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COVID-19 Antibody Testing in Pregnancy

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PII: S2589-9333(20)30086-0

DOI: <https://doi.org/10.1016/j.ajogmf.2020.100142>

Reference: AJOGMF 100142

To appear in: *American Journal of Obstetrics & Gynecology MFM*

Received Date: 10 April 2020

Revised Date: 13 May 2020

Accepted Date: 13 May 2020

Please cite this article as: Zullo F, Di Mascio D, Saccone G, COVID-19 Antibody Testing in Pregnancy, *American Journal of Obstetrics & Gynecology MFM* (2020), doi: <https://doi.org/10.1016/j.ajogmf.2020.100142>.

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1 *Clinical Perspective*

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2 **COVID-19 Antibody Testing in Pregnancy**

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8 **Disclosure:** *The authors report no conflict of interest*

9 **Financial Support:** *No financial support was received for this study*

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14 **Running head:** Antibody Response to COVID-19

15 **Key words:** SARS-COV-2, COVID-19, coronavirus, 2019-nCoV, influenza, vaccine, coronavirus

16 **Disclosure of interests:** None declared

17 **Contribution to authorship:** Sole author

18 **Details of ethics approval:** Not applicable

19 **Funding:** None

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21 The novel coronavirus 2019, or Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2),
22 is the virus responsible for COVID-19 infection, which can has been associated with maternal and
23 perinatal morbidity and mortality.^{1,2} Almost all patients with COVID-19 infection test positive for
24 antiviral immunoglobulin-G (IgG) within about 10-20 days after symptom onset (Figure 1), but the
25 clinical value of antibody testing has not yet been completely elucidated, either in non-pregnant or
26 even more pregnant patients.³

27 There are different ways to test for antibody against SARS-CoV-2. The three most common
28 methods currently are IgM and IgG titer measured by either chemiluminescence immunoassay
29 analysis, or enzyme-linked immunosorbent assay (ELISA); and a rapid (results within 15 minutes)
30 IgM-IgG combined antibody test.³ Their sensitivities and specificities are still being studied and
31 vary, but have been reported to be about 48%, 89%, and 89%, respectively; and 100%, 91%, and
32 91%, respectively.³⁻⁵

33 Testing pregnant women for antibody response to COVID-19 may have different advantages,
34 including identifying: 1. Possibly 'healed' women (e.g. IgG positive) never tested with real-time
35 reverse-transcriptase-polymerase-chain-reaction (RT-PCR) assay of nasopharyngeal (NP) swab
36 specimens; 2. Women still at risk for COVID-19 infection (e.g. IgM and IgG negative).

37 Women who do know their infectious status represent a potential threat to others, including
38 healthcare workers (HCWs) and other patients. Indeed, some governments have suggested that the
39 detection of antibodies to SARS-CoV-2 could serve as the basis for an "immunity passport" or
40 "risk-free certificate" (digital or physical documents that certify an individual has been infected and
41 is purportedly immune to SARS-CoV-2) that would enable individuals to, for example, return to
42 work or travel assuming that they are protected against re-infection.⁶

43 The use of the point-of-care rapid combined antibody test can be of paramount importance in
44 obstetric healthcare settings and may be particularly helpful in testing women before outpatient

45 (Figure 2A) and inpatient (Figure 2B) visits. After the rapid test, the following results can be
46 reported:

- 47 • IgG negative, IgM negative.
- 48 • IgG positive, IgM negative. There are limited data on when IgM disappears.^{3,4} Therefore,
49 even if there is a high chance that the tested person is not contagious anymore, a NP swab should be
50 offered.
- 51 • IgG positive, IgM positive or IgG negative, IgM positive. The presence of IgM increases the
52 chance that the tested person is still contagious.⁴

53 We suggest that, if rapid antibody testing and personnel are available, algorithms for care before
54 outpatient and inpatient care of pregnant women be implemented as suggested in Figure 2. At our
55 institution, the Department of Obstetrics and Gynecology at University of Naples Federico II
56 (Naples, Italy), all pregnant women are tested with the rapid combined antibody test before hospital
57 admission. If the rapid antibody test is positive to either SARS-CoV-2 IgM and/or IgG, we do offer
58 the NP swab and consider these women COVID-19 positive until the result of the NP swab is
59 available. Patients positive to the rapid combined antibody test are isolated, and inpatient admission
60 is postponed waiting the results of the NP swab, if feasible (e.g. planned cesarean delivery,
61 induction of labor, surgical procedure). If it is not feasible to postpone the admission (e.g. laboring
62 or bleeding pregnant women), the patient is admitted to the COVID unit, and managed as COVID-
63 19 positive (Figure 2A). For example, in our Department, recently two pregnant women with
64 positive IgG and IgM had admission to the hospital postponed of 24 hours while awaiting the NP
65 swab test result. In another patient, who tested positive for IgM, postponed hospital admission was
66 not feasible due to heavy bleeding in a first trimester spontaneous abortion. The patient received NP
67 swab and was admitted to the COVID unit where she received dilation and curettage. Result of the
68 RT-PCR assay, available the day after, showed positivity to SARS-CoV-2.

69 We are now also testing women scheduled for outpatient visits. Those tested positive to either IgM
70 or IgG at the rapid combined antibody test, have NP swab offered, and the outpatient appointment is
71 postponed, as shown in Figure 2B. Women with prior infection, and ‘certified’ recovered because
72 of two negative NP swabs 24 hours apart, are not tested for antibody response to COVID-19.

73 It would also be helpful, if available, to test visitors, and HCWs. In our Department, we have
74 mandatory rapid antibody testing for all HCWs every 7 days. HCWs positive to either IgM or IgG
75 self-isolate at home, waiting for the results of the NP swab.

76 In summary, we recommend testing for antibody response to SARS-CoV-2 for pregnant women
77 before receiving care in both the inpatient and outpatient setting, as feasible (Figure 2). Those
78 testing positive to either IgM or IgG rapid immunoassay should receive NP swab, and admission or
79 appointment should be postponed, if feasible, until NP swab test results is available, and considered
80 COVID-19 positive in the meanwhile (Figure 2).

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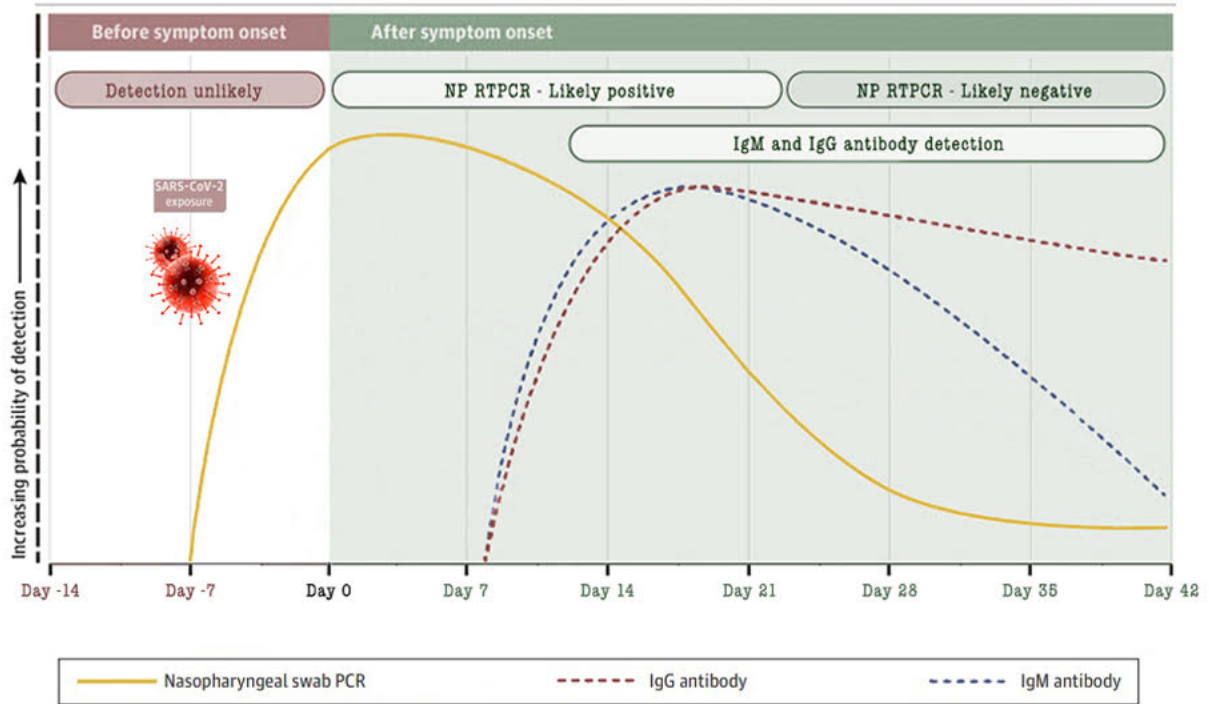
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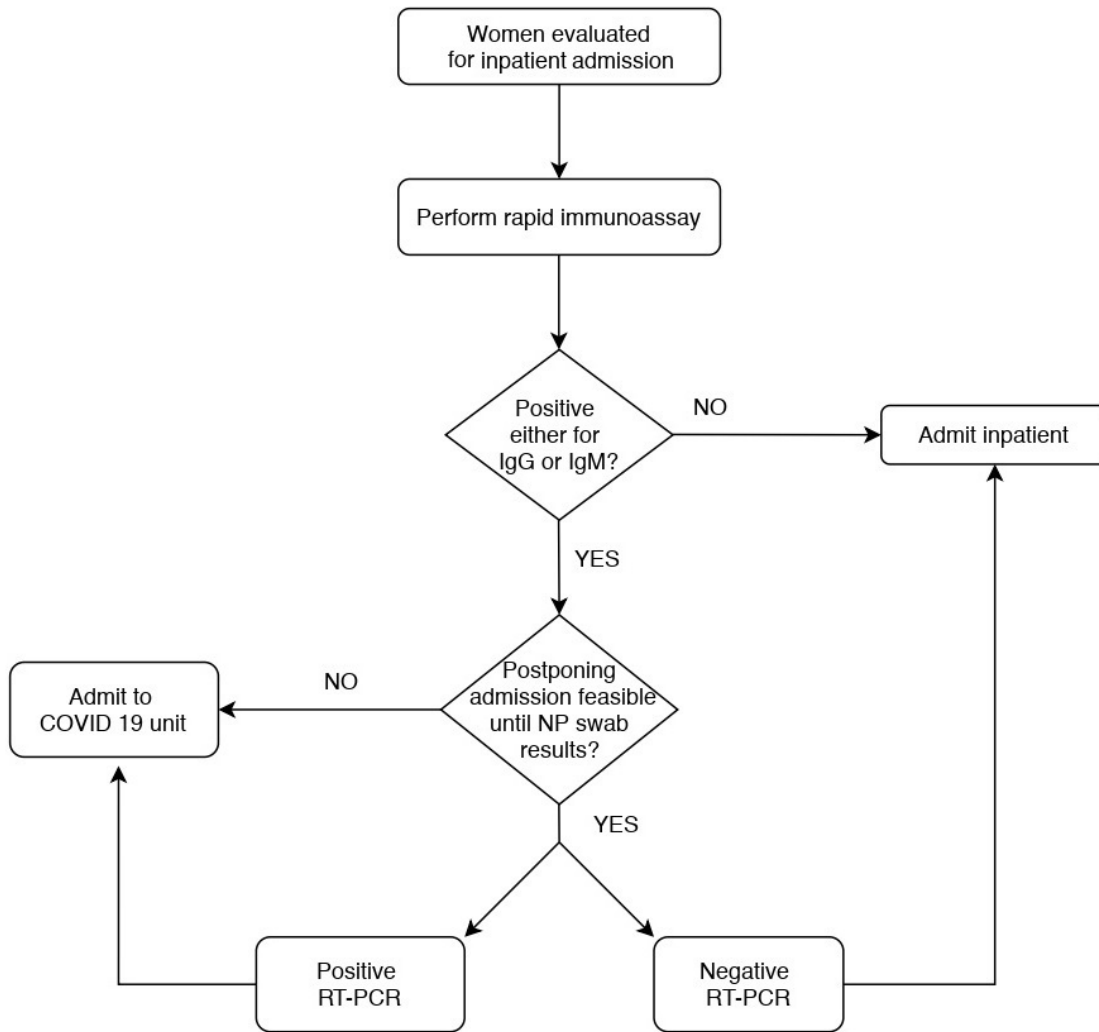
133 **FIGURES**

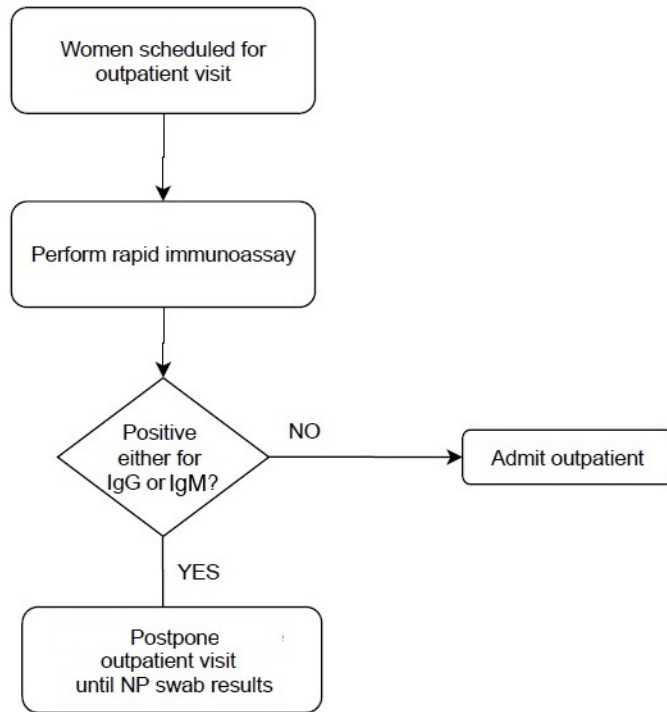
134 **Figure 1.** Antibody response against SARS-COV-2 based on data from several published
135 reports. SARS-CoV-2 indicates severe acute respiratory syndrome coronavirus 2; PCR,
136 polymerase chain reaction. *Modified from Sethuraman N et al. Interpreting Diagnostic Tests
137 for SARS-CoV-2. JAMA. 2020 May 6. doi: 10.1001/jama.2020.8259*

138 **Figure 2.** Algorithm for rapid combined antibody test used at University of Naples Federico
139 II (Naples, Italy). A) For women before admission to inpatient monitoring; B) For women
140 scheduled for outpatient appointment. *NP: nasopharyngeal; GP: general practitioner; RT-
141 PCR: real-time reverse-transcriptase-polymerase-chain-reaction*

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STATEMENT OF AUTHORSHIP

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Date: 05/05/2020

Manuscript # (if available): EDI-AJOGMFM-20-1061

Manuscript title: Antibody Response to COVID-19

Corresponding author: Gabriele Saccone

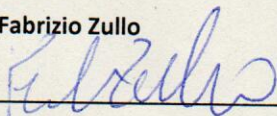
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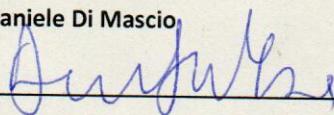
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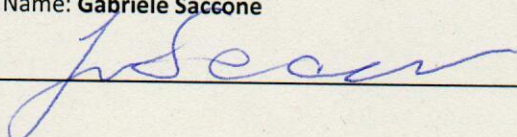
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