Partnership between the academy and public and private health systems to fight COVID-19: an experience report in Tubarão, Santa Catarina, Brazil

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Abstract

This article presents an experience report about integration between public and private health services, health service managers and the academy, for surveillance and control of the COVID-19 epidemic, in the municipality of Tubarão, Santa Catarina, Brazil. The city is home to a university and has a large flow of people from different parts of the country, as well as being one of the first municipalities in the state of Santa Catarina to report cases of community transmission of SARS-CoV-2. The measures adopted included the implementation of the COVID-19 Monitoring Committee, the Municipal Health Emergency Operations Center, and the COVID-19 Contingency Plan. After 100 days of pandemic, 5,979 cases had been reported, 431 (7.2%) had been confirmed, of which five (1.2%) died. Early decisions, such as the immediate suspension of business activities and crowded events, may have reduced the spread of the virus. The partnerships put into place have provided innovation and supported public service management in decision-making based upon scientific evidence.

Keywords: Public Health Surveillance; Epidemiology; Coronavirus Infections.

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Introduction

We are living through the pandemic of the novel coronavirus (SARS-CoV-2), the cause of COVID-19. Worldwide evidence and experience increases knowledge about this phenomenon daily, aiding collective decision-making about health and human lives.[1] As of June 27th 2020, according to the World Health Organization (WHO), approximately 9.8 million people had been infected globally and more than 495,000 had died due to COVID-19.[2]

Control measures have been adopted in the majority of countries, in different ways and at different times, resulting in unequal outcomes in terms of COVID-19 incidence and lethality.[3,4] Strategies implemented include social contact restriction measures, case isolation and contact tracing, in addition to keeping the population informed about epidemiological and prevention aspects of the novel coronavirus.[3,4]

> *In Santa Catarina, the first two imported cases were confirmed on March 12th and the following day, Tubarão, located in the south of the state, had its first suspected case.*

Following global guidelines and concerns, the Brazilian Federal Government, via the Ministry of Health, declared a Public Health Emergency of National Concern.[5] The President of the Republic enacted Law No. 13979, dated February 6th 2020 which made provisions for measures to address the declared emergency.[6]

Brazil's first confirmed cases were notified in February 2020. They were individuals who had returned from international journeys, mainly in Europe. The media began to provide daily information on the emergence of new suspected cases and control measures were recommended according to each local epidemiological situation.[7] In Santa Catarina, the first two imported cases were confirmed on March 12th [8] and the following day, Tubarão, located in the south of the state, had its first suspected case.[9] In the days that followed community transmission was identified in the Laguna region, which by the beginning of April was related to the country's sixth highest case incidence.[10]

On March 20th, community transmission of SARS-CoV-2 was declared throughout the entire national territory.[11] Despite not all the country's regions being at the same stages of the epidemic and not having the same level of transmission at the same time, protection measures were recommended for the country's entire population, as a joint effort to contain the spread of the pandemic. The Ministry of Health asked all the states and municipalities to promote social distancing and avoid crowding as non-pharmaceutical measures.[7,11]

In view of this scenario, this article has been prepared with the aim of describing the local decision-making process for addressing COVID-19 in Tubarão and surrounding region, based on a partnership formed between the public sector, the private sector and the local university, which is an experience of surveillance, prevention and control of the novel coronavirus epidemic.

Context

The municipality of Tubarão, located 144km to the south of Santa Catarina's state capital Florianópolis, is a regional business, service and health care hub. It also has a university attended by a large number of people from neighboring municipalities and other Brazilian states. The BR-101 highway runs through the middle of the municipality and also connects it with the Humberto Bortoluzzi Airport in Jaguaruna and the Port of Imbituba. The Tubarão was one of the state's first municipalities to record community transmission of SARS-CoV-2 and, at the beginning of the epidemic, was considered to be Brazil's third COVID-19 epicenter.[12]

Tubarão hosts the Laguna Region Municipalities Association (AMUREL),[13] comprised of 18 cities and approximately 370,000 inhabitants. Based on Imperial College projections[4] for several countries, including Brazil, the following estimates were calculated for AMUREL: assuming that 80% of the population (296,000 inhab.) will have contact with the virus at some time, 10% (29,600 inhab.) will be symptomatic and 16% of these[14] (4,736 inhab.) will have severe symptoms, many of whom will require hospitalization and intensive care, it is possible that demand for local health system services will exceed supply. Tubarão has 50 intensive therapy unit (ITU) beds, reserved for critically ill patients, to meet the demands of the entire region. Based on the disease's natural history, a patient's length of stay in the ITU facility is estimated as being between 15 and 21 days, depending on factors related to the patient and their clinical progression.[15] As such, if all the population became ill at the same time it would be impossible to

provide care for all those who needed it. Apart from the scarcity of beds, vacant ITU places, respirators and personal protective equipment (PPE), there is a lack of health professionals trained to handle the disease.

The objective of the main measures adopted, as reported here, was to reduce the speed at which the virus spread, in order to be able to prepare health services to meet the demand.[16] Another factor to be considered is that the Southern region of Brazil has the highest percentage of elderly people and that some 40% of its population has at least one chronic disease.[17] Notwithstanding data from other countries revealing higher mortality in the elderly and/or people with associated comorbidities, lack of medical care may unveil a differentiated scenario in Brazil, given the country's social inequality.[18]

Even before the first suspected case of COVID-19 was recorded in Santa Catarina, Tubarão's Municipal Health Foundation (FMS) began to articulate with municipal and regional leaders, as well as public and private organizations, regarding the creation of action and contingency plans to address the epidemic, with the aim of preventing the projection described above.

Figure 1 summarizes a timeline of decisions taken at the beginning of the COVID-19 epidemic in Tubarão and region.

Action plan

In view of the scenario in Santa Catarina state, on March 16th 2020 the municipality of Tubarão published Decree No. 4,979. Besides suspending unessential activities, the Decree established specific FMS measures, such as the creation of the COVID-19 Monitoring Committee, the Municipal Health Emergency Operations Center (COEMS), and the COVID-19 Contingency Plan. Among other measures, the municipality determined:

- suspension of onsite lessons at public and private teaching establishments;
- restriction of non-urgent appointments at primary health care centers, prioritizing care for suspected COVID-19 cases;
- suspension of all face to face services other than essential services provided by the Municipal Government;
- registration of volunteers to assist with addressing the pandemic, including health course students and teachers from the Southern Santa Catarina University (UNISUL);
- creation of a COVID-19 screening center at the Central Municipal Polyclinic;
- putting the Consumer Defense and Protection Program, Municipal Guard, Civil Defense and Communication Department, among others, at the service of Public Health;
- distribution of food hampers to needy families;
- sanitization of health service access points;
- lodging facilities for health workers at the Tubarão Athletic Club Training Center;
- recording and organization of donations received from organizations and individuals;
- concentrated efforts for purchasing PPEs and alcohol gel, and production of masks and aprons;
- increased care provision by the Municipal Social Development Foundation to needy families and street dwellers;
- purchase of more than 7,600 rapid tests for detection of SARS-CoV-2 antibodies, for suspected cases of the disease;
- creation of a special online education system with assignments for municipal school children;
- planning the creation of a field hospital;
- 60-day suspension of water rates for low-income people.

It should be highlighted that these measures were adopted early and in some sectors activities were suspended even before the State Decree suspending them had been issued.

COVID-19 Monitoring Committee

The COVID-19 Monitoring Committee is comprised of municipal health professionals and specialists responsible for debating the subject and guiding municipal service managers on issues related to the pandemic. Its team is formed by FMS members, representatives of private hospitals and clinics and UNISUL researchers.

The Committee works closely with the Municipal Health Surveillance service, which includes Health Surveillance and Epidemiological Surveillance, which must necessarily report all related information to the COEMS.

The Committee's role is to articulate the actions of the COVID-19 Contingency Plan between all the municipality's

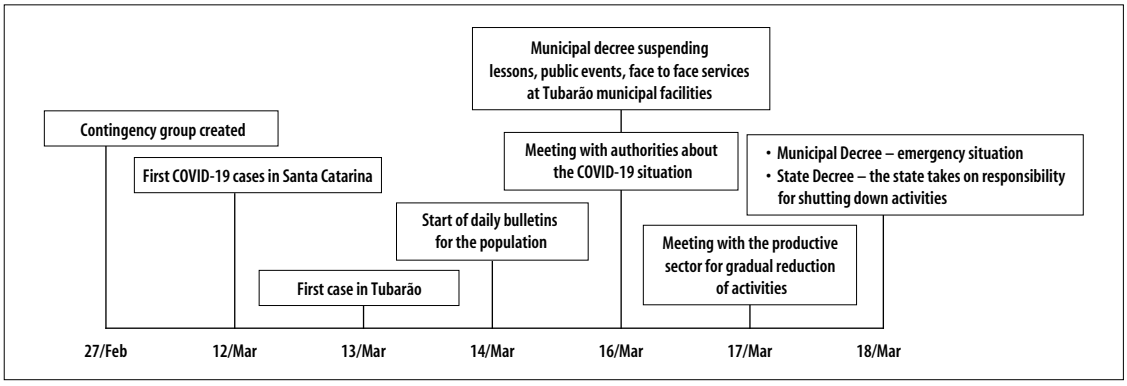


Figure 1 – Timeline of initial actions related to COVID-19, Tubarão and region, Santa Catarina

health services, building a care, prevention and treatment network that provides municipal inhabitants with quality outpatient and inpatient prevention, diagnosis and support.

Along with professionals from the region's clinics and hospitals, the Committee prepared a protocol for the use of PPEs. The protocol was based on WHO and National Health Surveillance Agency (ANVISA) recommendations, as well as taking into account PPE availability and the reality of the city's health services. It describes situations and health workers who should use PPEs, and what kinds of protection to be used by patients/carers inside health services. A protocol was also prepared on clinical practices, sample collections, case definition, COVID-19 severity classification and case management; this protocol was provided to all the region's health workers by means of an application available via internet which can be updated simultaneously by all participating institutions. The protocol was adopted by all health services involved, including the city's two hospitals, its primary health care centers, the COVID-19 screening center and Tubarão's largest private clinic.

Team training and communication

All FMS personnel and other health workers – doctors, nurses and technicians – from municipal institutions were trained in SARS-CoV-2 management and prevention. The topics covered in this training involved aspects relating to transmission, diagnosis and basic clinical management.

Training in sample collection was given to health center, clinic and hospital nurses, in order to enable decentralized and timely sample collection, especially for the real-time polymerase chain reaction test for SARS-CoV-2 detection. All other personnel, including administrative staff, technicians, auxiliaries and general service workers were provided with essential information on patient and health worker safety.

With regard to the form of information communication and its transparency, with the aim of avoiding fake news, FMS created an information bulletin with data on daily COEMS monitoring and hospitalizations in the form of a consolidated report for publication by the city government's Communication Department. Recorded by the Municipal Health Secretary, the daily bulletin informs the population and health workers about COVID-19 cases and deaths, as well as other information on the evolution of the pandemic. In partnership with UNISUL, press conferences were held in which statistical projections based on local and regional data were presented, based on daily analysis of cases and actions undertaken, as well as providing clarification for the public at large. Transparency in the provision of this information resulted in collaborative behavior among the city's citizens and raised awareness about changes needed in the provision of essential services and, later, in non-essential services as well.

During the pandemic, educational material was prepared about signs and symptoms related to novel coronavirus infection, as were protocols on everyday contact with people belonging to risk groups, care to be taken when arriving at home, forms of prevention, correct use of PPEs and guidance on social isolation.

Municipal Health Emergency Operations Center (COEMS)

The COEMS is comprised of a team of FMS personnel, Health Surveillance workers (Health and Epidemiological Surveillance) and Primary Care workers (Family Health Strategy – ESF). These professionals receive clinical and epidemiological information on all suspected and confirmed COVID-19 cases notified in the municipality, monitor them regularly and are available to the public to provide information and resolve queries, from Monday to Sunday, from 7 a.m. to 10 p.m.

When anyone suspected of having SARS-CoV-2 infection makes contact with the COEMS, whether by telephone or when referred by the ESF, Central Municipal Polyclinic, private clinical laboratories or hospitals, they are monitored daily. It should be noted that given the unspecific nature of the clinical picture,[19] the municipality opted to overreport and monitor anyone with any symptoms possibility indicating COVID-19. Tracing and isolating cases and their contacts controls the transmissibility of the virus.

In the event of mild symptoms, isolation is indicated and the team conducts daily monitoring by telephone, messages and WhatsApp video calls. This monitoring is done by doctors and UNISUL medicine students. If medication or a medical certificate is needed, the patient is advised to go to their neighborhood Health Center or to the Central Municipal Polyclinic.

In the event of severe symptoms, such as high fever for more than three days, somnolence, lack of air, hypotension or worsening of overall health condition, the person is advised to go to hospital immediately in order to get appropriate treatment. Monitoring is fundamental for timely identification of more severe cases that need differentiated care in hospital.

It must be emphasized that all these actions and protocols were the result of the partnership with UNISUL. The university assessed existing data, designed predictive models, as well as selecting existing scientific evidence in order to inform decision-making by municipal health service managers.

Figure 2 summarizes flow of care for suspected cases in Tubarão and region.

Other initiatives

The drive-thru system was also used in this period as part of the Influenza Vaccination Campaign and also for rapid SARS-CoV-2 serological tests purchased by the municipality. Given that these tests were not available for the entire population, they were administered to confirmed COVID-19 cases – diagnosed using RT-PCR or by epidemiological criteria (to validate the test) – as well as randomly to symptomatic patients monitored by the COEMS. At a later stage, random testing of the asymptomatic population was begun in order to predict herd immunity.

Results

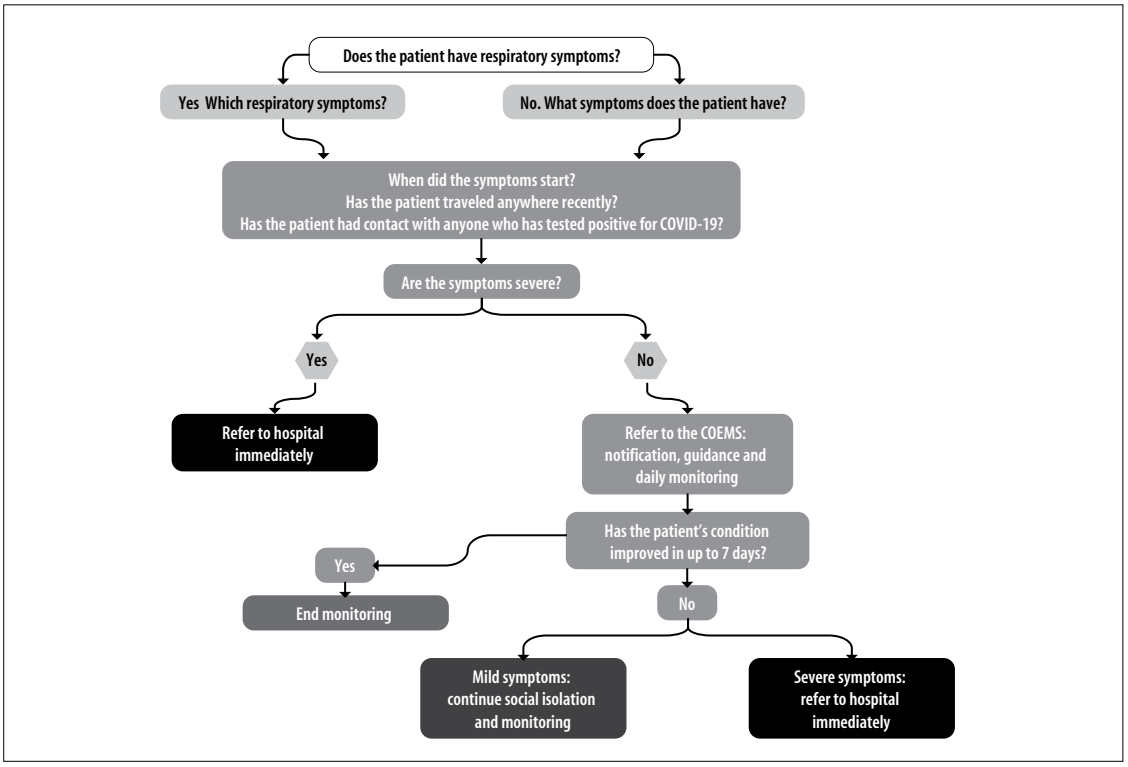
After 100 days of the SARS-CoV-2 epidemic, there were 5,979 notified cases and this information was made available publicly by the FMS on an electronic platform. The cases were monitored by the COEMS between March 16th and June 26th 2020, and 431 of them (7.2%) were confirmed by RT-PCR, by rapid serological tests or by epidemiological criteria. At that time, 79.6% of cases were cured, 18.3% were being monitored at home, three were hospitalized in an ITU and one in an infirmary. Five cases died, resulting in 1.2% lethality. Figure 3 provides a summary of the diagnostic tests performed in the municipality.

With regard to the partnership with UNISUL, 199 Medicine and Nursing course students worked directly in fighting the pandemic as volunteers, as well as activities involving selection of scientific evidence, assisted by 27 degree and postgraduate course teachers, who were also volunteers in the Influenza Vaccination Campaign and in administering rapid COVID-19 tests.

Final considerations

The partnership with the Unisul, involving participation of voluntary students and teachers and researchers from the Health Sciences Postgraduate Program, in assessing measures indicated to fight the epidemic, has been fundamental for health innovation, supported by a cooperative health care network, as well as for providing information to assist decision-making based on scientific evidence.

Leaders from the municipality of Tubarão, included in the COVID-19 Monitoring Committee, accompany incidence of the disease on a daily basis in the world, in Brazil and in Santa Catarina. Tubarão was the state's first municipality to adopt quarantine and social isolation measures based on assertive and early decisions and this resulted in a low number of hospitalizations,



Source: Municipal Health Foundation, Tubarão City Government, SC.

Figure 2 – Flow of care for suspected COVID-19 cases, Tubarão and region, Santa Catarina

Source: Municipal Health Foundation, Tubarão City Government, SC. Bit.ly/painelcovidFMS.

Figure 3 – Panorama of the SARS-CoV-2 infection diagnosis tests performed on symptomatic patients, contacts and health workers, Tubarão and region, Santa Catarina

including ITUs, and a low number of deaths, in contrast to the responses of other Brazilian cities to the novel coronavirus emergency.[20,21] Although it is still facing the pandemic, the municipality of Tubarão and surrounding region have achieved success in addressing COVID-19.

Authors' contributions

Schuelter-Trevisol F contributed to the study concept, reviewing the literature and drafting the article. Iser BPM assisted with reviewing the literature, drafting and reviewing the manuscript. Marcon CEM and Trevisol DJ assisted with drafting and reviewing the article and were responsible for conducting the entire pandemic action and contingency plan on which this manuscript is based. Baldessar MZ and De Souza KM contributed to writing information on the role of the university and volunteers, as well as to final revision of the article. De Mello RS drafted and reviewed the manuscript, especially with regard to training issues and clinical aspects, as he was technically responsible for these activities in the action plan. All the authors have approved the final version of the article and are responsible for all aspects thereof, including the guarantee of its accuracy and integrity.

References

1. Jin Y, Yang H, Ji W, Wu W, Chen S, Zhang W, et al. Virology, epidemiology, pathogenesis, and control of COVID-19. Viruses [Internet]. 2020 Mar [cited 2020 Jul 29];12(4):372. Available from: https://doi.org/10.3390/v12040372
2. World Health Organization - WHO. Coronavirus disease (COVID-19) pandemic [Internet]. Geneva: World Health Organization; 2020 [cited 2020 Apr 27]. Available from: https://www.who.int/emergencies/diseases/novel-coronavirus-2019
3. Hellewell J, Abbott S, Gimma A, Bosse NI, Jarvis CI, Russel TW, et al. Feasibility of controlling COVID-19 outbreaks by isolation of cases and contacts. Lancet Glob Health [Internet]. 2020 Feb [cited 2020 Jul 29];8(4):e488-96. Available from: https://doi.org/10.1016/S2214-109X(20)30074-7
4. Fergunson NM, Laydon D, Nedjati-Gilani G, Imai N, Ainslie K, Baguelin M, et al. Impact of non-pharmaceutical intervantions (NPIs) to reduce COVID-19 mortality and healthcare demand. MRC Centre for Global Infectious Disease Analysis. [Internet]. London: Imperial College; 2020 [cited 2020 Apr 20]. Available from: http://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-9-impact-of-npis-on-covid-19/
5. Brasil. Ministério da Saúde. Portaria MS/GM n° 188, de 3 de fevereiro de 2020. Declara Emergência em Saúde Pública de importância Nacional (ESPIN) em decorrência da Infecção Humana pelo novo Coronavírus (2019-nCoV) [Internet]. Diário Oficial da União, Brasília (DF), 2020 fev 4 [citado 2020 abr 27];Seção Extra:1. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2020/prt0188_04_02_2020.html
6. Brasil. Presidência da República. Lei n°13.979, de 6 de fevereiro de 2020. Dispõe sobre as medidas para enfrentamento da emergência de saúde pública de importância internacional decorrente do coronavírus responsável pelo surto de 2019 [Internet]. Diário Oficial da União, Brasília (DF), 2020 fev 7 [citado 2020 abr 27]. Disponível em: http://www.planalto.gov.br/ccivil_03/_ato2019-2022/2020/lei/L13979.htm
7. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Especial doença pelo coronavírus 2019. Bol Epidemiol [Internet]. 2020 abr [citado 2020 abr 27];7. Disponível em: https://www.saude.gov.br/images/pdf/2020/April/06/2020-04-06---BE7---Boletim-Especial-do-COE---Atualizacao-da-Avaliacao-de-Risco.pdf
8. Governo do Estado de Santa Catarina. Coronavírus [Internet]. Florianopólis: Governo do Estado de Santa Catarina; 2020 [citado 2020 abr 15]. Disponível em: http://www.coronavirus.sc.gov.br/boletins/
9. Município de Tubarão (SC). Saúde: coronavírus (Covid-19) [Internet]. Tubarão: Município de Tubarão; 2020 [citado 2020 abr 10]. Disponível em: https://www.tubarao.sc.gov.br/estruturaorganizacional/hotsite/index/codHotsite/9397
10. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Especial Doença pelo Coronavírus 2019. Bol Epidemiol [Internet]. 2020 abr [citado 2020 abr 27];9. Disponível em: https://portalarquivos.saude.gov.br/images/pdf/2020/April/12/2020-04-11-BE9-Boletim-do-COE.pdf

11. Ministério da Saúde (BR). Ministério da Saúde declara transmissão comunitária nacional [Internet]. Brasília: Ministério da Saúde; 2020 [citado 2020 mar 30]. Disponível em: https://www.saude.gov.br/noticias/agencia-saude/46568-ministerio-da-saude-declara-transmissao-comunitaria-nacional

12. Município de Tubarão (SC). Seja bem-vindo a Tubarão [Internet]. Tubarão: Município de Tubarão; 2020 [citado 2020 abr 25]. Disponível em: https://www.tubarao.sc.gov.br/municipio/index/codMapaItem/16672

13. Associação dos Municípios da Região de Laguna - AMUREL. Balanço social [Internet]. Tubarão: Associação dos Municípios da Região de Laguna; 2020 [citado 2020 abr 26]. Disponível em: https://www.amurel.org.br/cms/pagina/ver/codMapaItem/46704

14. Guan W, Ni Z, Hu Y, Liang W, Ou C, He J, et al. Clinical characteristics of coronavirus disease 2019 in China. N Eng J Med [Internet]. 2020 Feb [cited 2020 Jul 29];382:1708-20. Available from: https://doi.org/10.1056/NEJMoa2002032

15. Chen J, Qi T, Liu L, Ling Y, Qian Z, Li T, et al. Clinical progression of patients with COVID-19 in Shanghai, China. J Infect [Internet]. 2020 May [cited 2020 Jul 29];80(5):e1-e6. Available from: https://doi.org/10.1016/j.jinf.2020.03.004

16. Walker PGT, Whittaker C, Watson O, Baguelin M, Ainslie KEC, Bhatia S, et al. The global impact of COVID-19 and strategies for mitigation and suppression [Internet]. WHO Collaborating Centre for Infectious Disease Modelling, MRC Centre for Global Infectious Disease Analysis, Abdul Latif Jameel Institute for Disease and Emergency Analytics, Imperial College London. London: Imperial College; 2020 [cited 2020 abr 27]. Available from: https://static.poder360.com.br/2020/03/Imperial-College-COVID19-Global-Impact-26mar2020.pdf

17. Paradella R. Número de idosos cresce 18% em 5 anos e ultrapassa 30 milhões em 2017 [Internet]. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2018 [citado 2020 abr 26]. Disponível em: https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/20980-numero-de-idosos-cresce-18-em-5-anos-e-ultrapassa-30-milhoes-em-2017

18. Oliveira WK, Duarte E, França GVA, Garcia LP. Como o Brasil pode deter a COVID-19. Epidemol Serv Saúde [Internet]. 2020 [citado 2020 jul 29];29(2):e2020044. Disponível em: https://doi.org/10.5123/s1679-49742020000200023

19. Iser BPM, Sliva I, Raymundo VT, Poleto MB, Schuelter-Trevisol F, Bobinski F. Definição de caso suspeito da COVID-19: uma revisão narrativa dos sinais e sintomas mais frequentes entre os casos confirmados. Epidemiol Serv Saúde [Internet]. 2020 [citado 2020 jul 29];29(3):e2020233. Disponível em: https://doi.org/10.5123/s1679-49742020000300018

20. Marinelli NP, Albuquerque LPA, Sousa IDB, Batista FMA, Mascarenhas MDM, Rodrigues MTP. Evolução de indicadores e capacidade de atendimento no início da epidemia de COVID-19 no Nordeste do Brasil, 2020. Epidemiol Serv Saúde [Internet]. 2020 [citado 2020 jul 29];29(3):e2020226. Disponível em: https://doi.org/10.5123/s1679-49742020000300008

21. Cavalcante JR, Abreu AJL. COVID-19 no município do Rio de Janeiro: análise espacial da ocorrência dos primeiros casos e óbitos confirmados. Epidemiol Serv Saúde [Internet]. 2020 [citado 2020 jul 29];29(3):e2020204. Disponível em: https://doi.org/10.5123/s1679-49742020000300007

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