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Uninformative & useless: why it is necessary to actively challenge Covid-19 antibody testing post-vaccination

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TITLE PAGE

Title:

Uninformative & unuseful: why it is necessary to actively challenge Covid-19 antibody testing post-vaccination

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ABSTRACT:

Objectives

We aim to assess the evidence on the usefulness of post-vaccination testing of Covid-19 antibodies.

Study design

We use a descriptive analytical approach.

Methods

We synthesize insights of studies on the immunological responses to SARS-CoV-2 after natural infection or vaccination and recommendations by regulatory institutions, such as the Food and Drug Administration and the Centers for Disease Control and Prevention in the United States.

Results

Based on the multiple humoral and cellular responses elicited by either the virus or the vaccines, the high variability of antibodies in blood, and the lack of correlation between presence of antibodies and active cellular immunity against SARS-CoV-2, there has been explicit advise against assessing immunological status post-vaccination.

Conclusions

Post-vaccination antibody testing is not warranted to assess immunity status for Covid-19. Patients may misinterpret results, leading to the spread of misinformation regarding vaccine efficacy or the need to continue self-protection or the protection of others. Therefore, public health authorities should actively challenge the promotion and commercialization of this type of tests.

KEYWORDS

Covid-19; vaccination; antibody testing; immunological response

MAIN TEXT

In countries highly impacted by the Covid-19 pandemic, slow vaccine rollout has been met with offers to get tested for antibodies after being vaccinated against SARS-CoV-2. Prices may vary from £49 in England (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7954518/pdf/main.pdf>) and £43 (€50) in Spain (<https://ceydes.com/tienda-de-salud/prueba-anticuerpos-post-vacunacion-covid-19/>) to £14 (US\$ 20) in Ecuador (<https://www.facebook.com/CisealPuce/photos/a.452694978265861/180233435>)

[6635243/](#)). We examine here the evidence for the usefulness of post-vaccination testing of Covid-19 antibodies and, accordingly, for the potential need to limit the promotion and commercialization of this type of tests.

Through clinical trials, we know that vaccines against Covid-19 act in the human body to impede the clinical progression of the disease into a severe case, including death ¹. Evidence is based on observed decreases in morbidity, mortality, and potential transmission of Covid-19 on vaccinated individuals ². However, the presence of antibodies has not yet been measured systematically.

Studies assessing Covid-19 immunological responses are crucial since these dynamics offer key insights into the control of the pandemic. After vaccination, we can expect the presence of antibodies against the spike protein responsible for SARS-CoV-2 cell invasion in a blood sample (e.g., receptor binding domain immunoglobulin G or RBD-IgG). Nevertheless, science has yet to determine the threshold of either optimal or negligible immunological antibody response, which means that neither a positive result is automatically equivalent to immunity nor a negative result is equivalent to lack thereof ^{3,4}. This is why regulatory institutions such as the Food and Drug Administration and the Centers for Disease Control and Prevention in the United States have explicitly advised against post-vaccination testing of SARS-CoV-2 antibodies ^{5,6}.

Studies show that antibody presence is highly variable ⁷. A potentially negative or low antibody test result does not automatically translate into a diminished immunological status for two main reasons. First, the test might be failing to detect the amount of antibodies due to lower sensitivity (i.e., ~80% ⁸). Second, vaccines also elicit immune responses (Fig. 1), which play an important role in early virus clearance via T-cells (i.e., CD4+ and CD8+) and long-lasting protection via memory B cells (Fig. 1) ^{3,4,9}. Testing for antibodies does not assess cellular response but, more importantly, titers of antibodies in blood may correlate poorly with the presence of an active cellular immunity against SARS-CoV-2 (Fig. 1) ^{3,9}. To be truly informative, tests should follow scientific guidelines, including on cut offs to determine antibody presence and immunological compartments beyond antibodies ^{3,4}.

Individuals who are curious as to whether they have been “properly” vaccinated or if the vaccine is “working” may not know that an antibody test will not help to resolve these doubts. To the contrary, they may even interpret results in two ways. If the result is negative, the belief that a specific vaccine is ineffective could become extended and hamper vaccination efforts in countries where vaccine rollout is slow and inconsistent. Conversely, people with antibodies may feel safer and therefore possibly disregard current recommendations to prevent SARS-CoV-2 infection (e.g., maintain physical distance, use a face mask, avoid large indoor gatherings in poorly ventilated spaces). Because there is no clear evidence that vaccines prevent us from infecting others ¹⁰, this may place highly susceptible individuals (e.g., immunocompromised) at further risk.

Although we appreciate the right of individuals to satisfy their curiosity in contexts of uncertainty—i.e., countries with limited diagnostic capacity—, post-vaccination antibody tests are not warranted to assess immunity status for Covid-19. Results may contribute to misinformation regarding individual practices of self-protection and protection of others, as well as trigger opposition to vaccination-documented benefits. Therefore, as a public health measure, governments should actively challenge the promotion and commercialization of this type of tests.

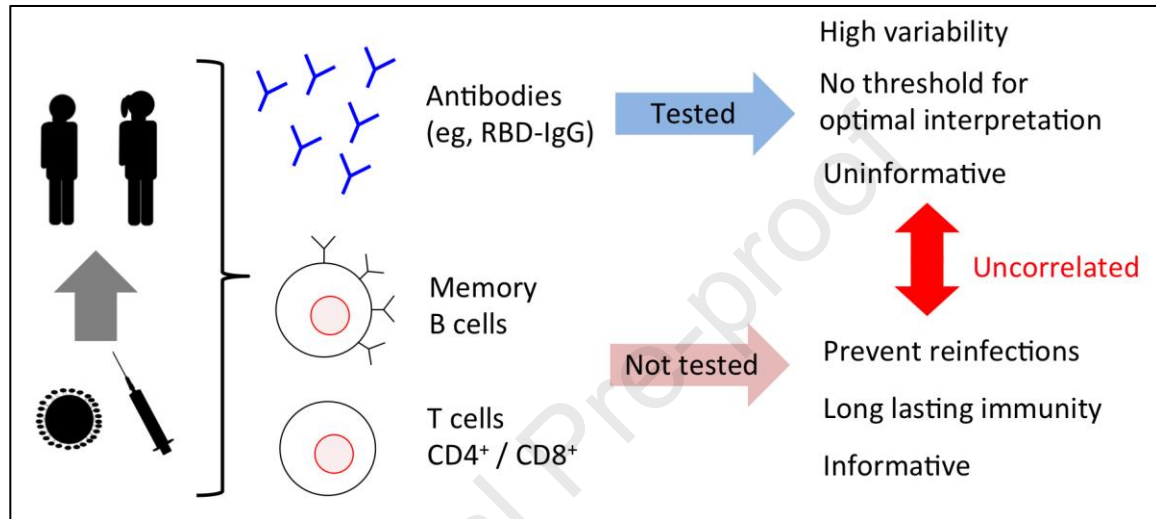


Figure 1. Schematic representation of different immunological responses elicited by either infection or vaccination against SARS-CoV-2. As of June 2021, antibody testing to assess immunity has not been recommended since antibodies are poorly correlated with the cellular compartments of immunological features that are key to long-lasting Covid-19 immune protection.

AUTHOR STATEMENTS

Ethical approval:

The present study is an analysis of published literature and therefore does not require ethical approval.

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Competing interests:

The authors declare no competing interests associated with the present study.

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