COMMENTARY

Getting Ready for the Covid-19 Pandemic: Experience of a Brazilian Hospital

Carisi A. Polanczyk, MD, ScD, Vania Rohsig, RN, Gisele Nader Bastos, MD, ScD, Alexandre P. Zavascki, MD, ScD, Luis A. Nasi, MD, ScD, Mohamed Parini, BEcon, MPhil

Vol. No. September 2, 2020
DOI: 10.1056/CAT.20.0428

Although the Covid-19 outbreak occurred later in Brazil and may not have yet reached its peak, some regions were affected earlier. Moinhos de Vento Hospital, a private hospital in Porto Alegre (the capital city of the state of Rio Grande do Sul, in southern Brazil) prepared for the outbreak before receiving alerts from the national health care system. Through the establishment of the Committee for Combating Coronavirus, led by the CEO and other chief officers and the board of directors, the hospital implemented specific flows, protocols, and staff dedicated to the care and safety of patients with Covid-19, and increased bed capacity. This report of the first 90 days of the outbreak in Brazil describes the experience and learning curve of the hospital. In spite of the significant impact on the revenues, the proactive role provided opportunities for other projects, such as telemedicine and public-private partnerships. Even though Brazil has a universal public health care system, private institutions still have opportunities for leadership.

Context of the Pandemic

Since the first cases of novel coronavirus (SARS-CoV-2) infection were identified in December 2019, the pandemic has spread to all continents and almost all countries. By September 1, 2020, 25,579,140 coronavirus cases and 852,561 deaths had been reported worldwide.

The first case of infection by the novel coronavirus in Brazil was identified on February 26, 2020, in the city of São Paulo. Brazil, the fifth largest country in the world by area, the sixth largest by population, and the ninth largest by GDP, has a wide diversity of climatic and environmental
conditions, population demography, social and economic development, and culture. It has one of the highest rates of social inequality according to the World Health Organization (WHO).

Brazil’s public health care system provides one of the broadest levels of coverage in the world, covering approximately 214 million people, and it is estimated that 76% of these are exclusively dependent on the public system. However, a supplementary system runs in parallel to the public one: For-profit and non-profit health care organizations provide care for approximately 24% of the population that is covered by private insurance (predominantly paid for by their employers). This supplementary health care system offers expanded access to diagnostic and therapeutic options, and is responsible for 52% of health spending in the country. The supplementary system supplies half of the ICU beds, approximately 15,000. The rate of private coverage varies by region. In the state of São Paulo, private coverage reaches 35%, in Rio de Janeiro 23%, in the state of Rio Grande do Sul 23.2%.

In the state of Rio Grande do Sul, the first Covid-19 case was confirmed on March 10, 2020, and in the city of Porto Alegre, the first case was confirmed on March 11. It was in this global scenario that Moinhos de Vento Hospital, a not-for-profit institution that cares for privately insured patients, took a lead in activating its crisis and disease committee.

Moinhos de Vento Hospital

Moinhos de Vento Hospital (in Portuguese, HMV) is a private nonprofit institution with 474 beds, located in southern Brazil, and is a reference center for high-complexity and critical cases. It cares for patients with private insurance, who represent 43% of the city’s population. Over the last decade, it has stood out for its rapid growth, notable participation in the private sector, and expansion in education and research, especially since the foundation of its School of Health Sciences. HMV has been accredited since 2002 by the Joint Commission International and has been affiliated with Johns Hopkins Medicine (JHM) since 2013. It is ranked as one of the best hospitals in Latin America by major journals and international rankings.

"After the first case of Covid-19 was identified in Brazil, HMV’s board of directors authorized the formation of the multidisciplinary Committee for Combating Coronavirus."

On February 26, 2020, after the first case of Covid-19 was identified in Brazil, HMV’s board of directors authorized the formation of the multidisciplinary Committee for Combating Coronavirus. It is unusual that within a universal and structural public system, a private hospital took the lead in defining routines and behaviors related to a pandemic with strong public health implications. HMV also adopted restrictive and conservative measures earlier than Brazil as a whole.

Several factors determined the board’s decision:
A governance model where the institution is an extension of the community, with a board comprising volunteer community leaders from industry, commerce, and cultural institutions, and an intense sense of solidarity

Support from JHM and interaction through video conferences that enabled agile adoption of the first measures

Previous experience in relevant crises (food poisoning in a preschool in 2015, KPC contamination in the neonatal unit of HMV in 2017, and Ebola outbreak in 2017)

Concern with and constant monitoring of high occupancy rates in emergency and intensive care units (Table 1).

HMV participates in the main public-private partnership program in the Brazilian health sector (PROADI-SUS), along with four other private philanthropic hospitals, considered to be centers of excellence by the Ministry of Health.6 This participation allowed the top management of the institution to have access to the main plans of the Ministry and its information on the urgency of the global situation.

Committee for Combating the Covid-19 Pandemic

Even though a global pandemic seemed like a distant possibility in February 2020, HMV formed its committee for the exchange of information and future planning. The committee had 22 members, drawn from both administrative and clinical personnel.

On March 9, 2020, with 25 confirmed cases in 7 states (though none in our state), HMV was invited to a face-to-face meeting with the then–Minister of Health, along with the other four hospitals of excellence in Brazil, where we received information about the severity of the situation and the risks of an acceleration of the increase in the number of cases that would occur in the coming days. The hospitals belonging to the PROADI-SUS program used this meeting as an opportunity to begin developing measures to support the government.6

“The committee created dedicated flows for the different patient profiles within the hospital facilities, seeking to create safe environments for all employees, clinical staff, and patients.”

Table 1. Institutional Reasons for Leading Pandemic Planning

| Reason                                                                 |
|------------------------------------------------------------------------|
| International affiliation with Johns Hopkins Medicine                  |
| Scientific recognition of international reports and news on the severity of the pandemic |
| Hospital occupancy rate higher than 88–90% and prolonged length of stay in the emergency room (boarding time greater than 24 hours in some months) |
| Highly qualified infection control service                              |
| Institutional mission to ensure the health of the local community       |
| Recognition that testing and control rules established by international organizations were inadequate for the local scenario |
| An alarming rate of transmission reported for health care professionals in other countries |

Source: Hospital Moinhos de Vento.
On March 10, 2020, we decided that the HMV Committee for Combating Coronavirus would meet daily with the CEO and all corporate and medical directors, as well as the medical leaders and the leaders of the department of infectious diseases.

This committee was responsible for the daily development of operational routines and procedures for all areas, seeking to ensure the continuity of essential services, to define priorities, and to create a process for rapid reaction to new demands and the rational and effective use of available resources. For instance, the group decided to cancel elective surgical procedures, establish criteria for ambulatory services (cardiac cath lab, endoscopy, diagnostic imaging), and postpone or cancel some planned investments.

The committee created dedicated flows for the different patient profiles within the hospital facilities, seeking to create safe environments for all employees, clinical staff, and patients. It also developed a formal communication plan for both internal audiences and external ones, to align the teams and minimize conflicts due to communication failures (Table 2).

### Continuity of Essential Services

The measures adopted involved preparing the institution for the care of Covid-19 patients, focusing on quickly building separate flows of individuals with confirmed and suspected cases, defining both medical protocols and protocols for the entire care team, training health care professionals, and ensuring the adequacy of the infrastructure and physical areas. The cancellation of outpatient visits, elective and semi-elective tests, and all nonurgent surgeries occurred 3 days before the announcement of local community transmission and the declaration by public managers of the need for social distancing in the city and the state.
Capacity Expansion

A detailed analysis of in-hospital capacity was performed to assess where existing space could be redeployed to accommodate Covid-19 patients in emergency, inpatient, and intensive care. The adequacy of the physical structure, with separate flows for patients with suspected or confirmed Covid-19, was quickly established, and we created temporary space with two external emergency care tents. Spaces in the hospital were adapted so that inpatient beds and an intensive care unit could be assigned exclusively for patients with Covid-19.

"The number of inpatient beds was practically doubled (474 beds to 824) by transforming private rooms into shared rooms and changing surgical areas to intensive care areas."

Considering that in that week it was not possible to estimate the severity of the situation and to predict what would happen in subsequent weeks, the number of inpatient beds was practically doubled (474 beds to 824) by transforming private rooms into shared rooms and changing surgical areas to intensive care areas. For this expansion, in addition to the reassignment and training of professionals for this new area, more than 50 new professionals were hired for the different areas, and a plan was defined for hiring more than 250 professionals if needed, though so far we have not had to execute this plan.

Infection Prevention and Control

Demand grew significantly for support by the infectious diseases department to the other areas of the hospital, as well as to external clients. Nursing and medical workforces were augmented by 82%, from 5 to 9 nurses (pre-Covid-19 1,100 person-hours per week versus 2,010 person-hours per week post-Covid-19). Reorganization of the Hospital Infection Control Service occurred immediately, with the creation of an internal hotline called Call Covid-19, where professional nurses and pharmacists were available 12 hours a day to answer questions about prevention, signs, and symptoms of Covid-19. The infection control service also provided constant support in the development of care flows, protocols, and routines.

Two points were critical in the planning. The first was the type of precautions to be offered to the hospital health care professionals, especially at a time when two entities guiding our infection control actions provided differing guidelines. While the WHO recommended only precautions for contact and droplets — recommendations that were also adopted by the Brazilian Ministry of Health — the U.S. Centers for Disease Control and Infection (CDC) indicated the need for additional protection for aerosols. We believe that the evidence for any of the recommendations was minimal at that time, but we chose to indicate precautions for aerosols, along with precautions for contact and droplets, to health care professionals treating patients with suspected cases of Covid-19.
The second was determining who should be considered a suspected case. There were guidelines from the WHO and the U.S. CDC, which generally converged on the criteria recommended, which were adapted by the Brazilian Ministry of Health. However, as the first case series were published, we noted the fragility of these criteria, because individuals needed to present both fever and respiratory symptoms to be considered suspected cases. Despite what the WHO, CDC, and the Ministry of Health recommended, we instructed the emergency teams to consider suspected cases as all patients with epidemiological criteria (returning travelers) who had either fever or some respiratory symptom.

“Demand grew significantly for support by the infectious diseases department to the other areas of the hospital, as well as to external clients.”

Subsequently, as WHO updated information on the spread of the pandemic, Brazil began to consider the need for individuals to return to Brazil from trips to countries where there were already cases of documented sustained (community) transmission. We identified limitations on these recommendations and sought to expand the geographic criteria for defining a suspected Covid-19 case. When only patients from the Wuhan region were included in the criterion, we expanded it to any location in China and then to any country in Southeast Asia. Later, with the arrival of the virus in Europe, we considered as suspected cases all symptomatic individuals from any European country.

As never before, challenges faced by the infection control team emerged daily. Exceptional situations were very frequent, but gradually, as we were able to implement the service routines — all documented in specific forms published by the team — the exceptions decreased, although they never fully ceased.

The educational process focused on the prevention of infections. We have continuously reinforced the importance of handwashing, the use of PPE, isolation, and cleaning routines for equipment and environment. Patient and family education emphasizes the importance of limiting the number of visitors and guests.

**Covid-19 Patient Care Management and Data**

The medical care protocols developed for each specific area ensured safe care in all instances. To guide decisions and criteria related to the diagnosis, treatment, and monitoring of patients with Covid-19, several clinical protocols were developed and made available to the medical community (Figure 1).
A specific medical staff team was assigned to the intensive care units dedicated to these cases, although the hospital has an open clinical staff team of accredited physicians who are responsible for and care for their own patients. One concern was the early training of medical care teams on how to adequately use PPE, and how to employ protective techniques to minimize the risk of personnel contamination during intubation care, secretion management, and mechanical ventilation.
From the beginning, HMV used its website to make information available to the entire medical scientific community throughout Brazil, including its own data linked to public data from other regions and countries. A bulletin was prepared and disseminated daily in traditional and digital media (Figure 2).

**FIGURE 2**

**Coronavirus Bulletin from Hospital Moinhos de Vento**

Source: Hospital Moinhos de Vento
NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society
Human Resources Management

Many of the measures took into account establishing protection mechanisms for employees and health care professionals at the entire institution. In addition to concerns regarding the care of patients and their families, the Committee for Combating Coronavirus was concerned with ensuring the well-being of all 4,200 hospital employees. Data from China showed an increase in Covid-19 cases in health care professionals who were infected during patient care.8,9 Specific training and protocols were prioritized to those caring for patients with suspected or confirmed Covid-19.

“Despite what the WHO, CDC, and the Ministry of Health recommended, we instructed the emergency teams to consider suspected cases as all patients with epidemiological criteria (returning travelers) who had either fever or some respiratory symptom.”

Similarly, to reduce the exposure of our staff, several practices were adopted to decrease the circulation of our employees, including working from home and granting vacation time. We also paid them for using previously banked overtime to stay home.

All employees with signs and symptoms of influenza were directed to the same flow as outpatients with suspected Covid-19. At 90 days after the first case in the country, 702 of the 4,200 employees were tested, and 45 tested positive for Covid-19, representing 1.07% of our workforce and demonstrating the effectiveness of the measures adopted to protect the workforce.

The institution provides all employees with a health insurance plan at no additional cost. In addition, all employees who tested positive for Covid-19 were monitored via telemedicine by the Moinhos Full Health program, a multidisciplinary family health team that includes a physician, nurse, and psychologist. Of the 45 employees who were positive for Covid-19, only 2 were hospitalized and they have already been discharged home. To date, we have had 1,619 days of absence from work in connection with Covid-19.

Supply Management

A concern from the beginning was maintaining the necessary amount of supplies, especially PPE, medications, and ventilators.

In a time of scarcity of materials and equipment, the hospital benefited from the support of board members and their relationship with the local export industry, ensuring the supply of N95 masks, face shields, surgical masks, and disposable gowns, among other supplies. We also acquired 35 ventilators to equip additional intensive care beds. Initially, the masks were offered to staff in triage and those caring for suspected and confirmed cases. As evidence advanced, masks became mandatory for all professionals within the institution.
A major challenge was to establish institutional criteria for Covid-19 tests, as there was a shortage of tests, and the criteria established by the Ministry of Health applied to very restricted and symptomatic cases. As described above, we were more flexible in the testing criteria, creating a greater demand for testing. One of the critical points was the lack of a laboratory that could meet the internal demand for RT-PCR laboratory tests. The number of tests conducted by the outsourced laboratory was insufficient, leading to a delay of up to 4 days in the delivery of results. It was this critical bottleneck that made hospital management realize the strategic risk of not having its own laboratory. The establishment of its own laboratory occurred very quickly and in less than a month, HMV obtained approval from the health surveillance agency to perform tests in its facilities. With the ability to perform up to 200 RT-PCR tests per day and with reports delivered within 24 hours, we saw an improvement in quality of care.

**Economic and Financial Aspects**

After the first cases appeared in Brazil, the main concern of the board was the risk of an overlap in the flow of patients expected for the beginning of the second quarter (where there is a traditional increase in demand from elective patients and winter-related respiratory diseases) with a dramatic increase in the number of suspected cases of Covid-19. At the beginning, we did not know how quickly infection might spread, and to protect our patients, employees, and clinical staff, we made the decision to cancel all elective and scheduled procedures, which meant giving up a potential 40% of the institution’s budgeted revenue for subsequent months. This decision was endorsed by the board of directors and it confirmed the institution’s commitment to the community. Additionally, the investments in PPE for employees, in addition to the acquisition of 35 mechanical ventilators and construction of dedicated spaces for suspected cases, generated an unplanned investment of approximately R$4 million (US$735,000).

"Specific training and protocols were prioritized to those caring for patients with suspected or confirmed Covid-19."

HMV did have some level of financial reserves. In December 2019, HMV recorded a total revenue of R$876 million (US$161 million), a surplus for the year of R$53.4 million (US$9.8 million) and an EBITDA of R$99.5 million (US$18.3 million), resulting from the combination of a long-term strategy focused on high complexity with professionalized corporate management.

However, the initiatives implemented during the pandemic generated a 30% reduction in budgeted revenue in April 2020 alone, approximately R$23 million (US$4.2 million). In turn, the accumulated revenue in the first 4 months was R$49 million (US$9 million) lower than budgeted, and the accumulated loss through April was R$15.2 million, (US$2.8 million) compared with a predicted surplus of R$9.8 million (US$1.8 million). We expect that the months of June and July have followed the same trend as the months of April and May because we decided to keep our workforce active and ready, despite a clear decline in the occupancy rate.
As already highlighted by other countries,\textsuperscript{10,11} even as hospitals gradually reopen, for scheduled visits and with separate patient flows to protect uncontaminated patients, they are showing new patterns. Low patient demand persists even in connection with acute diseases such as stroke and acute myocardial infarction, with consequences for both public health and the sustainability of hospital institutions.\textsuperscript{12,13} We have gradually opened for semi-elective procedures and urgent appointments (for example, for cancer treatment and suspected myocardial infarction) and have discovered that many patients are not seeking help for critical situations and have postponed tests and visits. The duration and intensity of this behavior, even after the loosening of social distancing measures, will determine the cumulative economic and health impact of the pandemic in the institution and for patients.

The HMV senior management and board of directors believe that institutions of our size and profile should maintain a long-term commitment to their community despite the economic impact in the short term. Patients and society at large regard the institution as a source of credibility and prestige, and reinforcing that role will reap benefits in subsequent years when the current pandemic and its consequences are behind us.

**Challenges and Opportunities**

To combat the pandemic, the institution needed to adapt to a new reality, and with this, some sensitive points have gradually been revised; today, they can be considered great legacies.

One of the critical points was the lack of a laboratory that could meet the internal demand for RT-PCR laboratory tests. With impressive speed, we developed an in-house laboratory with the approval of the health surveillance agency. The laboratory will be expanded and, after the pandemic, will allow us to perform other tests on site.

"We have gradually opened for semi-elective procedures and urgent appointments...and have discovered that many patients are not seeking help for critical situations and have postponed tests and visits."

Another opprotunity was the adoption of telemedicine, which was accelerated by the pandemic. Brazil’s Federal Council of Medicine had not allowed physicians to practice telemedicine except in specific circumstances, such as for research or to provide access to care in distant rural areas, but reconsidered these restrictions because of Covid-19. HMV had telemedicine resources available, and used them within our facility for family members to virtually visit Covid-19 patients admitted to the ICU. Once the Federal Council of Medicine approved the use of telemedicine throughout Brazil, we began offering remote medical consultations, thereby maintaining quality of care and reducing the circulation of patients within the hospital area. We developed an application integrated with patients’ electronic medical records and made it available for use by the clinical staff of the institution, facilitating remote consultations.
We also planned to introduce the Moinhos de Vento Consultancy in the second half of 2020, to provide paid consulting services to several companies, banks, schools, city halls, and universities that needed formal support in defining a reopening plan and applying processes and technologies adapted to their activities.

Notably, as a consequence of our leading role, we established a closer relationship with city hall and the state government to share strategic information in the management of population health. One of the emblematic examples was the invitation to participate in a public-private project involving some of the area’s largest employers, including Gerdau Group, Ipiranga Group, Zaffari Group, HMV, and Porto Alegre City Hall, to supply 60 additional beds to a free public hospital, using private resources of the participating companies. These beds will be used in the care of trauma-orthopedic surgical patients after the pandemic.

We remain focused on combating the epidemic, trying to adjust to the possibly permanent changes in patient behavior that will constitute the “new normal.”

**Concluding Remarks and Lessons to Share**

At the time of writing this article (August 14, 2020), the pandemic advances in the South and Midwest, and our state has the second highest growth in daily deaths in Brazil. The state recorded an increase of more than 96% in the average number of deaths per day in early August. ICU beds at our hospital are operating under 90% of capacity, although it seems to have reached a plateau. Patients are being taken care of at appropriate medical facilities, as planned. There were 208 cases in the first 90 days and 6 deaths; as of August 14, we registered 2,229 cases and 42 deaths assisted at our hospital.

The experiences reported in other countries helped the hospital and the community adapt and prepare for combating the coronavirus. Despite Brazil’s universal health care system, there is wide variation in the resources available depending on the location. In the first 90 days of the pandemic in Brazil, internal vulnerabilities were perceived, such as lack of on-site testing, of PPE, and of information technology structure for data capture and patient care. On the other hand, the hospital had some strengths such as financial reserves and autonomy, structured governance mechanisms, and excellent and engaged clinical staff. The pandemic has left a legacy both in infrastructure and in the new relationship between health care providers and patients, with improvements in the crisis management model. A focus on the institutional mission and long-term thinking guided the measures we adopted.

**Carisi A. Polanczyk, MD, ScD**  
Chief of Cardiology, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil

**Vania Rohsig, RN**  
Chief Nursing Officer, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil

**Gisele Nader Bastos, MD, ScD**  
Medical Manager, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil
Alexandre P. Zavascki, MD, ScD
Chief, Infection Control Service, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil

Luis A. Nasi, MD, ScD
Chief Medical Officer, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil

Mohamed Parini, BEcon, MPhil
Chief Executive Officer, Hospital Moinhos de Vento, Porto Alegre, RS, Brazil

Disclosures: Carisi A. Polanczyk, Vania Roshig, Gisele N. Bastos, Alexandre Zavascki, Luis A. Nasi, and Mohamed Parini have nothing to disclose.

References

1. Coronavirus Disease (COVID-19) Weekly Epidemiological Update and Weekly Operational Update. Geneva: World Health Organization, 2020. Accessed May 23, 2020. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports.

2. John Hopkins University of Medicine. Coronavirus Resource Center. Accessed September 1, 2020. https://coronavirus.jhu.edu.

3. Instituto Brasileiro de Geografia e Estatística. Data: General Population Characteristics. Accessed May 23, 2020. https://www.ibge.gov.br/en/statistics/social/population.

4. Agência Nacional de Saúde Suplementar. Dados Gerais Beneficiários de planos privados de saúde, por cobertura assistencial (Brasil – 2010-2020). Accessed May 26, 2020. https://www.ans.gov.br/perfil-do-setor/dados-gerais.

5. Newsweek. The world’s Best Hospitals 2020. Accessed May 14, 2020. https://www.newsweek.com/best-hospitals-2020.

6. Ministério da Saúde. Programa de apoio de desenvolvimento do SUS. Accessed May 23, 2020. https://www.saude.gov.br/acoes-e-programas/proadi-sus.

7. Guan WJ, Zhong NS. Clinical characteristics of Covid-19 in China. N Engl J Med. 2020;382(6):1861-2

8. Li Q, Guan X, Wu P. Early transmission dynamics in Wuhan, China, of novel Coronavirus-infected pneumonia. N Engl J Med. 2020;382(6):1199-207

9. Zhan M, Qin Y, Xue X, Zhu S. Death from Covid-19 of 23 health care workers in China. N Engl J Med. 2020;382(6):2267-8

10. De Rosa S, Spaccarotella C, Basso C, et al. Reduction of hospitalizations for myocardial infarction in Italy in the Covid-19 era. Eur Heart J 2020;41:2083-2088 https://academic.oup.com/eurheartj/article/41/22/2083/5837572.
11. De Filippo O, D'Ascenzo F, Angelini F, et al. Reduced rate of hospital admissions for ACS during Covid-19 outbreak in Northern Italy. N Engl J Med 2020;383:88-89 https://www.nejm.org/doi/full/10.1056/NEJMc2009166.

12. Garcia S, Albaghdadi MS, Meraj PM. Reduction in ST-segment elevation cardiac catheterization laboratory activations in the United States during Covid-19 pandemic. J Am Coll Cardiol. 2020;75(6):2871-2

13. Solomon MD, McNulty EJ, Rana JS. The Covid-19 pandemic and the incidence of acute myocardial infarction. N Engl J Med. 2020;383(6):691-3