

## Coronavirus in pregnancy and delivery: rapid review

E. Mullins<sup>1</sup>, D. Evans<sup>2,3</sup>, R. M. Viner<sup>3,4</sup>, P. O'Brien<sup>5,6</sup> and E. Morris<sup>6,7</sup>

1. Department of Metabolism, Digestion and Reproduction, Imperial College London, Queen Charlotte's and Chelsea Hospital, London, UK
2. North Bristol NHS Trust, Bristol, Bristol, UK
3. The Royal College of Paediatrics and Child Health, London, UK
4. University College London, London, UK
5. University College London Hospitals NHS Foundation Trust, London, UK
6. The Royal College of Obstetricians and Gynaecologists, London UK
7. Norfolk and Norwich University Hospitals NHS Foundation Trust, Norwich, Norfolk, UK

**Correspondence to:** Dr E. Mullins, Department of Metabolism, Digestion and Reproduction, Imperial

College London, Queen Charlotte's and Chelsea Hospital, DuCane Road London, London W12 0HS, UK (e-mail: [edward.mullins@imperial.ac.uk](mailto:edward.mullins@imperial.ac.uk))

**Keywords:** pregnancy, COVID-19, neonatal, breastfeeding, fetal, miscarriage, preterm

**Short title:** Rapid review: coronavirus in Pregnancy

### ABSTRACT

**OBJECTIVES** Person-to-person spread of COVID-19 in the UK has now been confirmed. There are limited case series reporting the impact on women affected by coronaviruses (CoV) during pregnancy. In women affected by SARS and MERS, the case fatality rate appeared higher in women affected in pregnancy compared with non-pregnant women. We conducted a rapid review to guide health policy and management of women affected by COVID-19 during pregnancy, which was used to develop the RCOG guidelines on COVID-19 infection in pregnancy.

**METHODS** Searches were conducted in PubMed and MedRxiv to identify primary case reports, case series, observational studies and randomised controlled trials describing women affected by coronavirus in pregnancy. Data were extracted from relevant papers. This review has been used to develop guidelines with representatives of the RCPC and RCOG who provided expert consensus on areas in which data were lacking.

**RESULTS** From 9965 results in PubMed and 600 in MedRxiv, 23 relevant studies (case reports and case series) were identified. From reports of 32 women to date affected by COVID-19 in pregnancy, delivering 30 babies (one set of twins, three ongoing pregnancies), 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 RT-PCR after delivery. Case fatality rates for SARS and MERS were 15% and 27%, respectively. SARS was associated with miscarriage or intrauterine death in five cases, and fetal growth restriction was noted in two ongoing pregnancies affected by SARS in the third trimester.

**CONCLUSIONS** Serious morbidity occurred in 2/32 women with COVID-19, both of whom required ICU care. Compared with SARS and MERS, COVID-19 appears less lethal, acknowledging the limited number of cases reported to date and one woman who remains in a critical condition. Preterm delivery affected 47% of women hospitalized with COVID-19, which may put considerable pressure on neonatal services if the UK's reasonable worst-case scenario of 80% of the population being affected is realized. Based on this review, the RCOG (in consultation with the RCPCH) developed guidance for delivery and neonatal care which recommends that delivery mode be determined primarily by obstetric indication and recommends against routine separation of COVID-19-affected mothers and babies. We hope this review will be helpful for maternity and neonatal services planning their response to COVID-19.