

## SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS-2 (SARS-COV-2): THE EMERGENCE OF A PANDEMIC

VÍRUS CORONA-2-2019 ASSOCIADO À SÍNDROME RESPIRATÓRIA AGUDA GRAVE: EMERGÊNCIA DE UMA PANDEMIA  
CORONAVIRUS-2-2019 ASOCIADO AL SÍNDROME RESPIRATORIO AGUDO GRAVE: EMERGENCIA DE UNA PANDEMIA

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The trivialization and fugacity of human relationships as well as the technocratization of human activities add to the complexities and tensions present in contemporary society- it is as if the human race is totally dependent on technological devices to save it from trials posed by regular life challenges. There is an increasing risk and vulnerability, and even a tendency to self-destruction, as demonstrated by the almost one million people who have committed suicide annually in the last decade and the nearly 55 million abortions performed between 2010 and 2014 worldwide.<sup>1,2</sup>

Amid the distress occasioned by feelings of vulnerability, weightlessness, loss of autonomy and awareness of finitude, there remains the challenge of being supportive, accepting, and active in defence of everyone's life. To recognize being alive as a blessing means to acknowledge the huge influence of social goods, such as education, freedom of expression, decent jobs and housing, social security, as well as respect for social differences and social equality. An individual's well-being depends on the contribution of all people. The basis for this, including that related to formal education or not, is self-knowledge, which is the continuous search to understand oneself and the other, to recognize one's own limits, to live respecting yourself and others, nature, life, and exercising compassion with dignity.

The fate of the world and its inhabitants depends on the eradication of ignorance, poverty, and the uncritical consumption of information which does not translate into knowledge; it depends on valuing the individual in detriment of the capital. Solidarity leads to dignity, respect and care for life, citizenship, harmony with nature; it boosts affection and an equal distribution of renewable social goods, which enables the individual to lead a dignified and satisfying life with social justice and peace. These are the lessons of the Severe Acute Respiratory Syndrome-Coronavirus 2-2019 (SARS-CoV-2).

Other lessons uncovered by the SARS-CoV-2 are<sup>3-5</sup>

1. Coronaviruses (CoV) are found in humans and other mammals, such as dogs, cats, cattle, pigs, and in birds. They can cause respiratory, digestive and neurological problems. The most common types are coronaviruses 229E, OC43, NL63 and HKU1 whose symptomatology is like the common cold in immunocompetent individuals. It is the third time in the last 20 years that a coronavirus is responsible for a serious human disease. SARS-CoV-2 emerged through a series of mutations or recombination of the virus nucleic acid, which made it more infectious and able to penetrate human cells through specific receptors, such as

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- angiotensin-converting enzyme 2 (ACE2) or nonspecific receptors.
2. Bats are the natural reservoir for SARS-CoV-2, but it is likely that humans have become infected through the pangolin. Recombination and genetic variation allow coronaviruses to adapt and infect new hosts through zoonotic or anthroozoonotic transmission. The virus can circulate in different ecosystems since it is capable of varied anthropophilic cycles and unpredictable mutations.
  3. Various experiments have demonstrated that it is transmitted through droplets expelled when speaking, coughing, sneezing, and shouting; aerosols too may be able to transmit the virus. Other modes of transmission include contact with asymptomatic carriers located at up to 1.5-2 m, for a prolonged (at least for 15 minutes) or for a smaller period in case of a symptomatic carrier. Contact with contaminated surfaces is another cause of infection. About 48-62% of transmission occurs via contact with pre-symptomatic carriers. Its transmission period varies from three to 14 days and it can last in the oropharynx and faeces for up to 50 days. The virus penetrates in host cells through an ACE2 receptor.
  4. An epidemiological methodology allows researchers to understand the dynamics of infectious diseases (endemic, epidemic and pandemic) using basic reproduction numbers  $R_0$ ,  $R_t$ :  $R_0$  is associated with the contagion ability of a microorganism. A disease is endemic when, on average, each infected individual contaminates another individual ( $R_0 = 1$ ). In the current coronavirus pandemic, the  $R_0 = 3$ , that is, each infected person infects three others, and so on, on an exponential scale. The measurement of  $R_0$  over time is represented by  $R_t$  (contagion speed). The result of SARS-CoV-2 disease control measures can take at least two weeks to be effective. By the end of September 2020, around 32,000,000 had been infected and 1,000,000 people died worldwide.
  5. SARS-CoV-2 has special tropism for airway, endothelial, gastrointestinal, neurological and myeloid cells. The variability of the response to infection depends on the host (innate genetic defence, age, habits, and comorbidities) and viral load. Antibody production occurs up to 20 and 15 days after exposure or the onset of symptoms, respectively.
  6. The disease presentation can range from no symptoms to extreme severity. The onset of symptoms after exposure to the virus averages five days. In 97.5% of cases it occurs up to 11.5 days after. The symptoms are mild in about two thirds of the patients; in others, however, it can lead to hospitalization. The prevalence of organ dysfunction ranges from 3.4% to 15% of positive cases. The most common complaints are fever, dry cough and dyspnoea, observed in 5% and 20% of outpatients and hospitalized patients, respectively. Complications in hospitalized patients include: pneumonia (75%); SARS (15%); acute liver failure (19%); elevation of troponin levels (7-17%), acute heart failure, arrhythmias and myocarditis; venous and arterial thromboembolism (10-25%); acute kidney failure (9%); neurological injuries (altered consciousness, 8%; acute cerebrovascular disease, 3%); and shock (6%). Elderly people with comorbidities have a high lethality risk, especially due to acute ventilatory failure and mechanical ventilation (MV), and organ failure.
  7. Very low blood oxygen saturation and absence of dyspnoea called "happy hypoxemia" are observed.
  8. Return to baseline health occurs in 14-21 days in 65% of patients. It can evolve in about 10% of patients after 21 days of their state of prolonged form (post-acute) or exceed more than 12 weeks (chronic). This evolution can result from: persistent viremia, recurrence, reinfection, inflammatory or immunological reactions, physical deconditioning or mental factors.
  9. Clinical-epidemiological diagnosis is made by assessing viral RNA, using real-time polymerase chain reaction (RT-PCR) in a nasal or Broncho alveolar clinical specimen. Identification of the virus with high sensitivity and specificity is essential for epidemiological control (contact tracing, social isolation), diagnosis, cure, vaccine response, identification of blood donors and hyperimmune plasma.
  10. Therapeutic measures go from conventional care without the need for hospitalization to supplemental oxygen therapy and mechanical ventilation. The use of some therapeutics such as remdesivir, hyperimmune plasma, corticoid therapy, anticoagulation, antibiotic therapy and antifungal depending on the association with these agents, is limited.
  11. The most effective preventive measures are those recommended for airborne diseases (miasma theory), that is, use of facial mask in order to reduce exposure to respiratory secretions, hand hygiene, social isolation. Strict measures, such as total social isolation, should be used only when other measures else fail.
  12. Active immunization is based on knowledge of how human defences against SARS-CoV-2 can be induced, however, little is known, and part of the assumption is that it can be achieved by the action of antibodies or lymphocytes.
  13. The lethality rate varies decidedly according to age: from 0.3 to 304.9 deaths/1,000 cases among patients aged 5-17 and 85 years or older, respectively. Lethality is up to 40% among patients in intensive care.

14. The incidence of the infection amongst the population determines its effects on the healthcare system given the surge in the number of patients with loss of their functional lung capacity, need for MV and consequent increase of hospital bed occupancy rates.
15. SARS-CoV-2 infection should be considered from now on in every patient with respiratory complaints, in which increase in temperature, rhinorrhoea and dyspnoea are predominant symptoms. This might require a differential diagnosis through a RT-PCR, in the third to fifth day from the onset of symptoms, or the rapid IgM or IgG identification test, 10 to 14 days after its onset.

The coronavirus pandemic highlights various and serious threats to public health worldwide, such as: a) ecological changes; b) demography, human behaviour; c) international trade and travel; d) industry and technology; e) selective pressure and resistance of microorganisms; f) collapse of public health measures; g) economic model which feeds on greed, rudeness, exploitation of workers, competition, loneliness, less affective capacity, predatory action on the environment, nutrition disorders, unemployment; precarious housing, urbanization, and sanitation conditions; h) industrialized foods and control of the production chain; i) predominance of a non-libertarian domesticating education system; healthcare unrelated to cultural and spiritual biopsychosocial well-being, an uncritical society, with limited self-knowledge, prejudiced, and unable to break with harassment and stigma.

A safe return to normal activities after quarantine begs some questions: is it safe to reopen schools? Is it safe to resume any activity that gathers large crowds? Security issues are fluid when they involve family members and acquaintances; subjectivism and emotions predominate, and no statistic is able to settle the issues and people are left with feelings of guilt for having taken the chance. An environment fully safe of contagion does not exist under any circumstances, not even at home. Schools are in a special category, for they discriminate against those that lack alternative learning resources and have less access to equipment and skills needed for home schooling. This situation leads to a widening of inequalities,

in the short and long term. The decision, therefore, depends on science, but also on sensibility.

The burden that the pandemic is imposing on society in the way of loss of lives and economic and social re-organization requires a thorough reflection. Does the economy (which is human, but values some human lives more than others) outweigh human life in general? Isn't it the time for the agencies that support the economy to support life without the intermediation of market logic? The Spanish flu preceded the Great Depression and World War II.

It is astonishing that no country, however developed it may be, is prepared to face such a challenge, be it in the organization of health services, or in political and economic integration. The flimsiness of the human experience points to solidarity as the only option. No future is possible without thinking about the world in a broad, interactive way, with common perspectives for actions to protect life and nature. The role of education, research, freedom of speech and expression, solidarity and compassion continue to give meaning to the human existence.

It was not necessary for an extra-terrestrial to show the human beings how much solidarity is needed.

## REFERENCES

1. Ganatra B, Tunçalp Ö, Johnston HB, Johnson Jr BR, Gülmezoglu AM, Temmerman M. From concept to measurement: operationalizing WHO's definition of unsafe abortion. *Bull World Health Org.* 2014[cited 2020 Out 14];92:155. Available from <https://apps.who.int/iris/handle/10665/271485>
2. World Health Organization - WHO. Preventing suicide: a manual for case registration of suicide and attempted suicide Geneva: WHO; 2014[cited 2020 Out 14]. 138 p. Available from: [https://apps.who.int/iris/bitstream/handle/10665/250536/EMRPUB\\_2014\\_EN\\_1688.pdf](https://apps.who.int/iris/bitstream/handle/10665/250536/EMRPUB_2014_EN_1688.pdf)
3. Cecconi M, Forni G, Mantovani A. Ten things we learned about COVID-19. *Intensive Care Med.* 2020[cited 2020 Out 14];46:1590-3. Available from: <https://doi.org/10.1007/s00134-020-06140-0>
4. Gonzalez-Duarte A, Nordliffe-Kaufmann L. Is "Happy Hypoxia" in COVID-19 a disorder of autonomic interoception? A hypothesis. *Clin Autonomic Res.* 2020[cited 2020 Out 14];30:331-3 Available from: <https://doi.org/10.1007/s10286-020-00715-z>
5. Chu DK, Akl EA, Duda S, Solo K, Yaacoub S, Schünemann HJ, et al. COVID-19 Systematic Urgent Review Group Effort (SURGE) study authors. Physical distancing, face masks and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: a systematic review and meta-analysis. *Lancet.* 2020 June 27[cited 2020 Out 10];395(10242):1973-87. doi:10.1016/S0140-6736(20)31142-9. Available from: [https://www.thelancet.com/article/S0140-6736\(20\)31142-9/fulltext](https://www.thelancet.com/article/S0140-6736(20)31142-9/fulltext)

