

Serological screening of COVID-19 in blood banks: What's the transfusion safety? A Brazilian study proposal

Lucas Alves da Mota Santana¹ (Orcid: 0000-0002-8261-1504) (lucassantana.pat@gmail.com)

Eloia Emanuely Dias Silva² (Orcid: 0000-0003-2895-4191) (eloiaemanuely@gmail.com)

Pamela Chaves de Jesus² (Orcid: 0000-0003-3282-7056) (pamcjesus@outlook.com)

Pedro Henrique Macedo Moura² (Orcid: 0000-0002-5689-2090) (phmm694@gmail.com)

Deise Maria Rego Rodrigues da Silva² (Orcid: 0000-0001-8916-5271) (deisemaria588@gmail.com)

Maria Rita Sotero Corcinio² (Orcid: 0000-0002-7889-4484) (ritacor@gmail.com)

Marina dos Santos Barreto² (Orcid: 0000-0003-4724-0688) (marinac23@gmail.com)

Ronaldy Santana Santos² (Orcid: 0000-0002-4928-7802) (ronaldysss@gmail.com)

Jessiane Bispo dos Santos² (Orcid: 0000-0002-7518-6108) (jessinik34@gmail.com)

Adriana Gibara Guimarães² (Orcid: 0000-0003-1643-5642) (adrianagibara@hotmail.com)

Lysandro Pinto Borges² (Orcid: 0000-0002-1721-1547) (lysandro.borges@gmail.com)

¹ Programa de Pós-Graduação em Odontologia, Universidade Federal de Sergipe. Aracaju-SE, Brazil.

² Departamento de Farmácia, Universidade Federal de Sergipe. São Cristóvão-SE, Brazil.

The COVID-19 pandemic has impacted several health programs around the world, consequently worsening the quality of life for patients with comorbidities (Poudel *et al.*, 2021). Services such as Intensive Care Units (ICUs), treatment for cancer, trauma rooms in emergency hospitals, and other services that require blood transfusions were adversely affected, primarily due to a reduction in blood donations (Silva-Malta *et al.*, 2021; Kiarie *et al.*, 2022). Furthermore, the risk of novel coronavirus transmission through blood banks remains unclear, as different pathogens have the capacity to cause cross-infection through transfusion (Langhi *et al.*, 2022). Therefore, we discuss the role of blood banks in monitoring SARS-CoV-2

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by investigating circulating antibodies, aiming to establish new epidemiological scenarios based on the Brazilian reality.

With the advance of the immunization process, high levels of seroprevalence have been observed among individuals (Zaballa *et al.*, 2023). This finding holds significant clinical relevance, particularly as rates of genomic sequencing and screening for new subvariants have decreased worldwide. Some authors have provided immunohistochemical evidence that the novel coronavirus can persist in organic tissues after the acute phase of infection, even when swab tests yield negative results (Limongelli *et al.*, 2023). While uncommon, cases of orocutaneous manifestations in vaccinated individuals have been reported, underscoring the importance of ongoing vigilance to control new strains (Santana *et al.*, 2022).

Thus, blood banks may represent a reliable alternative for monitoring the herd immunity rate. Currently, there are approximately 106 hemocenters distributed across 26 states in Brazil, with most of these services located in the southeast and south regions (<https://redome.inca.gov.br/campanhas/hemocentros-do-brasil/>).

It is estimated that 81.8% of the Brazilian population is vaccinated. (https://ycharts.com/indicators/brazil_coronavirus_full_vaccination_rate). On the other hand, special attention must be given to donors with a non-detectable diagnosis for SARS-CoV-2 antigen, but who show positive results for IgM. Curiously, the increase in the levels of this immunoglobulin may be induced by vaccine stimulation and could also indicate the presence of active cases of the disease (Tan *et al.*, 2020). The linkage of SARS-CoV-2 to human cells is mediated through ACE-2 receptors, which are commonly found in oral tissues and blood vessels (Santana *et al.*, 2021; Santana *et al.*, 2022). Alternatively, the application of antibody tests in blood donor patients may be a viable strategy for virus monitoring, as has been done for other infections (Langhi *et al.*, 2022).

Although no reports of blood transmission has been described in the literature, more evidence is needed to exclude this possibility (Langhi *et al.*, 2022). Intriguingly, recent case studies have demonstrated the capacity of vertical transmission of SARS-CoV-2 from mothers to babies through placenta. This mechanism has been associated with developmental delays and neurological disorders (https://www.newswise.com/coronavirus/case-study-shows-covid-19-can-be-transmitted-from-mother-to-baby-through-placenta-causing-brain-injury/?article_id=790048). In Brazil, some health surveillance authorities have suggested the inclusion of antibody tests against

SARS-CoV-2 for blood donors (<https://www.camara.leg.br/noticias/668327-proposta-inclui-teste-para-covid-19-na-lista-obrigatoria-para-doacao-de-sangue/>). Occasionally, the levels of antibodies induced by the vaccine decrease over time (Gaebler *et al.*, 2021) which results in a potential risk of individuals becoming vulnerable to new infections or experiencing the possibility of major complications.

The impact of COVID-19 on the circulatory system has been marked by the occurrence of thrombosis and vasculitis associated with Kawasaki disease, especially in non-vaccinated patients (Santana *et al.*, 2021). Epidemiologically, the current global scenario represents a significant advancement towards the end of the pandemic, driven by a decline in infection and death rates. However, geriatric patients and those with comorbidities remain at risk, as peaks of new cases may arise due to the emergence of variants of interest (Russel *et al.*, 2023). Therefore, the application of booster doses, including bivalent vaccine, is deemed mandatory, especially considering the stagnation in vaccination rates observed in the national territory in recent months (https://ycharts.com/indicators/brazil_coronavirus_full_vaccination_rate).

In summary, we emphasize the importance of monitoring the virus to accurately assess the profile of the sanitary crisis and to raise public awareness about adhering to public health policies. Therefore, blood bank services can act as a “thermometer” to evaluate virus evolution, the presence of circulating antibodies, and consequently, to influence new measures against the pathogen during the “new normal”.¹

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Note

¹ All authors contributed equally to this work.

