



## Bulletin of Covid-19 Observatory after six months of the pandemic in Brazil



Since WHO declared coronavirus pandemic on March 11, until the publication of this special bulletin from the Covid-19 Fiocruz Observatory, more than 30 epidemiological weeks have passed. Brazil, a continental, heterogeneous and unequal country, recorded more than 150 thousand deaths and 5 million cases in the period, making it one of the countries to suffer the greatest impact.

Covid-19 Pandemic produced several repercussions among various countries and, also, between Brazilian regions and states. It can be said that it constitutes a complex phenomenon, like multiple epidemics, given its manifestations in different socio-sanitary and geopolitical contexts.

This special bulletin, a review of the pandemic six months in Brazil, is one of the results of the work carried out within the scope Covid-19 Fiocruz Observatory, which is part of Fiocruz's set of actions in response to Covid-19 in its most varied areas. It integrates Fiocruz's mission to produce, disseminate and share knowledge aimed at strengthening and consolidating the Unified Health System (SUS) and contributing to the the Brazilian population the promotion of health, quality of life and social inequalities reduction, with the right to health and broad citizenship defenses, as central values.

Without wishing to exhaust the possible analysis on Covid-19 in Brazil, some themes were selected, always based on SUS principles and values analysis presents in the Organic Law 8080. The State's role in implementing policies for reducing disease risks, as well as ensuring universal and equal access to actions and services for health promotion, protection and recovery.

The brief analyzes in this bulletin include the pandemic evolution through some selected indicators and themes, involving two major groups. The first is related to health services organization, quality of care and patient safety, as well as the health workers health. The second is related to the different population groups impacted by the pandemic, from workers and even vulnerable groups, such as slums in large urban centers and indige-

nous peoples, as well as the pandemic ethical and bioethical implications in Brazil.

Considering that we are still in a pandemic with a lot of heterogeneity and inequality between states; with great variability in the evolution in some and still with recrudescences risks; that we have many months ahead to face its short, medium and long term impacts; and that it is necessary to think and act now for the necessary preparation for future health and humanitarian crises, we highlight some points.

With reference to the Organic Health Law (Law 8080 of 1990), it is necessary to further strengthen health actions and services universality and comprehensiveness by expanding financing and strengthening the SUS, creating the necessary conditions for improving its structures, as well as training and valuing its professionals, guaranteeing the quality of care, patient safety and occupational health and safety for health workers in the context of COVID-19. This involves investments and expansion to primary care that is resolute and integrated both to health surveillance and its monitoring capabilities and preventive actions, as well as to high and medium complexity services and their diagnostic, treatment and rehabilitation capabilities. SUS must be prepared to face health impacts caused by pandemic, which go far beyond those caused by the SARS-CoV-2 virus, combining from the impacts on mental health and caused by the increase in domestic violence to those resulting from the discontinuation of treatments or even lack of health care.

We also emphasize the importance of strengthening national public health institutions with the necessary autonomy and financing to produce, disseminate and share knowledge and technologies aimed at strengthening and consolidating SUS. Fiocruz's actions diversity and breadth in response to the pandemic in its 120 years reaffirms the importance of National Institutes of Health with their institutional profile for responding to crises such as the one we are experiencing now.

The pandemic economic impact has compromised a considerable part of the Brazilian population social and health protection. More than 107 million people

applied for emergency aid from the federal government and more than 65 million received the benefit. The unemployment rate reached 14.3% in September 2020, representing an increase of 44% in relation to the month of May in the same year, according to data from the Institute of Applied Economic Research (IPEA). These data warn of the social and economic precariousness and the access to minimum living conditions difficulties and social security during the greatest health emergency in the last 100 years.

Other situations less visible to the general public that need attention and specific policies are the Covid-19 repercussions in the elderly, representing more than 75% of the total deaths in the country; the fact that 93% of mental health services have been paralyzed or their routines have been affected during the past six months; mortality among indigenous people, which, depending on the age group, is up to 150% higher than that of non-indigenous ones; and the high lethality in slum regions, such as in Rio de Janeiro, when compared to neighborhoods and regions without slums.

Bearing in mind the 1988 Constitution and the complexity of facing Covid-19 in Brazil, it is imperative to expand and strengthen public policies and State actions oriented towards social justice fighting health, economic and social crisis, and in line with just and solidary society fundamentals objectives, with a development model that combines poverty eradication, social, racial and ethnic inequalities reduction, and well-being of all promotion. These objectives present in the 1988 Constitution, mean that facing this crisis must simultaneously combine policies and actions on health determinants and conditions, involving food security, access to housing and basic sanitation, jobs generation and income, health care guaranteed access, education and safe public transport, as well as access to essential goods and services, including health.

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# ■ Activity levels and Incidence of Severe Acute Respiratory Infections (SARI)

The surveillance of Severe Acute Respiratory Infections (SARI) is constituted with the purpose of strengthening decision-making for severe cases of respiratory diseases, such as Influenza. Its objectives include the timely identification of new viruses or subtypes with epidemic potential, identification of the main circulating respiratory viruses and their seasonality, and timely identification of the epidemic period beginning each year. In this context, SIVEP-gripe, the surveillance notification system, in recent years has established itself with importance by recording notifications of cases of SARI across the country. The InfoGripe system, maintained and developed by the Scientific Computing Program (PROCC / FIOCRUZ) in partnership with FGV and GT-Influenza (SVS / Ministry of Health), uses this database for periodic analyzes of SARI scenarios in all states. Since there is a time interval for the entry of records (typing opportunity), InfoGripe has developed an important tool to estimate the most recent incidence. As it is about hospitalization records, these indicators are important to understand the pressures that the health system may suffer in certain periods (seasonality of Influenza, for example) or even epidemics and pandemics, such as H1N1, MERS, SARS and now Covid-19. The wealth of historical data from the national notification system, combined with InfoGripe's analytical tools, allowed a fast identification of COVID-19 impact on the hospital network, manifested as cases of non-specific SARI at the process beginning even in March, establishing community transmission in the country, anticipating the subsequent laboratory confirmation of these cases.

The scenario monitored by InfoGripe until the 40th week showed a total of 485,459 cases already reported, 265,412 cases (54.7%) with positive laboratory results for some respiratory virus, 147,410 (30.4%) negative, and at least 42,315 (8.7%) awaiting laboratory results. Among the records with a positive result, a proportion of 97.6% was positive for SARS-CoV-2 (COVID-19). Laboratory tests investigation is not always exhaustive and this year more attention was given to the testing for SARS-Cov-2 virus. These first data are an approximation, because when considering the typing opportunity, it is estimated that 512,810 cases of SARS have already occurred, ranging from 503,600 to 525,262 until the end of the epidemiological week 40.

It is worth noting that these are the number of cases reported in the SIVEP-gripe database, which contain some specific symptoms of SARI surveillance, such as dyspnea or oxygen saturation below 95% or breathing difficulty, but regardless of having fever as one of the symptoms, which is another symptom determined by the international definition of SARI. This assessment is justified because for Covid-19 epidemic, in which there were many cases in age groups above 60 years, sometimes fever in many situations was not one of the symptoms, even in cases with hospitalization.

In retrospect, since 2015, the incidence had been higher in 2016, when it was greater than 1.5 cases per 100 thousand inhabitants. But, as observed in 2020, the number of SARI cases in the country has grown very intensively, reaching a level above 10 cases per 100 thousand inhabitants. When analyzing the number of deaths reported in Sivep-gripe, in SARI cases, there is also a very large difference between this year and previous years.

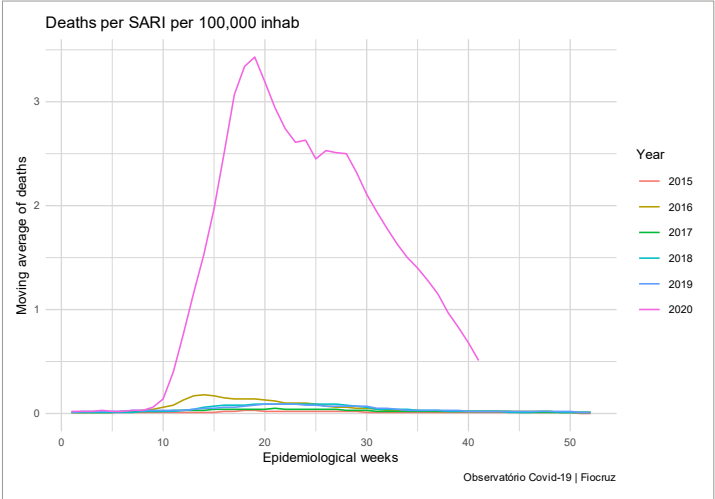
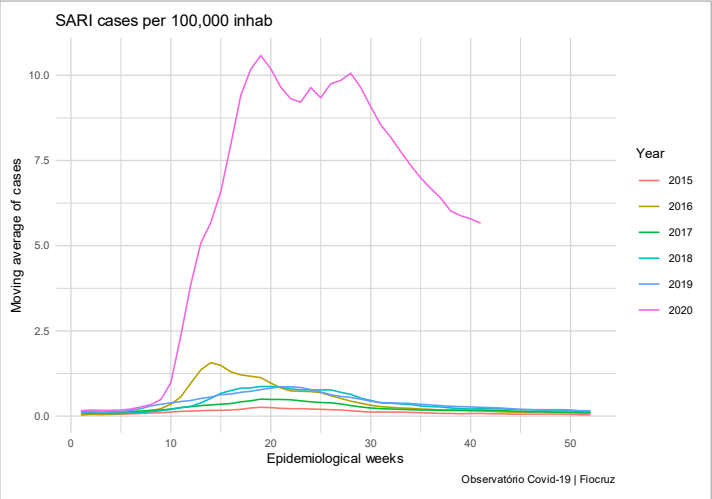
When considering symptom of fever as an inclusion criterion in the records, according to the international definition of SARS ([https://www.who.int/influenza/surveillance\\_monitoring/ili\\_sari\\_surveillance\\_case\\_definition/en/](https://www.who.int/influenza/surveillance_monitoring/ili_sari_surveillance_case_definition/en/)), the total number of reported cases was 333,255, with an estimate of 348,407 [Confidence Interval : 343,488 - 355,717]. For comparison purposes, the total numbers of SARI records in years 2019 and 2016 were 39,429 and 39,871 cases, respectively. During the 2009 H1N1 Influenza outbreak, 90,465 cases were reported with the same criteria throughout the year.

The total number of records of hospitalizations or deaths in Sivep-gripe, under analysis without restricting the totals by the reported symptoms regarding the SARI definition, is 777,150 cases, with an estimate of 830,227 [Confidence interval: 812,939 - 857,453]. During the 2009 H1N1 Influenza outbreak, 202,529 cases were reported with the same criteria.

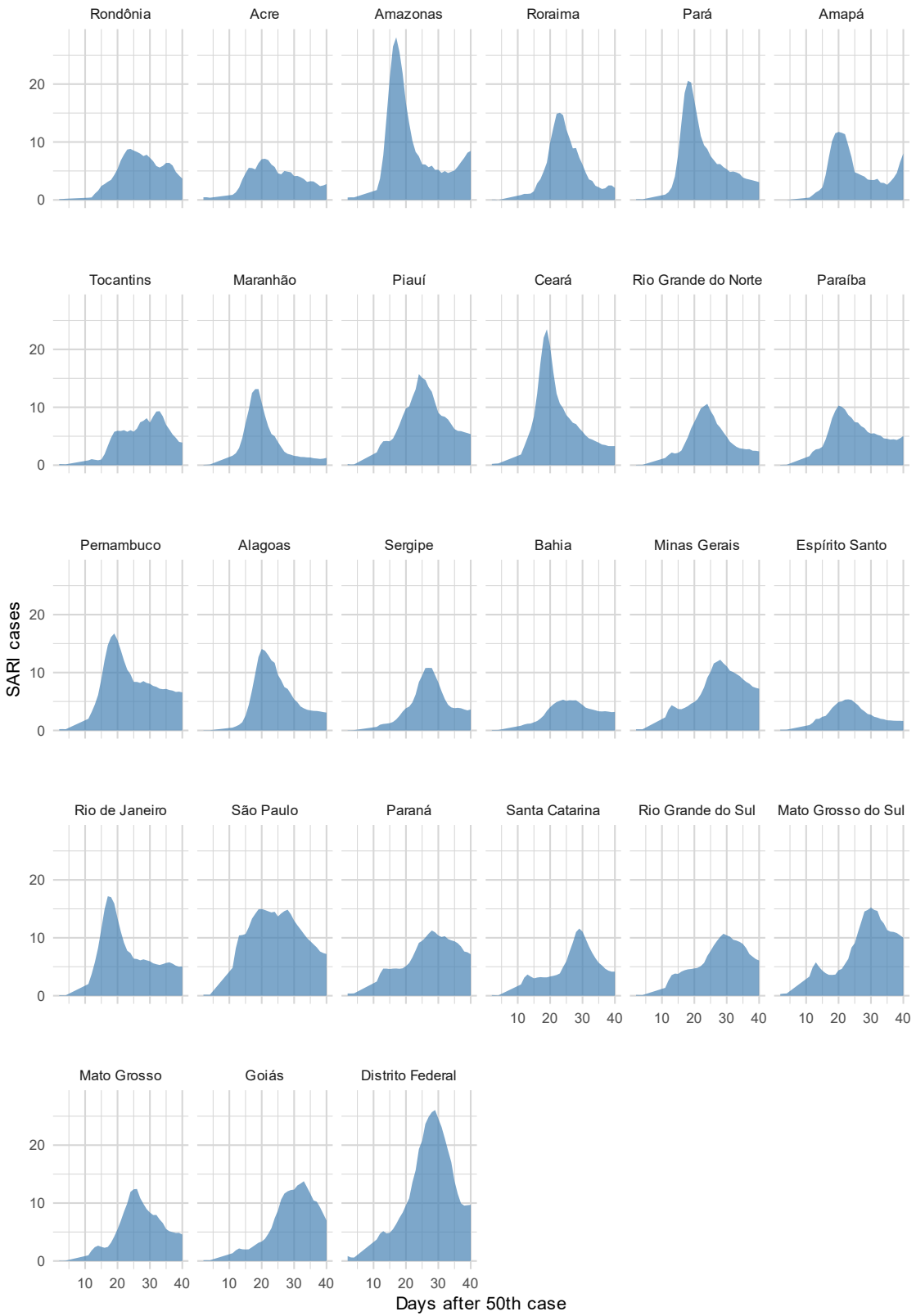
Some states in the North (Amazonas, Pará), Northeast (Ceará) and Southeast (Rio de Janeiro and São Paulo) regions, in weekly evaluations, had very high incidences since 11th epidemiological week. Other states, mainly in the South and Center-West regions, had an increase in incidence later, with the epidemic arriving in phases. Compared to previous years such as 2019, incidence values greater than 0.9 cases per 100 thousand inhabitants would already be very high and all states passed this mark at some time of the year. More critically, all states in the country, with the exception of Rondônia, Acre, Tocantins, Bahia and Espírito Santo, exceeded 10 cases of SARI per 100 thousand inhabitants, and there were epidemiological weeks in which Amazonas, Pará and the Federal District had values greater than 20 cases per 100 thousand inhabitants.

In summary, all states reached levels much higher than the levels observed in previous years in the same period and, even with several states having reduced incidence in recent weeks, the current level still remains very high in all states.

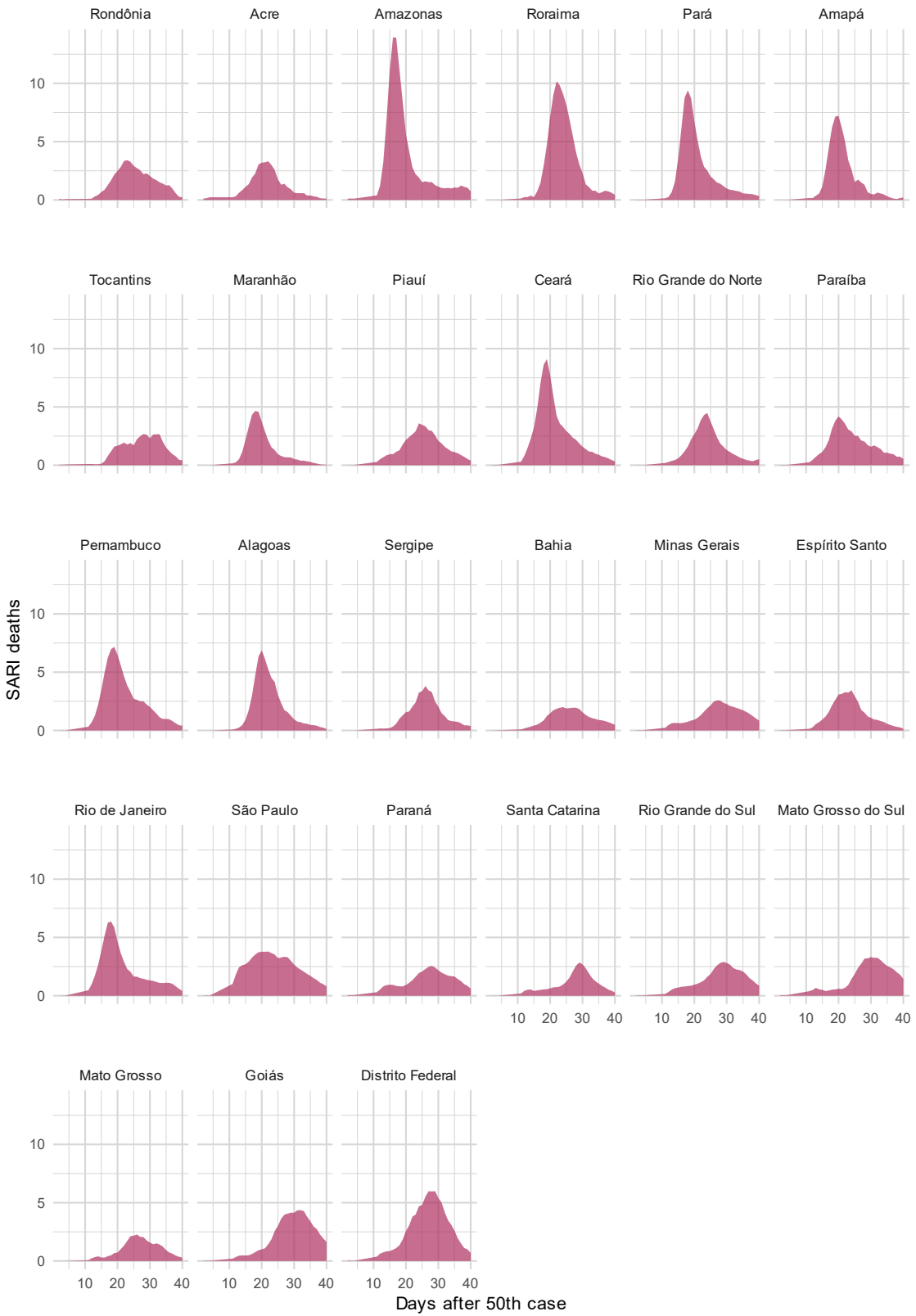
The analysis of deaths reported in SIVEP-gripe in cases of SARI shows that the weekly dynamics follows the pattern presented by the cases numbers. The states of Amazonas, Rondônia, Roraima, Amapá, Ceará, Pernambuco, Alagoas, Rio de Janeiro and the Federal District even had epidemiological weeks with values above 5 death records per 100 thousand inhabitants. This is an important indicator of fatality, which highlights the importance of adequate and priority assistance in vulnerable populations.



SARI cases per 100,000 inhab  
Weeks 11 a 40



Deaths per SARI per 100,000 inhab  
Weeks 11 to 40

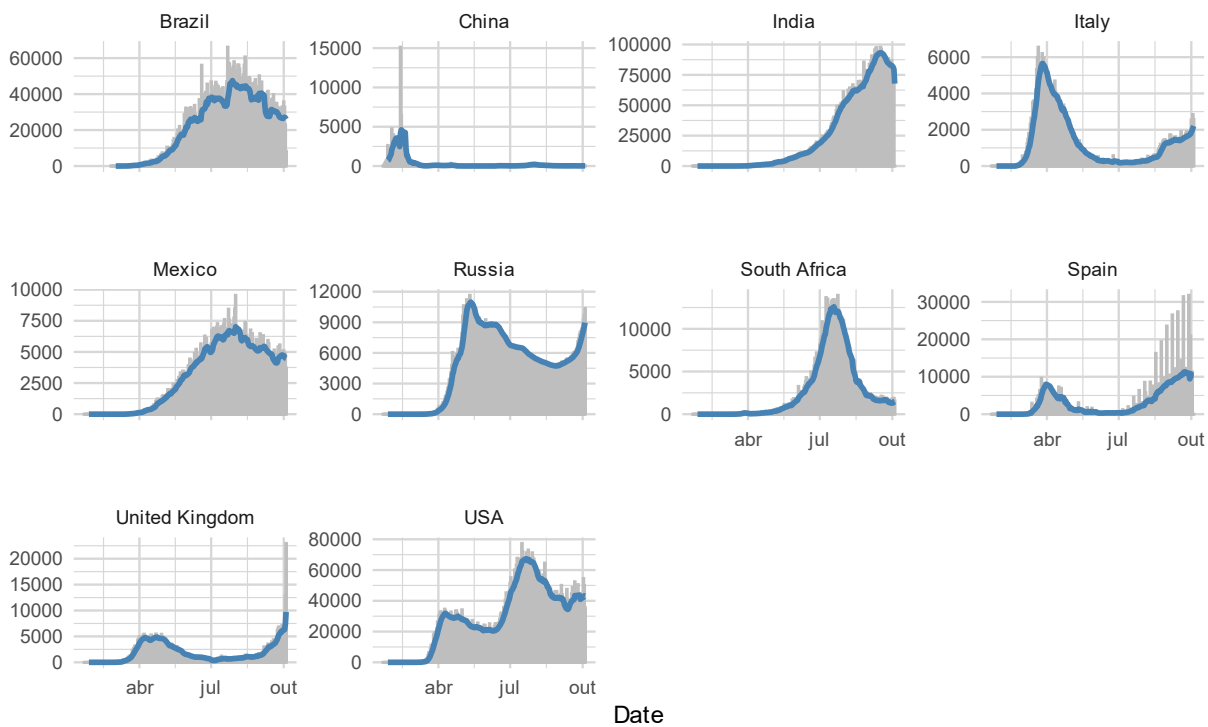


■ Covid-19 cases and deaths evolution in Brazil and worldwide

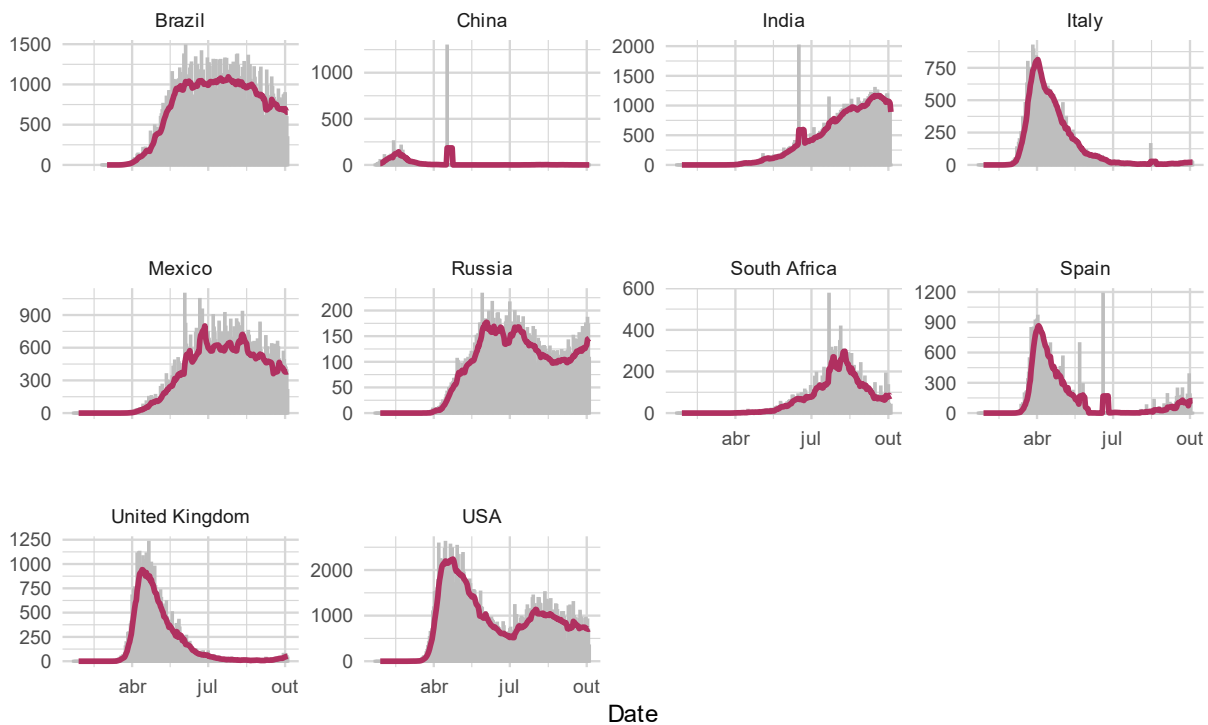
Both cases and deaths evolution 'curves' in Brazil showed a distinct pattern from other countries that were already in an advanced stage of community transmission of the SARS-CoV-2 virus. Both in Asia (China and South Korea, for example) and in Europe (Italy, Spain and the United Kingdom), for example, there was a sharp increase in cases number and deaths,

which reached its peak in March or April , after producing a strong impact in these countries (about 150,000 deaths in Asia and 225,000 in Europe according to data from Our World in Data - <https://ourworldindata.org/coronavirus>). From April onwards, there was a slow downward trend in the cases number and more localized outbreaks.

Cases in selected countries, daily totals and moving average  
Weeks 11 to 40

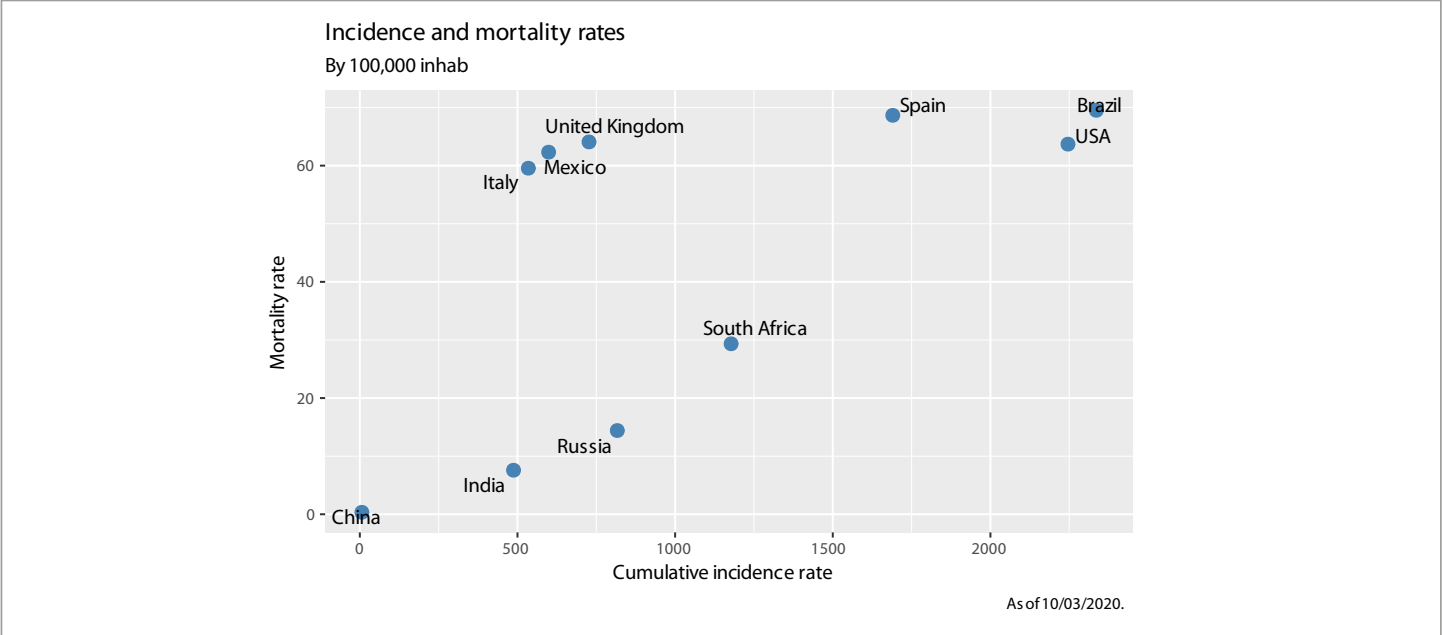


Deaths in selected countries, daily totals and moving average  
Weeks 11 to 40



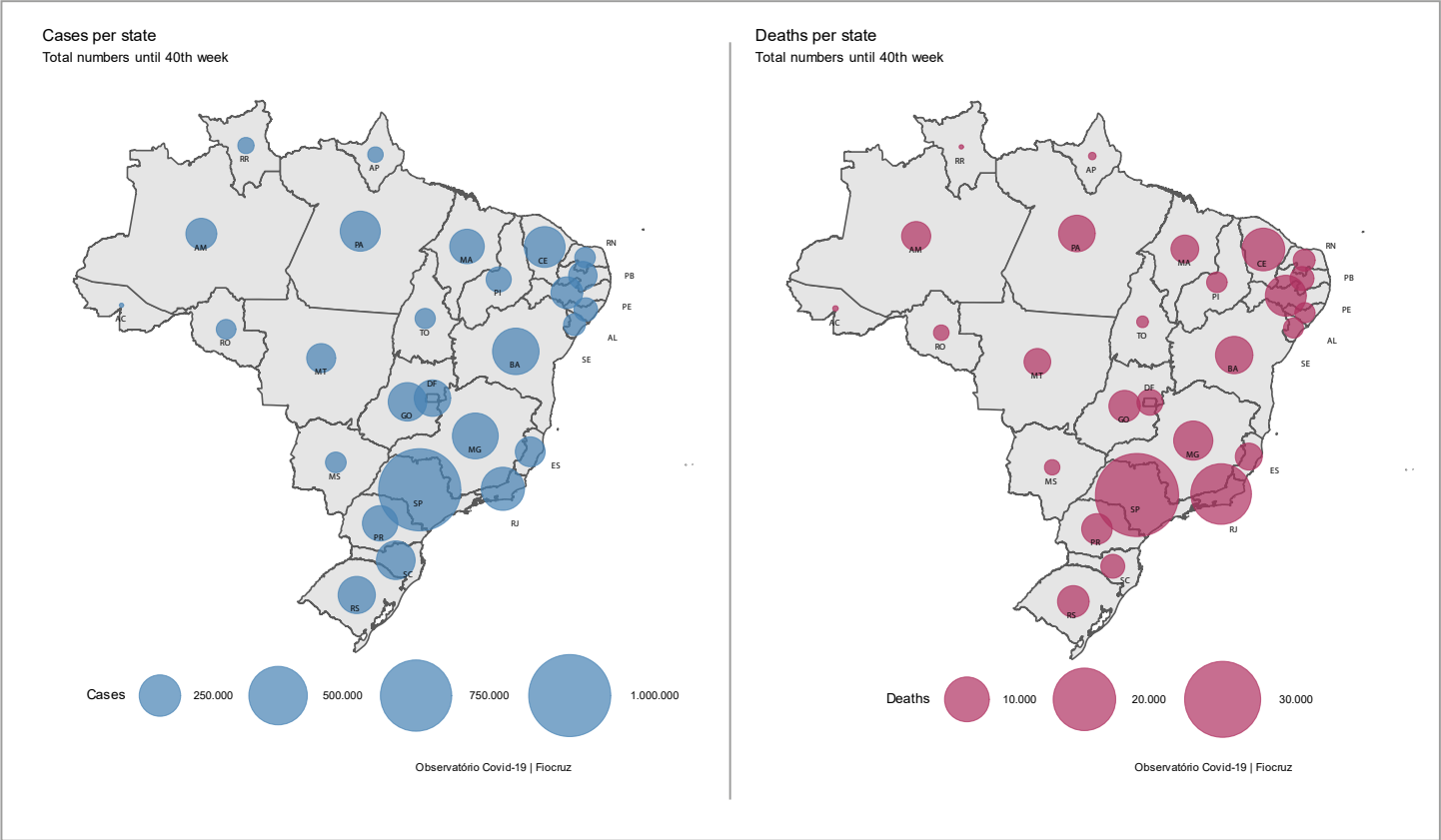
In Brazil, in opposite, there was a slow process of increasing the cases number and deaths, with a lag of two or three weeks between these events, and an extended plateau of transmission since June, with a slight downward trend in September. The country presented cases and deaths pattern of evolution similar to Mexico and India. In global terms, Brazil started to occupy the second place in cases number from May and in number of deaths from June, being together with the United States and India among the three countries with more cases and total deaths. Of the countries that compose the BRICS, Brazil and India are the

ones that accumulate the highest numbers of cases and deaths. When combining incidence and mortality rates, Brazil and the United States stand out from other countries, showing a very close pattern. It is worth noting that in these countries, such as Brazil, the United States and Russia - which have continental dimensions – may contain several lagged outbreaks, which explains extension of epidemics due to an overlay of epidemic waves. It is observed that Europe countries, after the summer of the northern hemisphere, are in a new wave process of cases, but with lower fatality than that verified in the first wave.



After six months that Covid-19 was declared as a global pandemic, Brazil has accumulated a number of approximately 5 million cases and almost 150 thousand deaths, as reported to the Ministry of Health. The pandemic permanence in the coming months may add some dozens of thousands new deaths in the country. Within the country, the number of cases and deaths per 100 thousand inhabitants evolution (incidence and mortality rates) in the states and the Federal District has, since the beginning, a very heterogeneous evolution pattern over time. The pandemic affected all states and the Federal District, with some of them accumulating a large number of cases and deaths, as shown by

country map in which circles size represents this impact. The states that, over these six months, had the highest number of deaths were: São Paulo (36,000), Rio de Janeiro (18,800), Ceará (9,000), Pernambuco (8,000) and Pará (6,600), which were also the first areas affected by virus entry and spread, as well as Bahia (7,000) and Minas Gerais (7,700), with more recent evolution. Other states, such as Rio Grande do Sul (5,000), Goiás (5,000), Paraná (4,600) and Mato Grosso (3,500) still show trends in the increase number of deaths and the maintenance of high transmission rates, which is an alert health system in the South and Midwest country regions.

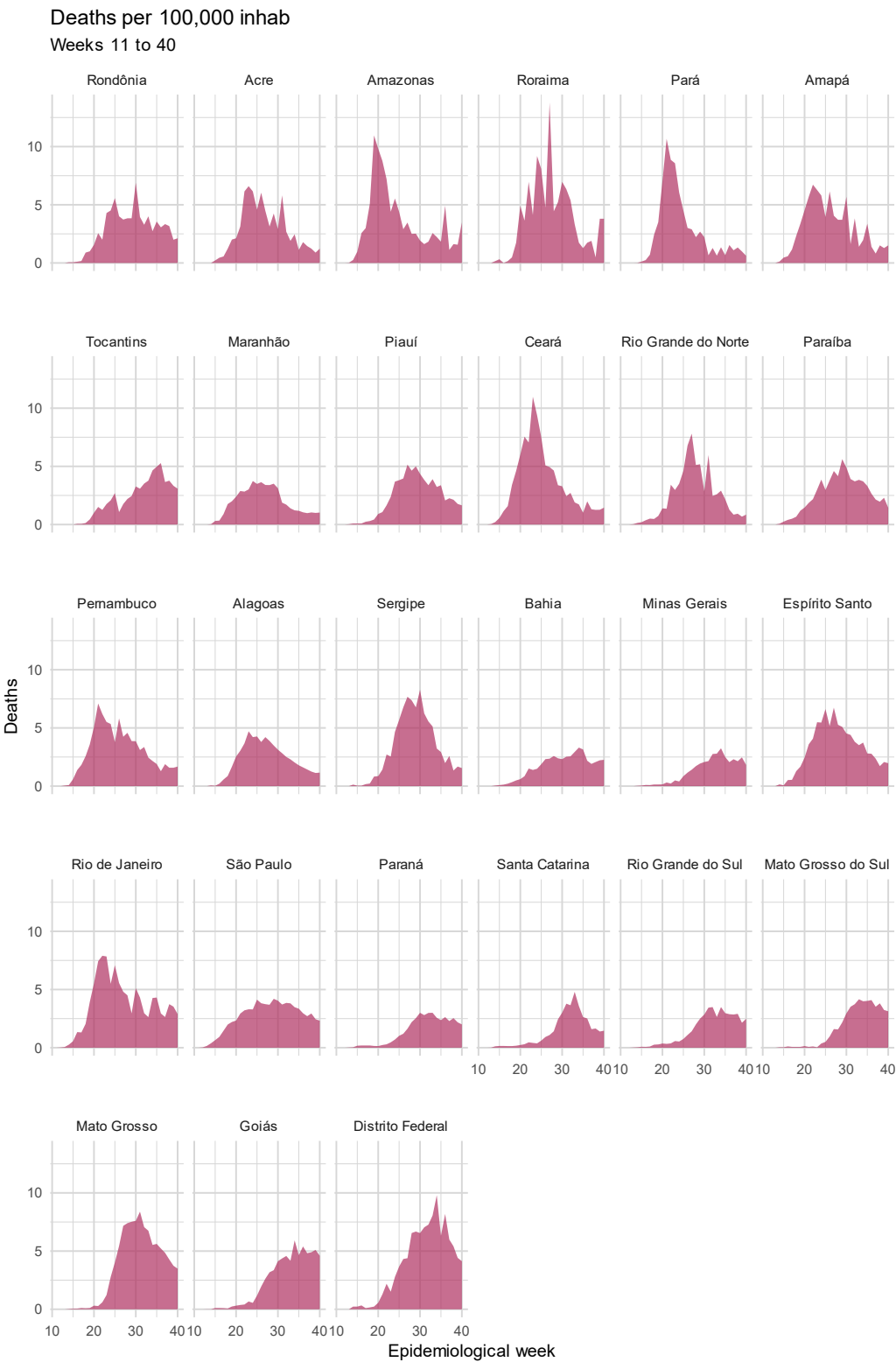




Mortality rate

In North Region, the highest peak occurred in Roraima, in June, showing a behavior of great variability. Amazonas and Pará showed a similar pattern, with the biggest peaks occurring in May. However, it is also important to highlight a wide variability, with new peaks, albeit smaller, in September and October. Tocantins showed a different behavior, with growth and peak in August. In the Northeast Region, Ceará stands out, with the highest peak in June. Although with less magnitude, Sergipe and Rio Grande do Norte (also with great variability) stand out, with peaks in July and showing an evolution close to that of Ceará. Paraíba and Piauí showed similar behaviors, peaking in July. Pernambuco and Bahia stand out for their temporal distances in terms of peaks in mortality rates, with the first in May and the second in August. In the Southe-

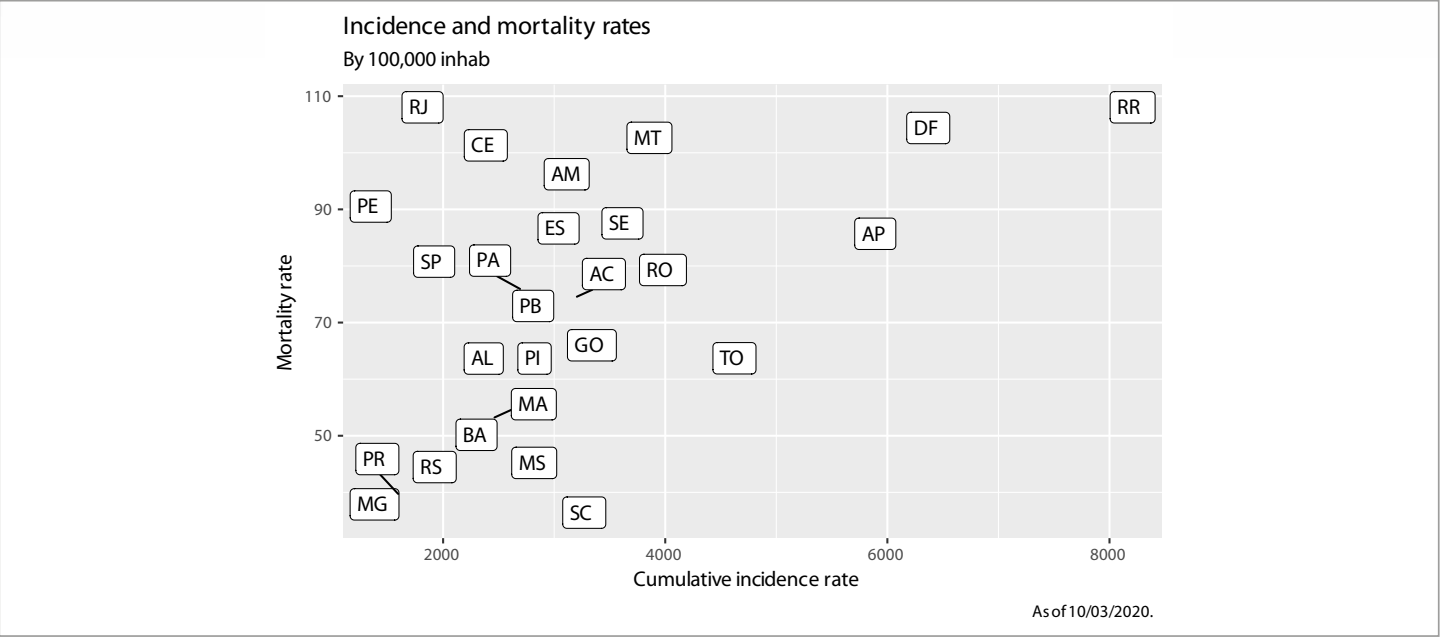
ast Region, the highest peaks in mortality rates are concentrated in Rio de Janeiro (May and June) and Espírito Santo (June), with the former having great variability. São Paulo showed a gradual growth that reached an extended plateau between the months of June and August, starting a gradual decline thereafter. Minas Gerais showed a slower growth, with its peak occurring in August. In the Midwest Region, the Federal District stands out, which is among the states with the highest peaks of mortality rates, followed by Mato Grosso, with both having their peaks in August. Goiás showed a greatest variability, with peaks in August and September. In the Southern Region, Santa Catarina had the highest peak of the region, with Paraná and Rio Grande do Sul showing similar behaviors, the latter with greater variability. August presented the highest rates for these states.



Incidence and mortality coefficients

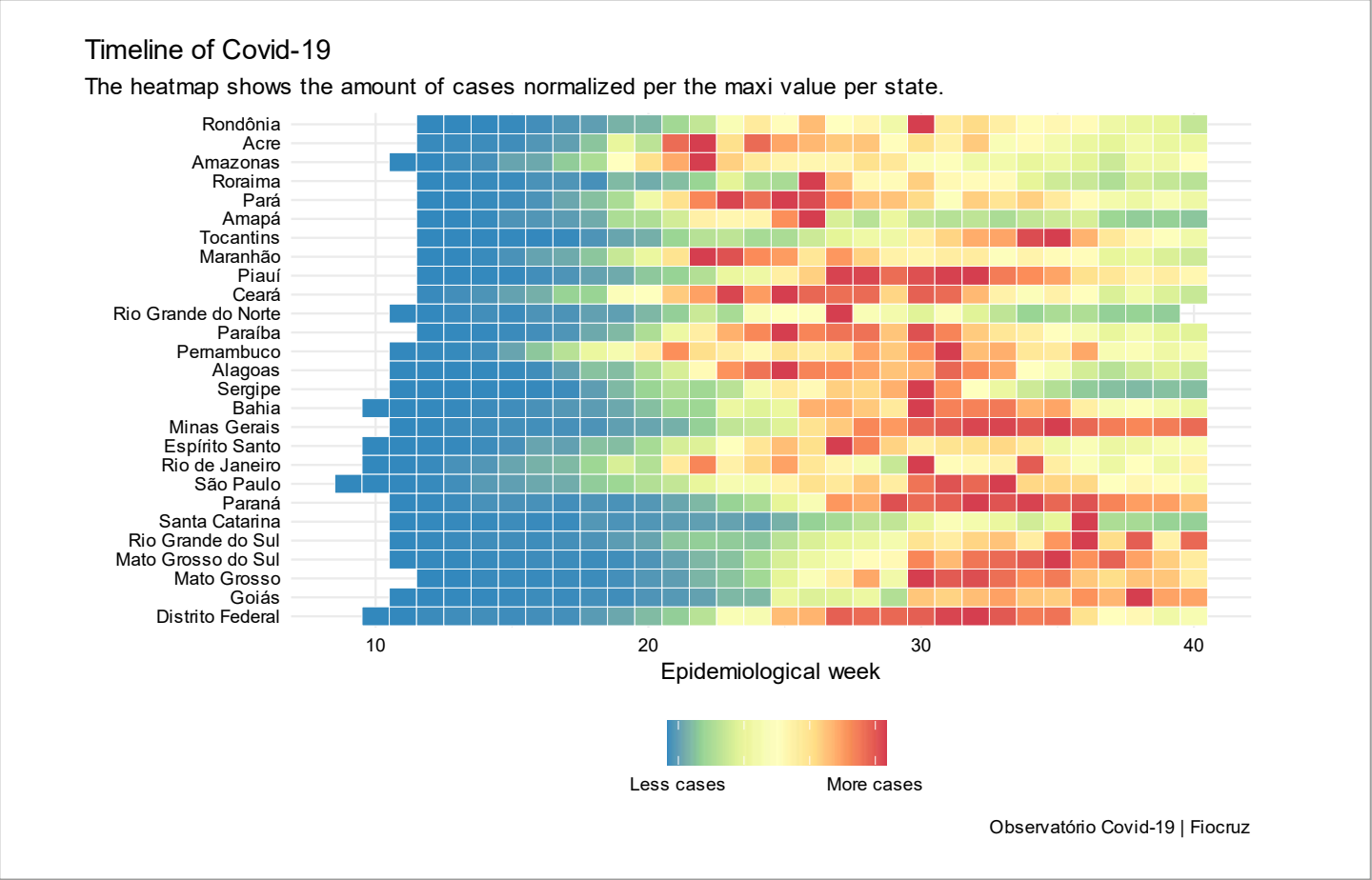
Some states have maintained high rates of mortality and incidence, such as Roraima, Amapá and Distrito Federal. In the first two cases, high hospital mortality was also observed. Rio de Janeiro, Pernambuco and Ceará have high

fatality rate, reflected by an unproportional relation between mortality and morbidity, while Santa Catarina has maintained lower fatality, which may be a result of health surveillance and primary health care system organization in facing the pandemic.



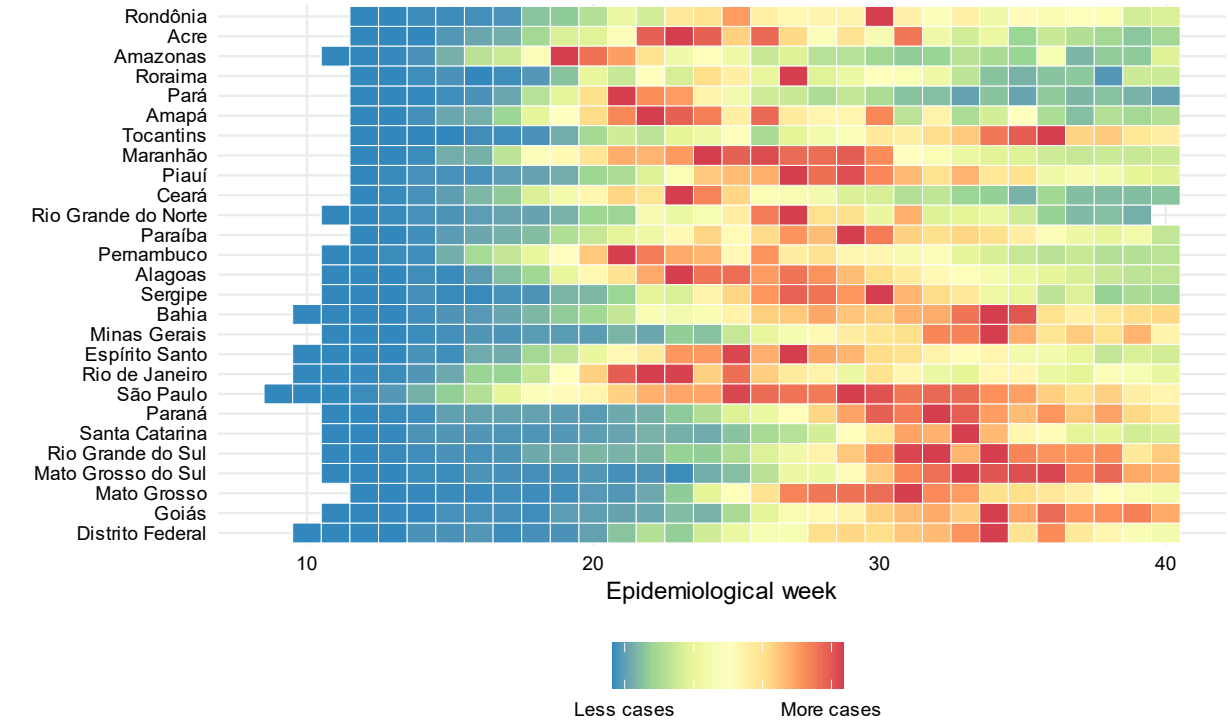
The timelines for cases and deaths by Covid-19 in the states, using a heat map, constitute a graphical representation of the evolution and records growth up to the 40th epidemiological week ended

on October 3, 2020. It allows to visualize not only the pandemic heterogeneity evolution in the country, as well as the period in which health situations became critical in case and death records terms.



Timeline of Covid-19

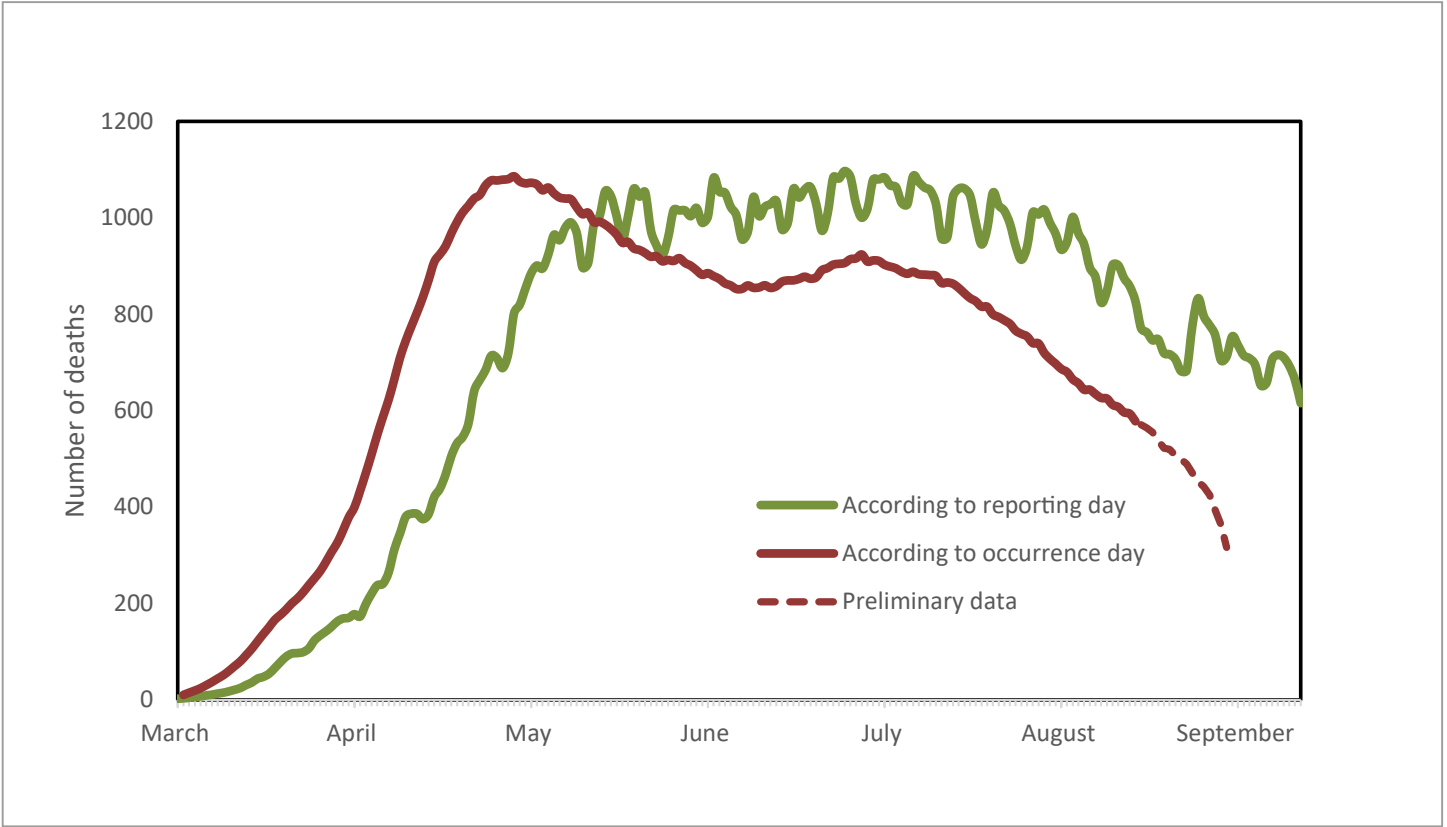
The heatmap shows the amount of deaths normalized per the maxi value per state.



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It is important to note that for the set of case and death records by Covid-19 in Brazil there is a gap between the event occurrence (first symptoms of the disease, testing, hospitalization and death) and their respective disclosures by the health departments and national panels consolidation. This delay can cause not only the cases and deaths underestimation in the last weeks analyzed, but also changes in the monitoring curve shape, leading to extemporaneous interpretations about epidemic dynamics. This gap implies directly in the organization and response of assistance to symptoma-

tic patients, as well as in the virus and disease transmission prevention and control through the set of non-pharmacological measures. When comparing the curve obtained using the date of death reporting with that using the death occurrence, it is observed that the maximum number of cases (peak) occurred in Brazil in May, followed by a plateau that lasts until September, when there is decrease trend in case and death numbers, which, if prolonged, can maintain the disease transmission in the coming months, or even represent a risk of localized outbreaks.



■ *Health services organization: balance and perspectives*

If, on the one hand, the availability of a universal spread health system provided access to health services at different levels of complexity to a significant part of the Brazilian population affected by Covid-19, on the other hand the pandemic exposed weaknesses of this system, accumulated due to underfunding and management problems. The initial diagnosis of the capacity installed in the country for the treatment of Covid-19 critically ill patients, demanding complex healthcare structures, showed great inequalities among regions and a strong concentration of resources oriented towards private insurance plans in specific areas, with high proportions of healthcare insurance beneficiaries. The difference between the availability of ICU beds to attend the 75% of Brazilian citizens dependent on the SUS and the 25% with private insurance plans was shown to be striking. Nevertheless, the hypothesis that the private sector increased SUS' capacity, defended by many specialists, was defeated by strong resistance from the sector and public agents.

The absence of a national coordination to mitigate inequalities and optimize processes for the purchase of necessary equipment and supplies, in a scenario of great global competition, has led states and municipalities to implement their own solutions, often competing with each other. Mistakes have been made in majorly investing in temporary structures against the strengthening of SUS' permanent structures. However, we should highlight the growth, since February, of the number of ICU beds for adults in the country, which went from 30,774 to 52,911 (71.9%); the number of respirators in use, from 61,772 to 78,137 (26.5%); and the number of CT scanners in use, from 4,883 to 5,191 (6.3%). At the beginning of October, 20,772 (39.3%) of the 52,911 existing ICU beds for adults are classified as beds for Severe Acute Respiratory Syndrome or Covid-19 (code 51), a category incorporated by the National Registry of Health Facilities (CNES) because of the pandemic.

Considering that most Covid-19 patients do not need hospitalization, it is also important to underline that there was a lack of investment in primary health care (PHC) and in its integration with health surveillance, besides the expansion of population testing so that more effective isolation actions could be implemented.

The results so far reveal serious problems in the health system performance, with high Covid-19 mortality, denoting access problems and an inability to integrate the services network. Part of the structures added to the system were implemented late, with important Brazilian cities experiencing evident overload on the health system. As a consequence, many deaths were registered in households, in outpatient healthcare units and in one day or less than 24-hour hospitalizations, revealing difficulties in timely accessing necessary healthcare. Adding to this scenario, it is relevant to note the huge inequities among population groups and regions, going beyond access and overflowing in health care quality itself and chances of good results.

With this overview, however, one cannot fail to recognize the learning that has been consolidated. Apart from the controversies surrounding therapeutic alternatives not supported by scientific evidence, there was substantive improvement in patients' clinical management, especially protocols for the treatment of severe cases. There has also been a need for valuing a systemic perspective to deal with complex problems, which may prove to be an important legacy.

An indicator that can point out health service network failures, difficulties and adaptations to face COVID-19 is the lethality rate (Figure 1). At the beginning of pandemic, these values fluctuated around 12%, which is considered high for an infectious disease. Over time, these values have decreased considerably in almost all states, except for Rio de Janeiro (7%) and Pernambuco (6%). Santa Catarina state positively draws attention, having maintained low lethality values, probably reflecting a better organization of the surveillance and health care system. In Brazil as a whole, in the last few months, lethality has remained around 3%, revealing that for every 100 infected persons, about three die. Obviously, the number of disease cases and of those infected by the virus depend on the diagnostic tests performed or their clinical diagnosis. The disproportion between deaths and registered cases, therefore, reveals flaws in the entire health system, in laboratory capacity, in health surveillance actions and in the integration of primary care to highly complex services.

We started tracking the occupancy rates of Covid-19 ICU beds for adults in the Brazilian states on July 17th. Since July 27th, we have monitored them biweekly

(Figure 2). The period is after the most critical moment in Northern Brazil, in some Northeast states and in Rio de Janeiro and São Paulo states, covering the phase in which the pandemic grew in Southern and Midwestern Brazil. In general, there has been improvement in the indicator, with the largest number of states (19), in the period, outside the alert zone (<60.0%) on October 5th, the last observation date, when also, for the first time, there were no states in the critical alert zone (≥80.0%).

Ceará, Pernambuco, Espírito Santo, Paraná and Rio Grande do Sul have remained for the last two weeks in the intermediate alert zone or very close to it, while Goiás entered it after all the period in the critical zone, and, conversely, Amazonas returned to it after the entire period outside the alert zone. Exceptionally, in Rio de Janeiro state, due to the non-availability of the indicator, only the capital was monitored, which remained in the intermediate alert zone throughout almost the entire period, reaching critical indexes in September. However, it is worth noting that in the last few weeks the state's Department of Health started to provide the Covid-19 bed occupancy rate, which corresponded to 51.8% in the week from October 3rd to 9th.

Prospectively, the focus cannot be lost on improving the capacity to respond to the challenges that may still arise from Covid-19 and, eventually, from other new conditions. It is possible that the system still has to experience moments of expansion and retraction to deal with the service demands posed by the pandemic.

Finally, the idea of strengthening SUS - involving the improvement of its structures and training and valorization of its professionals - must be pursued as the only way to meet the health needs of the Brazilian population as a whole. The capacity of the health services network to produce the best results requires that it is person/patient centered and depends on the integration of effective primary health care with health surveillance and intermediate and high complexity diagnosis, treatment and rehabilitation services. For such integration, electronic information systems, mechanisms that regulate the transition of patients between points of care transition and adequate health transportation are necessary. Financial resources volume increase is essential, and should constitute a fundamental agenda for improving SUS's performance, healthcare quality offered and Brazil's population quality of life.



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Figure 1: Evolution of fatality rate (%) in the Brazilian states per epidemiological week. Brazil, March-October 2020.

Occupancy (%) of Covid-19 ICU beds

Rondônia	74 %	79 %	63 %	71 %	67 %	56 %	42 %
Acre	28 %	57 %	74 %	57 %	47 %	28 %	31 %
Amazonas	46 %	35 %	26 %	25 %	48 %	55 %	68 %
Roraima	72 %	71 %	55 %	71 %	50 %	50 %	42 %
Pará	60 %	56 %	58 %	52 %	60 %	51 %	38 %
Amapá	30 %	29 %	25 %	23 %	14 %	16 %	18 %
Tocantins	62 %	64 %	83 %	74 %	71 %	53 %	50 %
Maranhão	55 %	51 %	39 %	39 %	39 %	28 %	24 %
Piauí	70 %	68 %	59 %	54 %	55 %	56 %	54 %
Ceará	72 %	71 %	70 %	65 %	59 %	62 %	64 %
Rio Grande do Norte	77 %	64 %	55 %	38 %	47 %	40 %	38 %
Paraíba	54 %	47 %	47 %	38 %	40 %	37 %	36 %
Pernambuco	76 %	75 %	65 %	72 %	73 %	66 %	70 %
Alagoas	60 %	62 %	44 %	40 %	37 %	36 %	25 %
Sergipe	79 %	77 %	74 %	49 %	38 %	40 %	54 %
Bahia	80 %	75 %	62 %	59 %	49 %	49 %	52 %
Minas Gerais	67 %	67 %	67 %	65 %	64 %	64 %	60 %
Espírito Santo	76 %	73 %	73 %	73 %	66 %	66 %	67 %
Rio de Janeiro (capital)	66 %	71 %	63 %	68 %	82 %	86 %	73 %
São Paulo	67 %	66 %	59 %	55 %	54 %	47 %	43 %
Paraná	39 %	42 %	72 %	73 %	72 %	71 %	62 %
Santa Catarina	72 %	84 %	80 %	65 %	56 %	61 %	34 %
Rio Grande do Sul	76 %	76 %	75 %	76 %	73 %	72 %	67 %
Mato Grosso do Sul	53 %	54 %	69 %	54 %	57 %	49 %	50 %
Mato Grosso	93 %	90 %	79 %	76 %	69 %	60 %	52 %
Goiás	84 %	83 %	83 %	87 %	82 %	85 %	74 %
Distrito Federal	81 %	81 %	87 %	70 %	78 %	76 %	56 %
	2020-07-17	2020-07-27	2020-08-10	2020-08-24	2020-09-07	2020-09-21	2020-10-05
	Date						

Low Intermediate High

Figure 2: Adult ICU bed occupancy rates in the states. Brazil, July-October 2020

# ■ *Quality of care and patient safety and the maternal death in the pandemic situation*

The new coronavirus (Sars-CoV-2) pandemic represented a major threat to the quality of care provided and patient safety, worldwide. This was no different in Brazil, which presented, at the end of March 2020, a significant increase in the demand for health care. This increase, in a short period of time, created an overload on health services and their workers. Routines, flows and protocols needed to be quickly revised and new beds provided. Changes of this nature have an impact on quality, in particular, due to the speed with which they need to be adopted, without time for training.

There were difficulties in adopting infection prevention and control measures. In addition to the scarcity of materials, especially personal protective equipment (PPE), many health units physical space does not allow for the adequate separation of areas dedicated to patients with Covid 19 or even maintaining the recommended distance.

Because it is an unknown agent, at pandemic beginning, little was known about disease pathophysiology, which is still not fully understood. This resulted in difficulties in the cases diagnosis and assessment through clinical and laboratory markers and in effective therapeutic interventions adoption, with conflicts

over various drugs use without proof of effectiveness and whose safety profile recommended caution in their use.

Government agencies, such as the National Health Surveillance Agency (Anvisa), educational and research institutions, and professional associations have produced various materials to guide safe practices for both health workers and the general population. They are manuals, technical notes, protocols and videos aimed at controlling and preventing disease in different environments, ranging from health services such as hospitals and long-term institutions. Thus, the precautionary measures were updated and gained wide dissemination, in health units today everyone wash their hands, wear gloves and a mask when having contact with patients.

Covid-19 impacts on the quality of care and patient safety can be seen in several areas, but there is a situation that is very worrying, the increase in maternal mortality in Brazil during this period. Initially, the obstetric population was not considered at risk for Covid-19, which meant that this group was not tested. In addition, for fear of contagion, examinations and consultations were postponed, implying the delay in identi-

fying problems earlier. Deaths occurrences in pregnant and puerperal women affected by Covid 19 soon began to draw professionals, managers and researchers attention f in the country, including the publication of several scientific articles.

Subsequently, reports were published by Sweden, Iran, Mexico, the United Kingdom and the United States, pointing out serious cases and deaths in pregnant and postpartum women<sup>1</sup>. In the middle of April, the Ministry of Health (MS) started to consider this group as at risk. Up to mid-July, 2,475 Covid-19 cases were reported in pregnant and postpartum women, with 8.2% (202) having died. Among these, 5.9% (12) had not been hospitalized, 39.7% (80) were not admitted to the ICU, 42.6% (86) did not receive mechanical ventilation and 25.5% (51) did not have access respiratory support.

These data analysis showed that black people and living in a peri-urban area, without access to the Family Health Strategy, were associated with adverse outcomes increased risk. These data point out the inequalities and difficulties in accessing services with specialized attention and adequate monitoring for obstetric complications<sup>2</sup>.



Foto: Raquel Portugal

1 Nakamura-Pereira, Marcos et al. COVID-19 and Maternal Death in Brazil: An Invisible Tragedy. Rev. Bras. Ginecol. Obstet. [online]. 2020, vol.42, n.8 [cited 2020-10-09], pp.445-447. Published: <[http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0100-72032020000800445&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-72032020000800445&lng=en&nrm=iso)>.

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## ■ Health workers situation due to Covid 19

Throughout the Covid-19 pandemic evolution, it became evident that one of the groups most at illness risk was health workers. In addition to direct contact and exposure to high viral loads, work overload and changes in protocols and routines, in a scarcity context of adequate personal protective equipment (PPE), an object of concern worldwide, make this group more vulnerable. In our country, this was a serious problem, the subject of complaints to professional councils. Another relevant factor, which increased the exposure of this group, was the supply of beds expansion through field hospitals, many without structure and without trained teams, virus and stress exposures increased risk.

China, where the pandemic started, reported that 3,300 health workers were infected, but European countries indicate much higher numbers. In early July 2020, data from just nine countries (Denmark, Germany, Hungary, Ireland, Italy, Russia, Spain, Turkey and Ukraine) showed that more than 150,000 health professionals had already been infected with the Sars-CoV-2<sup>1</sup>.

In view of the increase in cases and deaths by Covid-19 among health professionals in the region of the Americas, the Pan American Health Organization (PAHO) has issued a warning to governments on the need to strengthen the capacity of health services at all levels and to provide PPE and training for all.

In Brazil, data vary according to sources. According to the Observatory of the Federal Nursing Council (Cofen), on October 4, 2020, there were 40,608 cases and 441 deaths among its professionals (nurses, technicians and nursing assistants). Women account for 85% of cases and 63% of deaths, highlighting that they are 85% of the workforce in this segment. Deaths occurred more frequently in the age groups above 41 years, but the cases were concentrated in the range of 31 to 40 years.

The Epidemiological Bulletin (BE) dedicated to Covid-19, published by the Health Surveillance Secretariat of the Ministry of Health (MS), on April 3, brings alerts about health workers exposure. As of BE nº 16 (Epidemiological 21th Week, of May 18), case records related to health workers are now presented. At that time, there were 31,790 confirmed cases in this segment of workers, being: 14,831 (46.7%) in São Paulo; 4,451 (14%) in Rio de Janeiro; 1,669 (5.3%), in Ceará; 1,257 (4%), in Amazonas; and 1,174 (3.7%), in Bahia.

Until September 26, 1,301,066 cases of suspected flu syndrome in Covid-19 had been reported in health workers, with 322,178 cases of illness confirmed (24.8%). The most affected are nursing technicians/assistants (109,955; 34.1%), nurses (47,339; 14.7%), doctors (33,032; 10.3%), community health workers (16,546; 5, 1%), receptionists from health units (14,024; 4.4%), and physiotherapists (8,594; 2.7%), who have had a strong presence in Intensive Care Units.

It is worth remembering that, although data are not available to date, there are several publications and reports that draw attention to issues related to mental health, such as anxiety, depression and sleep disorders, which have affected this workers group.

Other segments of workers strongly affected by Covid-19 were formal workers in slaughterhouses and the oil industry. The National Agency of Petroleum, Natural Gas and Biofuels reported that, in April and May, production was temporarily interrupted in 38 and 34 fields, respectively, due to Covid-19 pandemic effects, with a strong impact on the oil industry, from the country. The National Confederation of Food Workers estimates that about 125,000 workers have been infected by August, which has also led to interdictions in industries in several states. The repercussion on the country's economy was

immediate, resulting in the suspension, by China, of meat imports from some slaughterhouses in the country.

These formal workers health situation panorama and of sectors with great visibility and importance in the national economy reveals the extreme vulnerability to which they are subject, either due to the scarcity and inadequacy of PPE, or due to strenuous work hours and processes and in inappropriate environments. In addition to these, there is also a large contingent of formal workers from other branches with less visibility and those who work on their own or do not have a formal contract, and are also vulnerable due to their age profile or chronic diseases<sup>2</sup>.

During the Covid-19 pandemic, combination of increased exposure to infection risks due to work activities types (formal and non-formal, including precarious work), with the vulnerability to maintain jobs and income and the age profiles or chronic diseases, represented a workers number doubling in health and economic risks situations, simultaneously<sup>3</sup>.

In this context, policies for the social protection of workers expansion, commuting risks prevention (including public transport) and workplaces - in addition to Covid-19 recognition as an occupational disease - are important public policies that must be integrated measures to protect workers during the pandemic.



Foto: Raquel Portugal

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# ■ Indigenous Peoples and Covid-19 in Brazil

Due to historical and socioeconomic factors, indigenous peoples are particularly vulnerable to Covid-19 and its serious consequences (1). Faced with social and health disadvantages, it was clear that facing Covid-19 in the indigenous context would be challenging, a situation aggravated by the low budget execution in indigenous health(2), the fragile dialogue between the government and indigenous representations in the elaboration and implementation of actions and the little transparency of the measures adopted to guarantee disease prevention and comprehensive care for cases(3,4). The dispute over narratives about facing the pandemic in indigenous peoples was evidenced by the delay in the approval of the law 14.021/2020 and in the overthrow of their presidential vetoes (5), by the interventions of the Federal Public Ministry (6,7) and, particularly, by the interpellations made by the indigenous movement together to the Supreme Federal Court, in the Action for Breach of Fundamental Precepts 7093, and in the Inter-American Commission on Human Rights of the Organization of American States (8). Six months after the pandemic, legislative and legal measures have not yet been fully implemented.

The Sars-CoV-2 circulation in Brazil resulted in a progressive proportion of indigenous people in municipalities at high immediate risk for a pandemic (9), quickly affecting the 34 Special Indigenous Health Districts. In urban areas, seroprevalences of superior seroprevalence were observed in indigenous people compared to other categories of color or race, in particular whites (10). The virus transmission in territories occupied by isolated and recently contacted peoples is alarming and aggravated by the increase in illegal invasions (11).

Divergences between official epidemiological data from the Special Secreta-

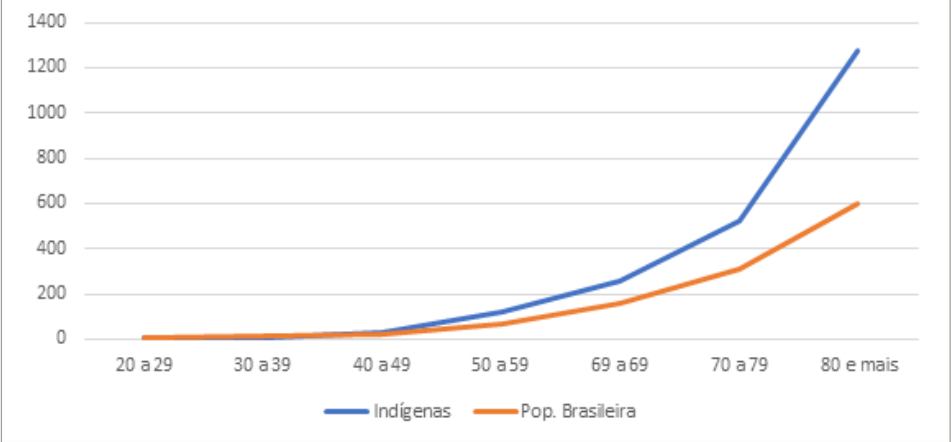
riat for Indigenous Health (SESAI), in relation to other sources (12), revealed problems in information transparency, restricted access to the Indigenous Health Care Information System (SIASI) and its lack of integration with the others Health Information Systems (SIS), as well as the importance of the color/race variable in the SIS and institutional racism. As a result, recently, SESAI assumed the need to complement its data on indigenous deaths by Covid-19 with data from other sources (8). Notwithstanding such divergences, the data made available by SESAI, in response to ADPF 709, show mortality rates for Covid-19 progressively higher in the age group from 50 years onwards in Indigenous compared to the general population (Figure 1). Such evidence warns of pandemic tragic socio-cultural impacts as older individuals are the guardians of traditional knowledge, languages and the memory of the historical struggles of these peoples.

Although the recent period has been highlighted by indigenous rights violations

and the worsening of health inequities, indigenous protagonism in fight for their rights and fundamental role of the Indigenous Health Care Subsystem (SASI-SUS) also emerge as central points.



Figure 1. Mortality rates for COVID-19 per 100,000 in indigenous adults and Brazilian population in general, by age group (in years) \*



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## ■ Covid in Favelas (Slums)

Recognition that Covid-19's behavior in the population is differentiated due to immense inequalities (promotion, social, territorial and racial) led to the creation of 'Sala de Situação de Saúde Covid-19 nas Favelas' within the scope of the Fiocruz Covid-19 Observatory. The challenge assumed was to highlight social dynamics and the repercussions in the context of the pandemic and its consequences in socio-epidemiological terms. The work developed relies not only on researchers from Fiocruz, but also with the active participation of residents and social articulators of favelas, seeking to promote various hypotheses visibility - both of vulnerability and of local initiatives to confront the pandemic.

A first and observation about disease behavior in the favelas is the recognition that the urban space is uneven. In areas where urban poverty is most pronounced, the new coronavirus advances more rapidly. This is because these territories do not have quality public policies to support collective protection. Furthermore, in countries marked by social inequalities, such as Brazil, poverty grows on an expanded scale, not only forming new peripheries, but also thickening old ones. As living conditions in peripheral urban spaces make it difficult for the population to adopt individual prevention, widely disseminated in Covid-19 control guidelines, such as social distance.

Given social protection policies insufficiency/absence, these territories are characterized by the high density of housing, marked by self-construction and autonomy in disagreement with urban regulation rules, without official land tenure and with insufficient access to basic sanitation. Due to these spaces social and environmental characteristics, as well as the difficulties of the health services, the Covid-19 occurrence, the cases severity and disease lethality is greater (Linder, 2020). In addition, measures of social distance, mobility restriction and service interruption, trade and industry activities have produced serious economic and social impacts. This is because a large contingent of favelas residents are informal workers. Many of them have lost their income sources and others are unable to carry out isolation, further accelerating the contagion speed.

In addition to the historical challenges related to housing with poor ventilation, lighting and space, and poor access to public services, the situation in favelas is aggravated due to the context of structural violence. Brazil ranks first in the world

as the country with the most years of life lost due to violence (Sawaya et al, 2018).

Favelas COVID-19 situation analyzes in Rio de Janeiro municipality, which appear in the newsletter "Boletim Socioepidemiológico", were carried out based on the official data from the city hall, data produced by organized movements and those provided by the basic units. There was an immense difficulty in carrying out favelas specific analyzes, whose reality is made invisible by data absence/dilution, since these are mostly aggregated by neighborhoods zip code.

This scenario imposed more accurate analyzes of some phenomena, such as the higher Covid-19 incidence rates in neighborhoods without favelas or with favelas low concentration, respectively, 115.58 per 10,000 inhabitants and 74.98 per 10,000 inhabitants (both above Rio de Janeiro average of 70.71 per 10,000 inhabitants), when compared to neighborhoods classified as favelas "very high concentration", have incidence rates until June 2020 were 24.94 per 10,000 inhabitants. This situation could be partly explained by the low access to testing by these territories' populations.

Laboratory criterion exclusivity (until June) for Covid-19 cases validation and the restriction of tests to severe cases that required hospitalization configured a low testing in public health services context. This fact caused difficulties to measure the disease magnitude in the peripheral spaces where the population is, in its majority, user of the Unified Health System - SUS.

Despite underreporting and limits on the specific information production about favelas, the COVID-19 monitoring incidence rates shows the disease periphery: on March, pandemic beginning, highest incidence rates were found in neighborhoods in the south zone with greater purchasing power. However, over the following months, the disease incidence showed greater expression among the peripheral neighborhoods. Despite health service in efforts of monitoring suspected deaths by Covid-19 process, many people die without the test and others have the death cause undefined. The increase in household deaths is another important indicator for the analysis of mortality rates.

Corroborating this analysis, it can be seen that neighborhoods with a high and very high concentration of favelas have higher lethality (19.47%), twice as much as neighborhoods considered "without favelas" (9.23%), indicating both the lack access to diagnosis in a timely manner, such as problems with access to greater assistance complexity health services. Territories such as "Complexo do Alemão", "Costa Barros" and "Jacarezinho" presented the highest

mortality rates observed, respectively 45%, 22.69% and 22.22%. The lethality rate in Rio de Janeiro city was 11.73%.

The disease unequal behavior in the city also reiterates racial inequalities, expressed by deaths greater number in the black population. The improvement in the information on race/color - observed from the first to the "Boletim Socioepidemiológico" second edition - resulted from the requirement to fill in this field by self-declaration in the Notifiable Diseases Information System (Sinan). This was a Federal Public Ministry action, beeing intense mobilization of associations and social movements result, with emphasis on black movements, which denounced the invisibility of blacks and indigenous people - as an obstacle to equity in health promotion. In fact, in the second bulletin (July and September) it is possible to observe that the incidence, mortality and lethality rates for Covid-19 in the municipality were higher in the black population. Covid-19 deaths percentage according to race/color in this period was 48.2% in blacks, 31.12% in whites, however there is still 20.15% of uninformed according to this item. The incidence in blacks is 44.6% and in whites 37.04%, 3.99% yellow, 0.17% indigenous and 14.19 ignored. This disease portrays our structural racism bases, expressed in the immense black lives vulnerability and precariousness.

Unofficial sources active monitoring - media, social networks and direct contact with residents, collectives and local articulators - brought to light several situations that make these territories population even more vulnerable, such as the precarious access to health services; conducting police operations in favelas during the pandemic, despite current legislation; the lack of water supply; the removal of residents from their homes; deaths at home found by community research; racism various situations, mental health problems intensification; hunger and food insecurity, among others. However, there was also a multiplicity of powerful initiatives by favelas residents to face the pandemic, dealing with this set of problems addressed with effective results, despite the State's failure to provide emergency protective actions due to the pandemic.

In favelas pandemic social and epidemiological monitoring, it was found that Covid-19 acts in order to make Brazilian social pattern and racial inequality even more explicit. The slumns is daily reiterated as an exclusion space, the plot of which is naturalized by a political project that has powerful strategies to hide its reality, such as the rationality used in health data production that makes it invisible and the social protection effective actions absence.

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## ■ Covid-19 Impact on the elderly populationi



October 2020 marks the 30th anniversary of the International Day of Older Persons and the 73rd World Health Assembly, with the initiative "Decade of Healthy Aging" (2020-2030), in line with the Sustainable Development Goals. Available in the MonitoraCovid-19 newsletter of Fiocruz, data from the Influenza Epidemiological Surveillance Information System (Sivep-Gripe) registered, until the beginning of this month (10/6), 210,007 cases and 100,059 deaths of people aged 60 or over, corresponding to 53.1% of the total cases and 75.2% of deaths.

This corroborates the Covid-19 greater severity among the elderly population. Without considering deaths from other causes, a reduction of 0.41% in the elderly male population and 0.25% in the elderly female population is estimated in 2020 in Brazil.

Covid-19 impacts the elderly male population more. These have a 70% higher mortality rate when compared to women in the same age group, with 414 and 249 deaths per 100 thousand, respectively. One of the pandemic demographic consequences will be the feminization trend of the elderly Brazilian population intensification.

It is recommended that Epidemiological Surveillance Systems, research and actions on Covid-19 focus on the elderly

population, recognizing their specificities and inequalities. In several countries, the lethality by Covid-19 in long-term care facilities for the elderly (LTCF) has been shown to represent between 30% and 60% of all deaths.

In Brazil, there are no data on elderly people living in such institutions. So far, updated data on the Mortality System (MMDS) is also needed, such as age, causes and other variables contained in the Death Certificate (DC), which are only disclosed by some municipalities and states health departments. The investigation of "ill-defined" causes of deaths among the elderly, that is, without diagnosis and often occurring without medical assistance, deaths in the home and mortality from causes indirectly associated with Covid-19 is a pressing task of the health surveillance system.

The elderly lives cannot be considered unnecessary. Most elderly deaths, directly or indirectly associated with Covid-19, can be prevented with social assistance and primary health care. Likewise, the possible sequelae and Covid-19 infection consequences on the elderly functional capacity should be monitored. On the other hand, it is essential to care for people who care for the elderly (family members and professional caregivers), due to the workload resulting from the pandemic.

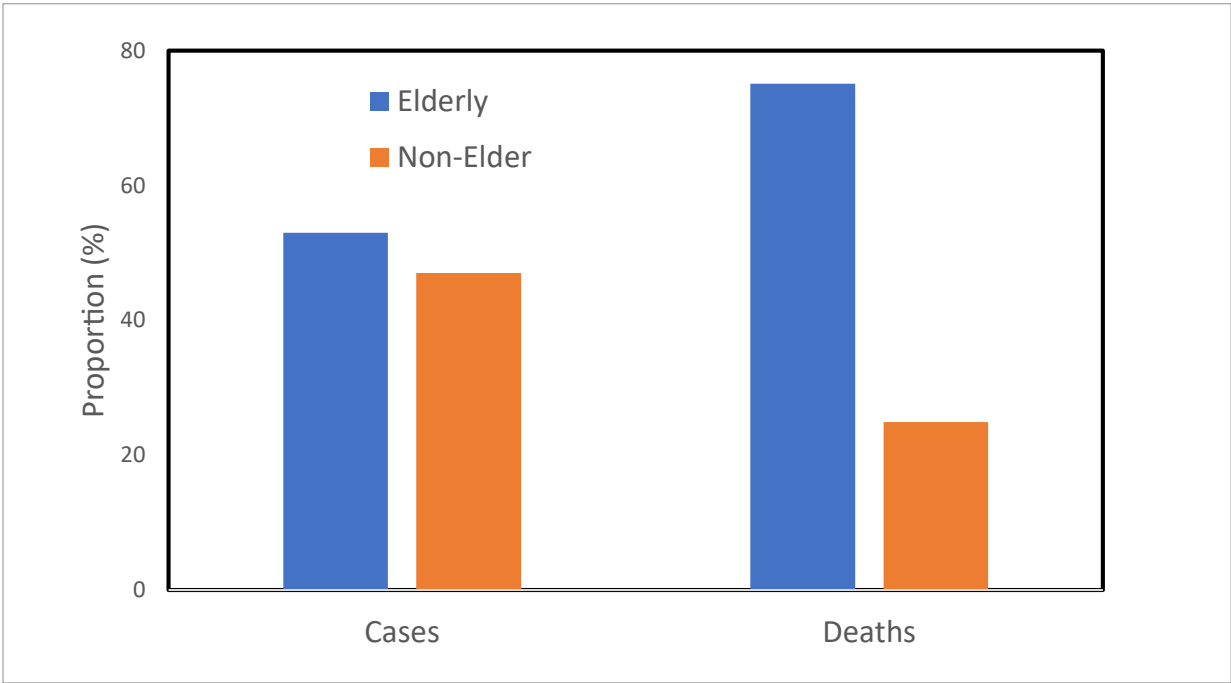


Figure 1. Comparison Elderly and Non-elderly COVID-19 cases and deaths in Brazil in 6 months.

# Ethics, bioethics and Covid-19 in Brazil

Bioethics enables the analysis of moral problems that affect the quality of life and human beings well-being. With the pandemic, Fiocruz gathered a scholars group dedicated to analyzing Covid-19 impacts in Brazil in a globalization context of socio-political and economic relations. This group has produced analyzes and recommendations that are made available on the Covid-19 Fiocruz Observatory (1) page.

Several ethically relevant issues have arisen since pandemic first moments, such as conflicts between individual and collective interests; criteria for allocating scarce resources and services (from access to personal protective equipment [PPE] to ICUs and, within them, to mechanical ventilators and medications); conflicts in the delimitation of collective protective actions and their economic consequences; establishing flows and criteria for assessing and deciding on research that can help respond to the pandemic; and the need for responses to be sensitive to issues of gender, race, color, ethnicity and places of residence.

## Covid-19 and Social Inequalities

As expected, the pandemic made the structural injustices that make our country one of the most unequal in the world more explicit. The differences observed in health indicators between the richest and the poorest, regardless of the geographic region, make the role of social determinants in population illness and death process even more clear. Even in large urban centers, access to food, clean water and sewage is precarious in the poorest communities.

In times of crisis, it is hoped that society will be able to unite and act with a meaningful community sense, which has occurred in many poor communities through various actions and in the private sector, which has mobilized for donations to combat the new coronavirus. However, the existence of sectors that, although minority, acted actively to discredit both pandemic and necessary responses, created an environment that greatly undermined effectiveness of states and municipalities response to the disease, affecting mainly the most vulnerable populations and territories.



In fact, we did not actually have a lockdown as observed in European cities and in New York. The motivational basis for the proposed social isolation has always been “if possible, stay at home”, which did not bring a sense of urgency and effectiveness to sensitize society. Once again, minority, but strident, speeches seem to have had an effect on the society demobilization, despite some media efforts.

Although the number of cases, especially fatal ones, has been gradually decreasing, there are no signs of population's adherence to elementary individual protection norms. Therefore, closed spaces progressive opening can bring about a foreseeable increase in the pandemic. It would be important for there to be a federal communication strategy that presents reasons why people should maintain basic care with the use of masks and personal hygiene, as well as access to basic supplies possibility for adherence to non-pharmacological prevention strategies.

## Health care and the SUS

Challenges related to health care, individual and collective, have not changed significantly (although it is believed that some resources scarcity is no longer as relevant), but the differences between what is offered to the segments that suffer the most from inequalities should be seen as a priority for public policies. The pandemic could have led to part of Unified Health System (SUS network) reconstruction, which was dismantled in recent years, and there was no need for the disordered and field hospitals uncontrolled construction that have a limited existence by definition.

## Vaccines: Caution and Social Justice

There was a very high expectation in relation to the vaccines approval in the short term and the limitations overcoming possibility that pandemic imposes on everyone. However, it is important that the vaccine is not considered as the only solution, but as part of the national coping strategy, combined with other fronts.

Regardless of the protection degree that the vaccine will provide the population, individual and collective protection measures will certainly still be needed.

Another fundamental issue that arises in vaccine debate is the importance of its universal and free access for the entire population, through the Unified Health System (SUS). Any restriction on this access could further aggravate the social inequalities already evidenced by the pandemic.

The vaccination strategy to be implemented in the country, regarding the priority groups choice, should also consider two central pillars: social justice and epidemic scenarios, which show the populations most affected or exposed to the virus. So, let us ask ourselves: how to be fair in the distribution of these vaccines? Who should be a priority to be vaccinated? Health personnel directly involved in caring for pandemic victims or health professionals in general? Elderly people in general or those who have comorbidities or who are also more socially vulnerable? Citizens involved in the national economy food or structural sectors production and distribution?

Therefore, it is a question of aligning a social perspective with scientific evidence that can contribute to the broader strategy to face the pandemic. (text updated 10/15)

<sup>1</sup> - Some of the elaborated texts: Some lessons that we must already try to learn from the pandemic; Good practices of community involvement in the preparation and research conduction; Covid-19 Social Impacts: a perspective sensitive to gender inequalities; The apparent dilemma posed by the Covid-19 pandemic: saving lives or the economy? The practice of medicine in facing Covid-19 - vulnerabilities and protective needs; Is it possible to minimize the ethical requirements to expedite research approval in a Research Ethics Committee during a health emergency?; Compulsory isolation of contact persons from children, adolescents, people with disabilities and the elderly; ethical recommendations for health units; Is there a right to say no in the context of the Covid-19 Pandemic? The Covid-19 Pandemic and the Death Naturalization; Pakistan today: thinking about social inequalities and the Covid-19 pandemic; Whose ethical responsibility is the prescription for chloroquine for Covid-19 treatment? Institutional racism and race/color in Covid-19 context; The right to basic income in Brazil in the time of Covid-19.

## ■ *Fiocruz in six months of pandemic: a brief summary (February to July)*

**A**t the moment Fiocruz was about to celebrate its 120th anniversary, Brazil and the world were surprised by the novel coronavirus. Amid biomedical uncertainties and political instability, the institution mobilized to respond to the emergency, reaffirming its historic commitment to producing science for the Brazilians' health. In its various units scattered throughout the country that give it a national dimension, Fiocruz developed actions in its areas of activity: research, production, technological innovation, health surveillance, environment, health care, education, information and communication. In conjunction with the Ministry of Health (MS), state and municipal health secretariats, various sectors of civil society and multilateral agencies, it took a leading role in confronting Covid-19 in the national, regional and global scenarios.

In February, even before the announcement of the first officially registered case in the country, the Laboratory of Respiratory Viruses and Measles of the Oswaldo Cruz Institute (IOC / Fiocruz) promoted training courses on diagnostic methods for laboratories in Brazil and Latin America. The Laboratory would be designated, in April, as a World Health Organization (WHO) reference for Covid-19 in the Americas. From the beginning, Fiocruz has played an important role in WHO's international coordination efforts, participating in the Global Research and Innovation Forum and other meetings held by the agency. Several studies on the virus, including its genetic characteristics and effects on the human organism, as well as research on the biomedical and social aspects of the disease would be carried out in the various units of Fiocruz from then on.

In March, the Immunobiological Technology Institute (Bio-Manguinhos/ Fiocruz) started diagnostic tests production, the scale of which would expand significantly since then. Important initiatives were launched to monitor the disease, such as the CoVida Network: Science, Information and Solidarity, by Fiocruz Bahia and the Federal University of Bahia (UFBA), and the Monitor Covid-19, by the Institute of Scientific and Technological Communication and Information in Health (Icict/Fiocruz). The Covid-19 Observatory was designed as a center for systematizing data and producing studies and information, involving the various monitoring panels and research groups of Fiocruz, in order to help government and communities plan actions to face the pandemic. In the field of health care the Hospital Center for Covid-19 started to be built as part of the Evandro Chagas National Institute of Infectious Diseases (INI/ Fiocruz) so as to treat severe cases of the illness. Through INI and the new hospital, Fiocruz also took over the national coordination of the WHO Solidarity clinical trial, aimed at studying repurposed drugs for the disease.

In April, the launch of the Public Call to Support Emergency Actions for Vulnerable Populations, of national scope, expressed Fiocruz's strong concern about



the social impacts of the pandemic. Reinforcing its leading role in field of global health, Fiocruz joined a coalition formed by scientists and institutions from 30 countries in Latin America and Africa to face the pandemic in low and middle income countries. Also in that month, a special call of the "Inova" program, part of Fiocruz's innovation strategy, was launched to support research projects in strategic areas focused on the pandemic.

In May, the Hospital Center received its first patients. The "Fiocruz Tá Junto" seal was launched to validate community communication materials about Covid-19 as part of the communication and information campaign "Se liga no corona!" ("Watch out for the Corona!") Set up in April, through the strong articulation between Fiocruz and local groups from the Manguinhos and Maré territories, part of Rio de Janeiro's favelas (slums), the campaign was aimed at stimulating active response to the pandemic from populations living in the city's peripheries.

In June, Fiocruz's presidency was invited to join international commissions formed by leaders from around the world in the search for global responses to the health emergency, such as The Lancet COVID-19 Commission and the United Nations Economic Response Steering Group. At the end of this month, after prospecting jointly with Fiocruz on potential vaccines under development in several countries, the Ministry of Health announced an agreement with the biopharmaceutical company AstraZeneca for the production, by Bio-Manguinhos, of the vaccine being developed by the University of Oxford.

In July, the document establishing the basis for the technology transfer agreement from AstraZeneca to Fiocruz was signed, a step considered to be crucial in the institution's efforts to guarantee Brazil's

autonomy in the production and distribution of a safe and effective vaccine accessible to the entire country's population through its universal public health system (Sistema Único de Saúde/SUS). That month, Fiocruz was appointed by the Articulation of Indigenous Peoples of Brazil to provide technical support in a national plan to confront and monitor Covid-19 in indigenous peoples following the Brazilian Supreme Court decision determining that the Federal Government should take action to stop the virus spread among these populations.

In addition to the actions aimed at facing Covid-19 and its impacts on the population, Fiocruz has implemented initiatives to protect its workers, students, collaborators and patients. In March, it launched its Contingency Plan, which would be permanently updated. In July, Fiocruz published the first version of a plan designed to offer guidance on safety measures for its staff activities during the pandemic ("Plano de Convivência com a Covid-19 na Fiocruz").

In short, in a broad front that combines cooperation and diversity, Fiocruz has been producing responses to Covid-19's health and humanitarian crisis in the most varied areas, from virus genetic sequencing to actions for diagnosis and treatment, the production of vaccines, support for vulnerable populations, and generation of information and analysis that provide Brazilian society with guidelines as well as technical and scientific support to face the pandemic.

Despite living through a present of continuous change and uncertainties, Fiocruz acts with an eye towards the future. Beyond emergency responses, it projects structural actions in the fields of science, technology and health innovation in order to strengthen the SUS, protect and save lives and honor its 120 years of history.

# ■ Timeline

This timeline compiles the main events related to the first six months of the COVID-19 pandemic in Brazil. Along with political measures by local governments and scientific advances, this resource shows some of the main developments such as vaccine development, confinement measures, individual and collective protection and social distance.

We are aware that this timeline does not cover the totality of events that occurred during these pandemic months in Brazil. However, we hope that the compiled data will serve as a basis for studies and research on the pandemic, in addition to policy planning.

### Sources

Qualitative sources data used was multiple. Mostly, we use official reports from health agencies and the government. When these were not available or complete, we consulted local media press releases and also local Wikipedia pages. After curing and verifying all the information, we summarize the topics that are represented. Quantitative data (total cases and deaths) were reported by "Our World in Data".

### JANUARY

- 1/28: Brazil raised the emergency alert to level 2, considering COVID-19 an "imminent danger". Meanwhile, the Ministry of Health was monitoring 3 suspected cases.

**Brazil:** Confirmed cases / deaths at month ended  
0 total case, 0 total death

**World:** Confirmed cases / deaths at month ended  
9,824 total cases, 213 total deaths

### FEBRUARY

- 2/3: The Ministry of Health declared COVID-19 to be a Public Health Emergency of National Importance (ESPIN).
- 2/7: The Ministry of Health, the Oswaldo Cruz Foundation and the Pan American Health Organization (PAHO) carried out technical training for representatives of nine countries in Latin America for the new coronavirus laboratory diagnosis.
- 2/9: 34 Brazilians residing in Wuhan were repatriated through Operation Regresso and remained in quarantine at a Goiás state's military facility.
- 2/25: Brazil identified its first case. He was a São Paulo citizen, who had traveled to Italy.
- 2/28: The Ministry of Health announced the purchase of 20 million surgical masks and 600 thousand hospital gowns (cloaks) due to the new coronavirus infections increase number in the country.

**Brazil:** Confirmed cases / deaths at month ended  
1 total case, 0 total death

**World:** Confirmed cases / deaths at month ended  
85,236 total cases, 2,921 total deaths

### MARCH

- 3/3: The Minister of Health highlighted the quarantine and social distance measure importance.
- 3/4: Fiocruz started distributing diagnostic kits for COVID-19 to Brazilian States' Central laboratories (LACENs).
- 3/6: Brazilian immunologist Ester Sabino and her team sequenced the SARS-CoV-2 genome at the Adolfo Lutz Institute, in São Paulo.

- 3/11: Schools in the Federal District had their classes suspended. DF Governor was the first to adopt this measure.
- 3/13: With more than 100 confirmed cases, the Ministry of Health has regulated isolation and quarantine criteria to be applied by health authorities in patients with suspected or confirmed coronavirus infection.
- 3/15: The National Health Surveillance Agency (ANVISA) approved the first eight rapid tests for the COVID-19 diagnosis.
- 3/17: First death in Brazil was recorded in São Paulo, due to the new coronavirus.
- 3/18: The Chamber of Deputies passed a public calamity decree due to the coronavirus pandemic.
- 3/18: Fiocruz finalizes training of the country's 27 Brazilian States' Central Laboratories (LACENs) for Covid-19 diagnosis.
- 3/19: Special Secretariat for Indigenous Health/ Ministry of Health released the National Contingency Plan for Human Infection for the new Coronavirus in Indigenous Peoples and the first Technical Report for Special Indigenous Health Districts (DSEI).
- 3/20: The Ministry of Health published an ordinance confirming community transmission throughout Brazil.
- 3/27: Fiocruz announced a partnership with WHO to carry out an international study of multicenter clinical trials called Solidarity.
- 3/30: Brazilian virologist Felipe Naveca coordinated the SARS--CoV-2 genomic sequencing in Amazon, identifying virus mutations, in comparison with other samples. The research was carried out at Fiocruz in Manaus.
- 3/31: The Minister of Justice and Public Security authorized the use of National Force to help in the areas most affected in fight against the coronavirus, a measure valid for 60 days.

**Brazil:** Confirmed cases / deaths at month ended  
4,579 cases in total, 159 deaths in total

**World:** Confirmed cases / deaths at month ended  
807,629 total cases, 38,719 total deaths

### APRIL

- 4/1: Brazil changed the protocol for wearing a mask and began to recommend it to everyone, not just health professionals.
- 4/1: Confirmed the first indigenous COVID-19 case, the case is that of an Indigenous Health Agent in the Alto Rio Solimões/AM region.
- 4/2: In order to mitigate the financial damage caused by social isolation to families, the National Congress approved emergency aid of R\$ 600 per month.
- 4/2: Publication of provisional measure 940/2020 that released R\$ 9.4 billion to the Ministry of Health to face COVID-19. Fiocruz will receive approximately R\$ 457.3 million, and the National Health Fund (FNS) will receive the remaining R\$ 8.9 billion.
- 4/8: The Ministry of Health announced the purchase of 14 thousand mechanical respirators produced in the national territory for critically ill patients' treatment.
- 4/9: Brazil reported the first death of an indigenous man, from the Yanomami tribe in the Amazon: a 15-year-old boy.
- 4/20: Manaus, Amazonas State capital, began to open mass graves, due to the high mortality rate by COVID-19 in this state.

**Brazil:** Confirmed cases / deaths at month ended  
78,162 total cases, 5,466 total deaths

**World:** Confirmed cases / deaths at month ended  
3,138,130 total cases, 227,895 total deaths

MAY

- 5/6: The Ministry of Health has communicated a national testing plan as part of efforts to contain and combat the new coronavirus pandemic. The initiative aims to test 22% of country's population.
- 5/7: Brazilian capitals located in Amazon region, hiten hard by COVID-19, such as Manaus and Belém, declared lockdown.
- 5/14: Fiocruz's Institute of Technology in Immunobiologicals (Bio-Manguinhos) reached the milestone of the production of 1 million Covid-19 diagnostic tests for public laboratories in the country.
- 5/19: Publication of Provisional Measure 967/20 that allocated R\$ 4.8 billion to the National Health Fund (FNS) and R\$ 713.2 million to the Oswaldo Cruz Foundation (Fiocruz) for actions to combat the pandemic.
- 5/19: The Hospital Center for Covid-19 Pandemic, of Evandro Chagas National Institute of Infectious Diseases (INI / Fiocruz), was inaugurated.
- 5/28: InfoGripe's report indicates a persistent trend of growth in Severe Acute Respiratory Syndrome (SARS) cases number in several Brazilian regions and suggests the need to maintain social distance measures.

**Brazil:** Confirmed cases / deaths at month ended  
498,440 total cases, 28,834 total deaths  
**World:** Confirmed cases / deaths at month ended  
6,012,227 total cases, 368,042 total deaths

JUNE

- 6/11: São Paulo governor announced that the state will produce a vaccine against coronavirus in partnership with a Chinese laboratory Sinovac Biotech and the Butantan Institute.
- 6/19: Researchers from Fiocruz and Abrasco sent a document to the Special Rapporteur on the rights of indigenous peoples of the United Nations (UN) reporting Covid-19 situation and its confrontation in indigenous peoples context in Brazil.
- 6/27: Ministry of Health announced an agreement between Fiocruz and the biopharmaceutical company AstraZeneca for the COVID-19 vaccine purchase and technology transfer, developed in conjunction with University of Oxford.

**Brazil:** Confirmed cases / deaths at month ended  
1,368,195 total cases, 58,314 total deaths  
**World:** Confirmed cases / deaths at month ended  
10,245,214 total cases, 502,123 total deaths

JULY

- 7/15: PAHO issued a warning about the importance of intensifying the actions to confront Covid-19 in the indigenous peoples context in the Americas.
- 7/23: InfoGripe Bulletin pointed to Severe Acute Respiratory Syndrome (SARS) second wave in states like Amapá, Maranhão, Ceará and Rio de Janeiro.
- 7/28: Ministry of Health added diagnostic imaging to record cases and deaths from Covid-19; health departments can review previous data.

- 7/31: Fiocruz and AstraZeneca signed a Memorandum of Understanding, a document that establishes the basis for the agreement involving technology transfer and production of 100 million doses of Oxford vaccine.

**Brazil:** Confirmed cases / deaths at month ended  
2,610,102 total cases, 91,263 total deaths  
**World:** Confirmed cases / deaths at month ended  
17,298,375 total cases, 668,329 total deaths

AUGUST

- 8/6: Federal government signs a collaboration agreement with the University of Oxford and AstraZenica for vaccine against covid-19 production. The agreement provides for technology transfer.
- 8/7: Brazil reaches 100 thousand deaths resulting from COVID--19. The Ministry of Health highlighted the importance of early treatment.
- 8/10: Announced by Fiocruz the expansion of the national testing capacity for the COVID-19 detection, a strategy to support the country's Central laboratories (LACENs), financed by the Ministry of Health.
- 8/24: Brazilian states relax health restrictions, but postpone resumption of face-to-face classes at schools.
- 8/31: STF approved the Sanitary Barriers Plan for the Isolated and Recent Contact Indigenous Peoples protection presented by federal government as a measure to contain the spread of Covid-19 in villages.

**Brazil:** Confirmed cases / deaths at month ended  
3,862,311 total cases, 120,828 total deaths  
**World:** Confirmed cases / deaths at month ended  
25,275,808 total cases, 846,949 total deaths

SEPTEMBER

- 9/1: The government's emergency assistance was extended for 4 months, with the amount of R\$ 300.00.
- 9/9: Fiocruz signed the Technological Order (Etec) contract with AstraZeneca, which holds the production, distribution and marketing rights for Covid-19 vaccine, guaranteeing access to 100 million doses of this.
- 9/14: Presential classes have already been resumed in some Brazilian cities, but most public school's students still do not have a schedule return to classroom activities.
- 9/22: Study by the Center for Technological Development in Health (CDTS/Fiocruz), in partnership with D'Or Institute and UFRJ, observed that COVID-19 virus can infect neural cells and create brain damage.
- 9/23: São Paulo Government announces study indicating safety of the Chinese vaccine against COVID-19, which will be produced in partnership with the Butantan Institute.

**Brazil:** Confirmed cases / deaths at month ended  
4,777,522 total cases, 142,921 total deaths  
**World:** Confirmed cases / deaths at month ended  
33,731,717 total cases, 1,009,118 total deaths