Covid-19:
Public Policies and Society's Responses

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COVID-19 TEST

Quality information for refining public policies and saving lives

> ## Policy Briefing Note 13
> ### Differentiated Strategies and Lack of Testing Benchmarks Hinder Pandemic Response, Undermine Social Distancing Decisions, and Further Increase Insecurity

Main conclusions

- Brazil has the lowest testing rate among the 20 countries with the highest Covid-19 death rates. The country does not test enough, nor does it conduct sufficient tests to identify the proportion of Brazilians who have had contact with the virus in the past.

- The lack of information regarding the presence and propagation of the virus among the population is the root cause of why there is an underreporting of positive cases. It also makes social distancing policies (as well as their subsequent relaxation) more susceptible to pressures from business, politics, or subjectivity.

- The share of tests returning a positive result – the positivity rate – in the country was 36% in June 2020, while the WHO recommendation is a maximum of 5%, a threshold not reached by any Brazilian state.

- Most states only disclose information regarding the total number of tests without differentiating results by type, which, as we know, have different effectiveness in identifying the virus. Only 14 states report the number of RT-PCR tests – more accurate for identifying infected individuals – or the number of IgM and IgG tests, which detect people who have had a prior infection and thus developed antibodies.

- The health secretariats in the states of Acre, Amapá, Goiás, Rondônia, Rio de Janeiro, Roraima, São Paulo, and Tocantins do not report any information regarding tests on their official platforms;

- Only 7 states had a positivity rate below 20% in the first week of June. Furthermore, until June 20, positivity was high in all states.

Introduction

The WHO proposes 3 criteria that governments can use to decide to determine if they are ready to relax social distancing policies: (1) there has to be an indication that the epidemic is under control; (2) there has to be sufficient healthcare capacity for handling a resurgence of new cases; (3) the surveillance system must be able to identify new cases and monitor contact tracing (WHO, 2020a). The ability to conduct mass testing underpins two of the three criteria proposed by the WHO for the relaxation of social distancing policies. As for control of the epidemic, the guideline is that the positivity rate should not exceed 5% for at least 14 days.

The WHO also recommends tracing the contacts of infected individuals so that they may be adequately instructed and quarantined. This measure depends on the local testing capacity and has proved to be efficient in controlling the pandemic in Germany and Switzerland, which had a lower death rate when compared to other countries (Salathé et al., 2020; Abeler et al., 2020).

This technical report maps information about Covid-19 testing and identifies: (1) the difference between the types of tests conducted; (2) the inaccuracy of the information disclosed by the State Health Secretariats (SESs); (3) the testing coverage in Brazil and each Brazilian state.

Differences between tests

Since the beginning of the pandemic, the types of tests performed for diagnosis and screening are: (1) RT-PCR test (reverse-transcriptase polymerase chain reaction); (2) serological test (detection of antibodies – IgA, IgM, and IgG); and, (3) rapid antigen/antibody tests (IgM and IgG). The RT-PCR test is the gold standard in the diagnosis of Covid-19, while rapid and serological tests screen and track the spread of the virus, as summarized in Table 1.

Table 1 - General overview of the different types of testing for Covid-19

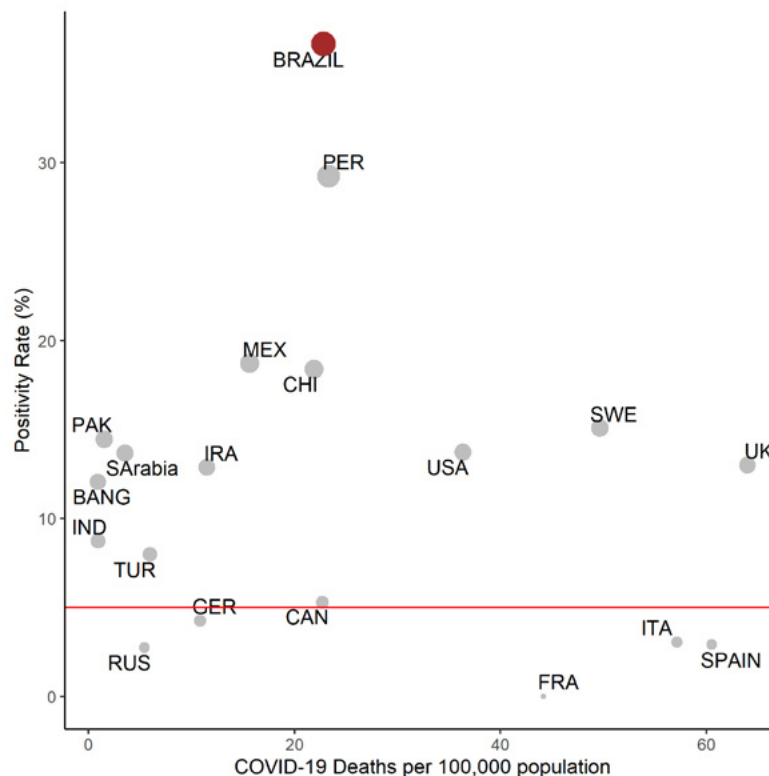|	RT-PCR	Rapid Serology Test (IgG and IgM)
What does it test?	Detects the presence of the virus's genetic material, the RNA.	Detects antibodies specific to the virus. There are two types of antibodies: IgM, when the infection was recent, and IgG, when the person is no longer infected and has antibodies.
How is it conducted?	Sample collected from the upper respiratory tract, preferably nasopharyngeal and oropharyngeal swabs.	Capillary blood sample collection.
When is it used?	Collection must occur from the third day of symptom onset until the 10th day when the amount of RNA tends to decrease.	At the end or immediately after the infectious period, with possible detection of two antibodies: – IgM, produced in general 10 days after the onset of symptoms and allows detection of recent infection – IgG, produced after the end of the infectious period and allows detection of previous contact with the virus.
Why is it used?	Identifies whether the virus is active in the organism, allowing for appropriate medical actions, hospitalization, social isolation, and tracing people who had contact with the infected individual.	Identifies the presence of antibodies in persons who had previous contact with the virus, allowing to measure infection and the susceptibility of the population to the virus.

Source: CDC, 2020; John Hopkins University and Medicine, 2020

Brazil tests less than other countries

Currently, Brazil is the least-tested country in the world. According to the WHO, the percentage of positive cases among those tested, also known as the positivity rate, should not be higher than 5% for 14 consecutive days, an analytical reference standard adopted by the world's leading medical centers. Figure 1 shows the positivity percentage in the countries monitored by John Hopkins University[1], as well as the Covid-19 death rate of these countries per 100 thousand inhabitants, identified as the highest in the world in June 2020.

Among the monitored countries, Brazil has the highest positivity percentage (36%).

Figure 1 - Positive tests compared to the death rate in the 20 countries with the highest death toll (% per 100 thousand)

Source: John Hopkins University (https://coronavirus.jhu.edu/testing). The red line indicates the WHO recommended positivity rate (5%). Cumulative data until June 18, 2020.

Testing in the Brazilian States

The official platforms of the SHSs and the state bulletins provide disparate data, indicating the lack of a national benchmark. Fourteen states report the number of tests conducted, differentiating between RT-PCR and rapid tests. The states of Mato Grosso and Paraná report only the number of RT-PCR tests, while 4 states do not report the type of test conducted, and 7 states do not register the number of tests on their state platforms. For the states that do not provide any information, we used testing data from the Brazil Covid-19 dashboard[2]. We performed weekly analyses for this technical report since the SHSs rarely announce the daily number of tests.

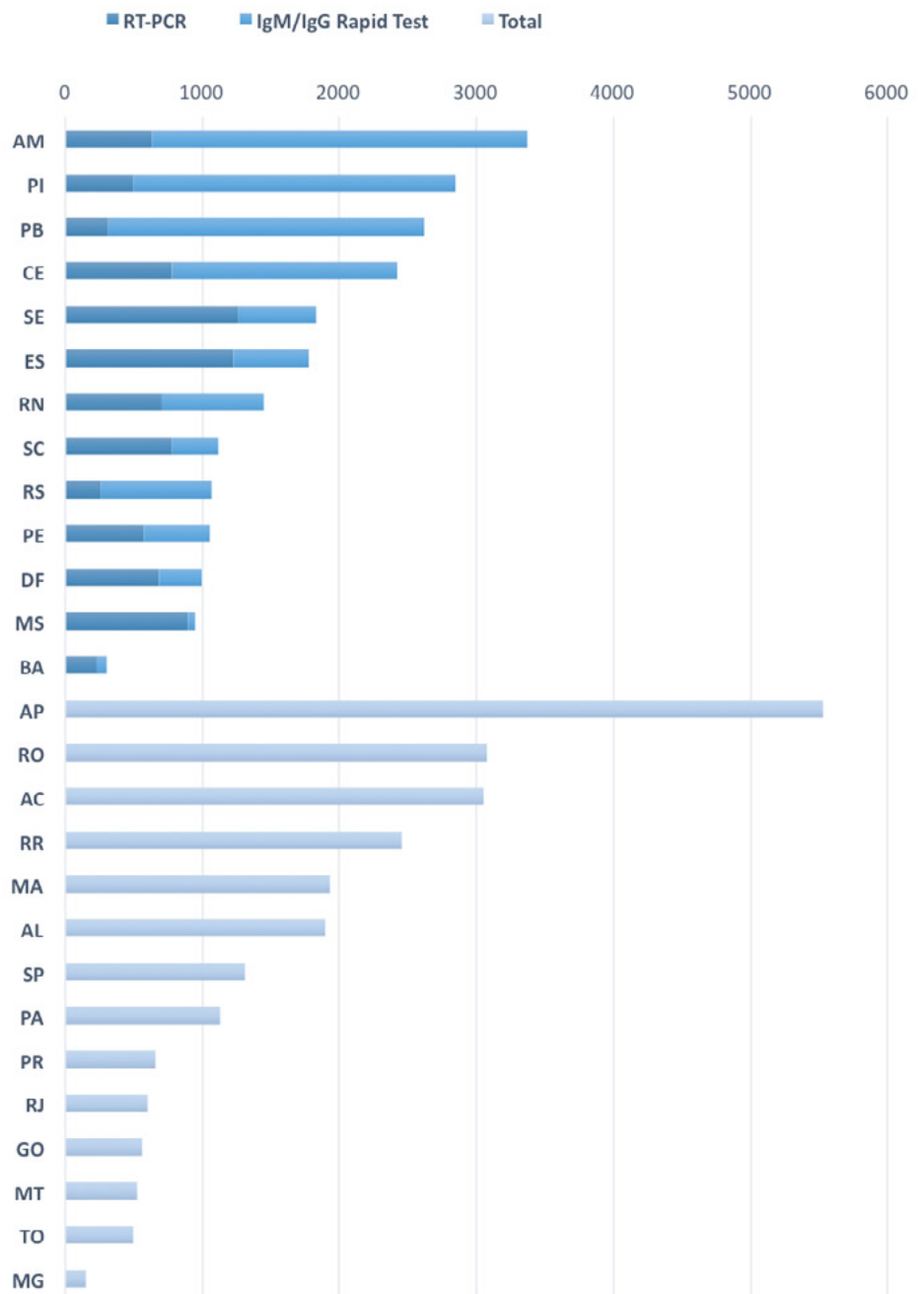Table 2 shows the Brazilian states according to the quality of the information regarding testing.

Table 2 - States and information about tests conducted

Covid-19 Testing Data	State
Reports the total number of tests by type (PCR or Rapid Serological Test)	Alagoas, Amazonas, Bahia, Ceará, Distrito Federal, Espírito Santo, Mato Grosso do Sul, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, Rio Grande do Sul, Santa Catarina, and Sergipe
Reports only PCR tests	Mato Grosso and Paraná
Reports the total number of tests, but does not differentiate by type	Maranhão, Minas Gerais, Pará, and Rondônia
Tests are not reported on platforms or reports	Acre, Amapá, Goiás, Rio de Janeiro, Roraima, São Paulo, and Tocantins

Source: State Health Secretariats (SHS)

Figure 2 - Testing by type in Brazilian states and total number of tests in states that do not differentiate testing type (per 100 thousand inhabitants).

To identify the number of tests conducted in the states, Figure 2 displays the testing rate per 100 thousand inhabitants, according to the type of test. We obtained the data on June 23 and they refer to June 22. It is important to remember that private entities and laboratories are under no obligation to notify testing; only positive results fall under that obligation. Thus, we may infer that these numbers refer to tests conducted by public entities, except for the state of Maranhão, the only state to report the number of tests conducted by both the public and private sectors.
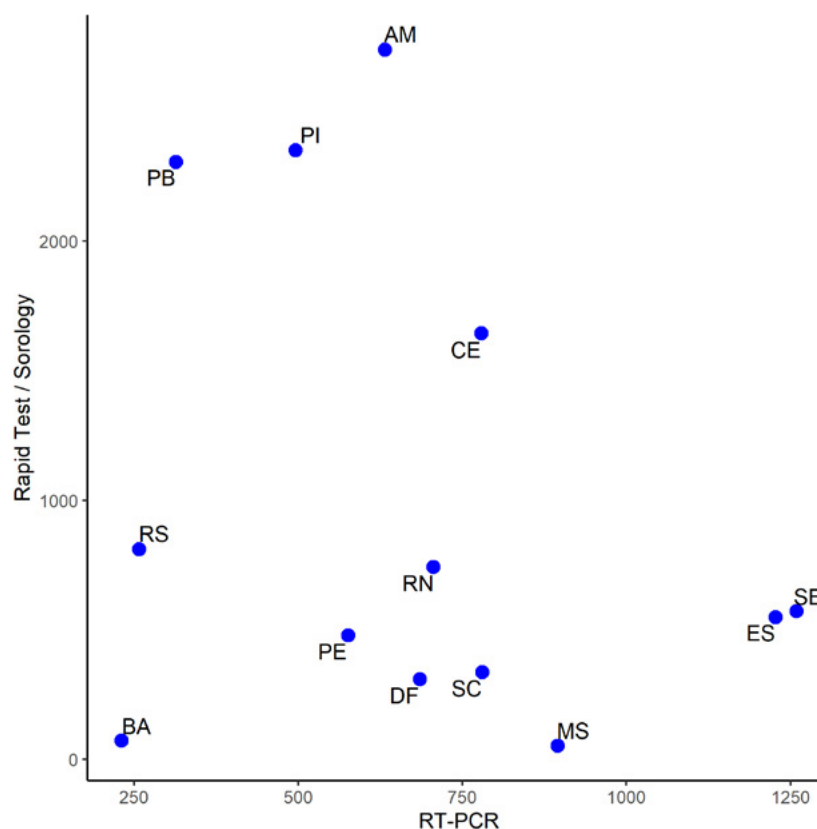
As shown in Figure 2, only 13 Brazilian states report the total number of tests according to type. Regarding the state of Alagoas, the total number of RT-PCR tests and rapid tests performed was not obtained, although the state health department platform reports the number of tests performed on the day. The states of Paraná and Mato Grosso report only the numbers of RT-PCR tests, while the 11 other states do not specify results by the type of test performed.

Among the states that reported the number of tests conducted, we found two different strategies: (1) monitoring active infections (predominance of RT-PCR testing); and (2) tracing the population's previous contact with the virus (predominance of rapid IgM/IgG testing). Figure 3 compares how each state prioritized its efforts with respect to both testing strategies.

RT-PCR tests identify infected individuals and enables the adoption of corresponding isolation measures, quarantining of their contacts, and the beginning of medical care. Conversely, the use of rapid tests assists in tracking the disease and analyzing the evolution of the pandemic. Identifying people with antibodies serves as an important guideline for easing social distancing measures. Thus, an effective strategy should make use of both tests. Our research results show that this combination does not always occur in Brazil.

Some states mostly conduct rapid tests, such as Amazonas, Piauí, and Ceará. This may lead to a testing deficit of people with an active infection and a high probability of transmitting the disease – leading to less control over the pandemic. Other states mostly use RT-PCR tests, such as Sergipe, Espírito Santo, and Mato Grosso do Sul, which could lead to a blind spot as to the proportion of residents who have had prior contact with the virus. Hence, the decision-making process regarding social distancing policies for local officials becomes severely impaired due to biased results that may minimize the risks of the pandemic.

Figure 3 - Brazilian states according to the predominant type
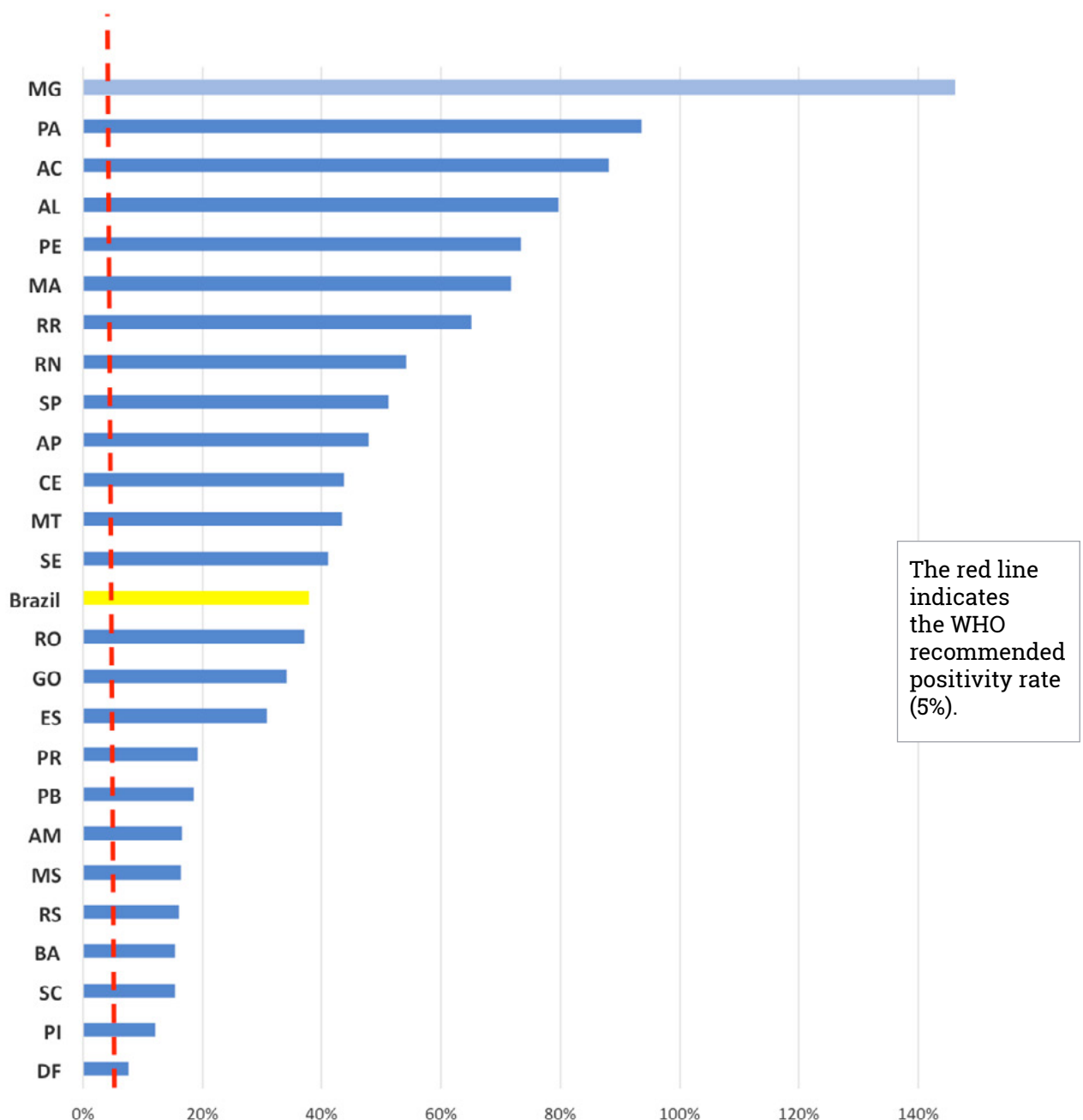of test conducted (RT-PCR and Rapid IgM/IgG)

Positivity rate in Brazil

In order to assess testing coverage and compare the evolution of the pandemic in Brazilian states, we estimated the percentage of positive cases among the total number of tests conducted in Brazilian states. This estimate considered the total number of tests performed, regardless of the type, as reported by the SHSs. Figure 4 shows the positivity rate of the tests performed in the week from May 31 to June 6 for all Brazilian states as well as the entire country. We did not include the states of Rio de Janeiro and Tocantins in this figure as they did not report testing data for the analyzed period.

As shown in Figure 4, the state of Minas Gerais has over 100% positivity. Therefore, the number of new Covid-19 cases was higher than the number of tests conducted in the week. While this number reveals significant information, we clarify that the lack of daily updated information on testing in the states limits our capacity to understand the oscillations in these rates. Figure 4 also shows that only Distrito Federal had a positivity rate lower than 10%, albeit still higher than the WHO recommendation of 5%.

Figure 4 - Positivity rate of tests conducted in the states between 05.31 and 06.06 (%)

The red line indicates the WHO recommended positivity rate (5%).

We also analyzed testing sufficiency over time from the moment the SHSs epidemiological bulletins first included testing information, which generally occurred sometime in April. Unfortunately, since not every SHS reported this information (See Table 2), we find reasons for even greater concern, given the insufficiency of information for more objective diagnoses of the real situation in the states.

If we consider testing positivity rates as our reference point, Brazil emerges as the least tested country in the world among the countries with the highest Covid-19 death rates. Similarly, the numbers indicate that no Brazilian state had a positivity rate lower than 5% since the beginning of May when almost all epidemiological bulletins began to include testing data.

Conclusion

The State Health Secretariats (SHSs) provide an extremely low level of information regarding testing. In addition to the absence of reliable estimates regarding the number of infected people, the lack of information reinforces doubts as to the appropriateness of the social distancing policies that States should be adopting at this moment.

The population must have access to this information, and it should guide social distancing policies as well as their potential relaxation.

The lack of a benchmark for measuring, testing, and defining strategies further fuels the debate over the consequences of the lack of national coordination and avoidable risks, which further increases the insecurity of the Brazilian population.

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3 The evolution of the positivity rate of Covid-19 testing in Brazilian states is further detailed on the Data section of the Solidarity Network website. See: https://redepesquisasolidaria.org/dados/.

ABOUT

   We are over 70 researchers, actively engaged in the task of improving the quality of public policies within federal, state, and municipal governments as they seek to act amidst the Covid-19 crisis to save lives. We dedicate our energies towards rigorous data collection, devising substantial information, formulating indicators, and elaborating models and analyses to monitor and identify pathways for public policies and review the responses presented by the population.

   The Solidary Research Network has researchers from all scientific fields (Humanities as well as Exact and Biological Sciences) in Brazil and overseas. For us, the combination of skills and techniques is vital as we face the current pandemic. The challenge ahead is enormous, but it is particularly invigorating. And it would never have come to fruition if it weren't for the generous contribution of private institutions and donors who swiftly answered our calls. We are profoundly grateful to all those who support us.

Visit our site: **https://redepesquisasolidaria.org/**
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