

Seroprevalence and presentation of SARS-CoV-2 in pregnancy

One of several case series of pregnant women diagnosed with COVID-19 by PCR reports that 41 (10%) of the 427 women required admission to a critical care unit.¹ Most women described in these case series are in the third trimester of pregnancy, which could reflect reporting bias, or a higher risk of infection or increased disease severity compared with women in the first trimester of pregnancy.² Seroprevalence studies can detect infections that test negative on PCR, and provide information on early pregnancy, when doing PCR in asymptomatic individuals is logistically difficult. We tested for antibodies for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in 874 pregnant women consecutively attending first trimester screening (ie, at 10–16 weeks of gestation; n=372) or delivery (n=502) from April 14 to May 5, 2020, at three university hospitals (ie, Hospital Sant Joan de Déu, Hospital Clínic, and Sant Pau) in Barcelona, Spain. At enrolment, women were interviewed for COVID-19 symptoms during the previous 2 months. We tested for anti-SARS-CoV-2 IgG, IgM, and IgA antibodies in participants' serum using VIRCLIA (Viracell Microbiologist, Granada, Spain). We re-tested 107 indeterminate results using VITROS (Ortho Clinical Diagnostics, Rochester, NY, USA) and re-classified samples as positive or negative for these antibodies. Women with COVID-19 were treated according to a standard protocol.³

125 (14%) of the 874 women were positive for anti-SARS-CoV-2 IgG, IgM, or IgA; 54 (15%) of the 372 women in the first trimester of pregnancy and 71 (14%) of the 502 women in the third trimester. 75 (60%) of the 125 women who were seropositive

reported having no previous symptoms and 50 (40%) reported one symptom or more. 31 women (25%) had at least three symptoms or anosmia and eight (6%) had dyspnoea. Seven women (6%) were admitted to hospital for persistent fever (>38°C) and dyspnoea. Of these seven women, three had pneumonia that was classified as severe (bilateral chest condensation, respiratory rate >30 breaths per min, and leucopenia), required oxygen support but not critical care, and were discharged well. Symptomatic infection, hospital admission, and dyspnoea were significantly more prevalent in women in the third trimester of pregnancy than in women in the first trimester of pregnancy (appendix pp 1–2).

We have found a substantially higher seroprevalence (14%) of SARS-CoV-2 than that found by use of the SARS-CoV-2 PCR positive rates (0.78%) in women aged 20–40 years in Barcelona, Spain.⁴ Our data suggest that COVID-19 is commonly asymptomatic in pregnant women⁵ and illustrate that seroprevalence studies might capture undiagnosed infections and offer different estimates of infection severity. In this study, none of the 125 women who were infected with SARS-CoV-2 required critical care, compared with the 10% of women diagnosed with COVID-19 by PCR.¹ We believe these data are reassuring and relevant to pregnant women and obstetricians. Seroprevalence was similar between women in the first trimester of pregnancy and women in the third trimester, suggesting a similar risk of infection, but the proportion of women with symptoms and the proportion of women who required hospitalisation were higher in the third trimester group than in the first trimester group. This result agrees with data reported from case registries of pregnant women with COVID-19,¹ suggesting that, as with other respiratory viruses, SARS-CoV-2 might cause more severe disease and require

increased surveillance in late pregnancy than in early pregnancy. These findings should be further investigated in larger studies. Samples of serum and peripheral blood mononuclear cells obtained in this study are stored at biobanks for future studies with better or complementary immunological tests. Long-term follow-up of the infants is now underway given the fact that SARS-CoV-2 is potentially neurotropic.⁶

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- 2 Rasmussen SA, Jamieson DJ, Bresee JS. Pandemic influenza and pregnant women. *Emerg Infect Dis* 2008; **14**: 95–100.
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See Online for appendix

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- 4 Generalitat de Catalunya. Interactive case map by municipality. [http://aquas.gencat.cat/ca/actualitat/ultimes-dades-coronavirus/mapa-per-municipis/index.html#googtrans\(ca|en\)](http://aquas.gencat.cat/ca/actualitat/ultimes-dades-coronavirus/mapa-per-municipis/index.html#googtrans(ca|en)) (accessed June 12, 2020).
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- 6 Vivanti AJ, Vauloup-Fellous C, Prevot S, et al. Transplacental transmission of SARS-CoV-2 infection. *Nat Commun* 2020; **11**: 3572.