronavirus Infections and Neonates Born to Mothers with 2019-nCoV; a Systematic Review.</u> Muhidin S, Moghadam ZB, Vizeh M. Arch Acad Emerg Med. 2020; 8(1): e49.</p>	<p>Systematic review of 11 papers, with 89 pregnant patients. Pregnant patients in late pregnancy had clinical manifestations similar to non-pregnant adults. The risk of fetal distress, preterm delivery and prelabour rupture of membranes (PROM) rises with the onset of COVID-19 in the third trimester of pregnancy. There is no evidence of intrauterine and transplacental transmission of COVID-19 to the fetus in the third trimester of pregnancies.</p>
71	<p><u>Clinical Characteristics of COVID-19 Infection in Newborns and Pediatrics: A Systematic Review.</u> Panahi L, Amiri M, Pouy S. Arch Acad Emerg Med. 2020; 8(1): e50.</p>	<p>A total of 2228 children, new-borns and infants were studied. Clinical manifestation in children may be mild (72%), moderate (22%) or severe (6%). The most common symptoms were dry cough (91%) and fever (96%). In the included articles, 2 children died, one of which was a 14-year-old boy, and the other was a male new-born with gestational age of 35 weeks and 5 days, birth weight of 2200, Apgar score of 8, 8 (1 min and 5 min) and his first symptom was increased heart rate.</p>
72	<p><u>COVID-19 in Children, Pregnancy and Neonates: A Review of Epidemiologic and Clinical Features.</u> Zimmermann P, Nigel C. The Pediatric Infectious Disease Journal: June 2020 - Volume 39 - Issue 6 - p 469-477 doi: 10.1097/INF.0000000000002700</p>	<p>11 case series including a total of 333 infants and children are reviewed. Neonatal complications included respiratory distress or pneumonia (18%), disseminated intravascular coagulation (3%), asphyxia (2%) and 2 perinatal deaths. Four neonates (3 with pneumonia) were reported to be SARS-CoV-2 positive despite strict infection control during delivery and separation of mother and neonates, meaning vertical transmission could not be excluded.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Newborn and child management



No.	Publication	Notes
73	<p>Neonatal Late Onset Infection with Severe Acute Respiratory Syndrome Coronavirus 2. Buonsenso D, et al. Am J Perinatol. 2020 Jun;37(8):869-872. doi: 10.1055/s-0040-1710541.</p>	<p>Study to evaluate postdischarge SARS-CoV-2 status of newborns to mothers with COVID-19 in pregnancy that, at birth, were negative to SARS-CoV-2. Seven pregnant women with documented SARS-CoV-2 infection were evaluated. One had a spontaneous abortion at 8 weeks, four women recovered and are still in follow-up, and two women delivered. Two newborns were enrolled in the study. At birth and 3 days of life, newborns were negative to SARS-CoV-2. At 2-week follow-up, one newborn tested positive although asymptomatic. Findings highlight the importance of follow-up of newborns to mothers with COVID-19 in pregnancy, since they remain at risk of contracting the infection in the early period of life and long-term consequences are still unknown.</p>
74	<p>Fatal Outcome of COVID-19 Disease in a 5-month Infant With Comorbidities. Climent FJ, Calvo C, Garcia-Guereta L, et al. Revista Española de Cardiología (English Edition). Available online 27 April 2020. https://doi.org/10.1016/j.rec.2020.04.011</p>	<p>Case report of 5-month old infant. Had been diagnosed with heart failure and mucopolysaccharidosis type I-Hurler syndrome at age 1 month. Clinical course of our patient was very short, reaching the hyperinflammation phase in just 3 to 4 days from the onset of symptoms. Patient experienced cardiac arrest that proved fatal.</p>
75	<p>Delivery in pregnant women infected with SARS-CoV-2: A fast review Parazzini F, Bortolus R, Mauri PA, et al. Int J Gynaecol Obstet. 2020 Apr 9. doi: 10.1002/ijgo.13166. [Epub ahead of print]</p>	<p>Review of delivery outcomes and vertical transmission of COVID-19. Concluded that there is a low risk of vertical transmission and generally favorable neonatal outcomes.</p>
76	<p>Clinical features and obstetric and neonatal outcomes of pregnant patients with COVID-19 in Wuhan, China: a retrospective, single-centre, descriptive study. Yu N, Li W, Kang Q et al Lancet Infect Dis. 2020 May;20(5):559-564. doi: 10.1016/S1473-3099(20)30176-6</p>	<p>The maternal, fetal, and neonatal outcomes of patients who were infected in late pregnancy appeared good, and these outcomes were achieved with intensive, active management that might be the best practice in the absence of more robust data. The clinical characteristics of these patients with COVID-19 during pregnancy were similar to those of non-pregnant adults with COVID-19 that have been reported in the literature.</p>

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Newborn and child management



No.	Publication	Notes
77	<p>Novel Coronavirus disease (COVID-19) in newborns and infants: What we know so far De Rose D.U., Piersigilli F., Ronchetti M.P., Santisi A., Bersani I., Dotta A., Danhaive O., Auriti C. Italian Journal of Pediatrics 2020 46:1 Article Number 56</p>	A review published on the data published till April 07th, 2020 with an overview of the on SARS-CoV-2 epidemiology, transmission, the associated clinical presentation and outcomes in newborns and infants up to 6 months of life.
78	<p>Managing COVID-19-Positive Maternal-Infant Dyads: An Italian Experience Salvatori G., De Rose D.U., Concato C., Alario D., Olivini N., Dotta A., Campana A. [Article in Press] Breastfeeding medicine : the official journal of the Academy of Breastfeeding Medicine 2020</p>	Two reports of maternal-infant cases describing the clinical Features of newborns with Postnatal Confirmed SARS-CoV-2 infection and their Mothers. Neither the mothers nor the infants any intensive care. The authors stated that, “medical staff and nurses should not only focus on care of COVID-19 mothers and infants, but also protect, promote, and support breastfeeding. Breastfeeding creates a unique relationship between mother and child, thus reducing the length of hospital stay and the negative effects linked to quarantine and stress because of this pandemic.”
79	<p>Neonatal Resuscitation Where the Mother Has a Suspected or Confirmed Novel Coronavirus (SARS-CoV-2) Infection: Suggestion for a Pragmatic Action Plan Trevisanuto D, Moschino L, Doglioni N, et al. Neonatology. 2020 Apr 24:1-8. doi: 10.1159/000507935. [Epub ahead of print]</p>	Perspective, giving overview for delivery and neonatal resuscitation of neonates born to mothers with COVID-19.
80	<p>Chinese expert consensus on the perinatal and neonatal management for the prevention and control of the 2019 novel coronavirus infection (First edition) Wang L, Shi Y, Xiao T, et al. Ann Transl Med. 2020 Feb;8(3):47. doi: 10.21037/atm.2020.02.20.</p>	Measures from a Chinese expert working group for a national management plan for helping prevent and control COVID-19 infection.
81	<p>Expert consensus for managing pregnant women and neonates born to mothers with suspected or confirmed novel coronavirus (COVID-19) infection Chen D, Yang H, Cao Y, et al. Int J Gynaecol Obstet. 2020 Mar 20. doi: 10.1002/ijgo.13146. [Epub ahead of print]</p>	Recommendations from a multidisciplinary consensus meeting, gives ten recommendation for the management of COVID-19 in pregnancy, including recommending that staff be trained for infection control.

Pregnancy, Maternal-Fetal and Newborn Related Outcomes

Newborn and child management



No.	Publication	Notes
82	<u>Coronavirus disease (COVID-19) and neonate: What neonatologist need to know</u> Lu Q, Shi Y. J Med Virol. 2020 Mar 1. doi: 10.1002/jmv.25740. [Epub ahead of print]	A review describing current understanding of COVID-19 in newborns and children.
83	<u>Perinatal-Neonatal Management of COVID-19 Infection - Guidelines of the Federation of Obstetric and Gynecological Societies of India (FOGSI), National Neonatology Forum of India (NNF), and Indian Academy of Pediatrics (IAP)</u> Chawla D, Chirla D, Dalwai S, et al. Indian Pediatr. 2020 Jun 15;57(6):536-548. doi: 10.1007/s13312-020-1852-4.	Guidelines from FOGSI, reviewing existing guidelines and literature. Twenty recommendations are given for pregnancies with confirmed infection, neonatal care, prevention and control, diagnosis and general queries.
84	<u>Neonatal Resuscitation and Postresuscitation Care of Infants Born to Mothers with Suspected or Confirmed SARS-CoV-2 Infection</u> Chandrasekharan P, Vento M, Trevisanuto D, et al. Am J Perinatol. 2020 Apr 8. doi: 10.1055/s-0040-1709688. [Epub ahead of print]	Outline of precautions and steps of managing newborns born to COVID-19 infected mothers, discussing different strategies and promoting shared-decision making for management decisions.