An evaluation of the SARS-CoV-2 epidemic 16 days after the end of social confinement in Hungary

Veronica Galvan · Jorge Quarleri

More than 11 million confirmed Coronavirus disease 2019 (COVID-19) cases have been documented, and the pandemic had claimed nearly 500,000 lives worldwide by the beginning of July 2020 (Dong et al. 2020). The epidemiological situation is continuously and diversely evolving worldwide, where some countries appear to have surpassed their epidemic peak, but the incidence of infections in others it is still rising. SARS-CoV-2 is an airborne virus transmissible via inhalation through close contact with a COVID-19-infected person (Tang et al. 2020). To slow down the spread of infection ("flatten the epidemiological curve"), different preventive measures including strict lockdown, social distancing, and individual protection

V. Galvan
Department of Cellular and Integrative Physiology, Barshop Institute for Longevity and Aging Studies, and Glenn Biggs Institute for Alzheimer's and Neurodegenerative Diseases, University of Texas Health San Antonio, San Antonio TX USA
e-mail: galvanv@uthscsa.edu

V. Galvan
e-mail: veronica.galvanhart@va.gov

V. Galvan
Department of Veterans Affairs South Texas Veterans Health Care System (STVHCS), San Antonio TX USA

J. Quarleri (✉)
Instituto de Investigaciones Biomédicas en Retrovirus y Sida (INBIRS), Universidad de Buenos Aires (UBA), Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Buenos Aires Argentina
e-mail: quarleri@fmed.uba.ar

measures were adopted in several countries considering that effective therapeutic interventions such as a vaccine or antiviral therapy are still unavailable (Chinazzi et al. 2020; Guan et al. 2020). More than 6 months into the pandemic, it is imperative to assess the effectiveness of these interventions from the standpoint of disease, with the goal of preventing epidemic growth as well as avoiding a recurring epidemic wave of SARS-CoV-2 cases after societal measures are relaxed or removed. Based on a stochastic model that allows to simulate both the degree of population confinement and the effectiveness of different post-confinement strategies, a gradual relaxing of restrictions accompanied by the temporal extension of restrictions for more susceptible groups seems to be optimal, resulting in a significant reduction in death counts (Lopez and Rodo 2020).

Differences in the rigor of confinement policies between countries and the speed with which they have relaxed these measures affect both the public health of COVID-19 and the social and economic impacts of different policies (Wells et al. 2020). In this regard, a rigorous analysis reported recently by Vokó and Pitter (Voko and Pitter 2020) based on data from 28 European Union member states and the European Free Trade Association countries found an association between the degree of "flattening" of the epidemic curve and the social distance index (where a higher score indicates less risk) and with degree of restrictions on internal movements. Other measures (contact tracing and isolation, widescale use of individual protective equipment, keeping safe interpersonal distance in public places, and proper hand hygiene) have also contributed to curb the

first wave of the pandemic in Europe. Just as people increase the safety of neighbors by staying at home for their own protection, the strict blockades that countries impose on themselves also provide a public good to other countries that are reflected internationally (Voko and Pitter 2020). Because of its disproportionate impact on the elderly (Williamson et al. 2020), effective preventive policies to curb the spread of SARS-CoV-2 infection are particularly meaningful as an effective measure to protect its most vulnerable hosts. At-risk older adults, particularly those in nursing homes and other chronic care facilities that have high transmission rates for SARS-CoV-2 (UN Bonn 2020), would need to be shielded from potential infection for a longer period of time to ensure adequate infection control, in compliance with the European Commission recommendations (European Commission 2020).

Large economies around the world are on the verge of a crisis, needing to regain some degree of dynamism. To reach this goal, overall lockdown measures are moving to relax. However, there are important differences in policies and in their implementation that have generated an international debate about when and how to best alleviate economic distress while preventing increases in COVID-19 cases. A discussion focused on how to adjust public health measures needs to include an estimate of the impact of the epidemic that considers the number of persons infected, knowledge about the infection's transmissibility, and the frequency of diverse clinical presentations, from asymptomatic to severe. Important information includes the total number of infective cases and the prevalence of previous exposure that reflect the current and past SARS-CoV-2 infection status in the population. However, since only confirmed cases are reported, much of this information can be heavily biased to moderate to severe clinical presentations involving sick individuals that request medical care and laboratory diagnosis. In order to calibrate the epidemic response, it is necessary to expand the spectrum of laboratory testing by including the rate of mild or asymptomatic infections that do not seek medical attention. The role that asymptomatic, pre-symptomatic, and mild infections play in transmission may come from household studies. This type of studies allows for the identification of individuals that may have a primary role in contagion, thus emphasizing the importance of measures for social distancing (Lipsitch et al. 2020).

In the *GeroScience* Special Issue "Understanding the impact of aging on the susceptibility and response to

COVID-19 infection," Merkely et al. describe the results of a comprehensive survey of present and past SARS-CoV-2 infection in Hungary 16 days after the relaxation of containment measures that were in effect during the previous 50 days, using simultaneous PCR-based and serological testing. To define the impact of confinement policies, the investigators estimated the prevalence and degree of SARS-CoV-2 infection using a large-scale nationwide, cross-sectional screening study in a representative Hungarian population living in private households distributed in different regions of the country (Merkely et al. 2020). The investigators devised and implemented an effective strategy that took advantage of established health care networks, engaged the media, and included in-person visits, together resulting in a high participation rate in the selected study population that included more than 10,000 participants. Concomitant low rates of active SARS-CoV-2 infection and prevalence of SARS-CoV-2 exposure as seropositivity were found, suggesting that effective decisions that (a) initiated containment measures early, (b) achieved high levels of adherence and compliance with regulations by the general population, and (c) applied specific safety rules for elderly people, who are more prone to severe COVID-19 clinical conditions, including but not limited to selective opening hours for grocery stores, pharmacies, and markets for individuals 65 or older, and effective implementation of policies that resulted in high levels of compliance in the population, with 60–90% reduction in overall mobility.

In conclusion, using a strong national surveillance strategy on people living in private households, Merkely et al. highlight the effectiveness of early initiation of confinement accompanied by high social adherence that drove a strong decrease in morbidity and mortality associated with COVID-19. These data are in agreement with a prior study by Vokó and Pitter (Voko and Pitter 2020) that showed that social distancing measures reduced the incidence of new COVID-19 measures in Hungary and other countries of the EU from an overall average growth of 24% per day for new cases to 0.9–0.3% increase after change points in social distance indexes derived from unbiased measures in population mobility. Together, the data reported suggest that early initiation of strict containment measures combined with high levels of compliance by the population explains the pronounced reduction in the spread of SARS-CoV-2 infection in Hungary.

The data provided by Merkely et al. are timely and should inform decisions by public health officials both with regards to the implementation of preventive societal measures and the formulation of exit strategies when specific goals for decreasing transmission have been met, in environments where appropriate monitoring is effectively performed, to avoid any resurgence of sustained community transmission. These data also emphasize the importance of specific strategies aimed to shield older adults from potential infection for a longer period of time (European Commission 2020). Furthermore, the study by Merkely et al. suggests that preventive approaches aimed to bolster immune function or diminish frailty, potentially together with interventions that target mechanisms of aging (Promislow 2020), may provide an additional line of defense in the worldwide response to SARS-CoV-2.

Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

References

Chinazzi M, Davis JT, Ajelli M, Gioannini C, Litvinova M, Merler S, et al. The effect of travel restrictions on the spread of the 2019 novel coronavirus (2019-nCoV) outbreak. medRxiv. 2020.

Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. Lancet Infect Dis. 2020;20:533–4.

European Commission. A European roadmap to lifting coronavirus containment measures. 2020. https://ec.europa. eu/info/sites/info/files/factsheet-lifting-containment-measures_en.pdf. Accessed 14 April 2020. 2020.

Guan D, Wang D, Hallegatte S, Davis SJ, Huo J, Li S, et al. Global supply-chain effects of COVID-19 control measures. Nat Hum Behav. 2020;4:577–87.

Lipsitch M, Swerdlow DL, Finelli L. Defining the Epidemiology of Covid-19 - Studies Needed. N Engl J Med. 2020;382:1194–6.

Lopez L, Rodo X. The end of social confinement and COVID-19 re-emergence risk. Nat Hum Behav. 2020;4:746–55.

Merkely B, Szabó AJ, Kosztin A, Berényi E, Sebestyén A, Lengyel C, et al. Novel coronavirus epidemic in the Hungarian population, a cross-sectional nationwide survey to support the exit policy in Hungary. GeroScience. 2020; (in press).

Promislow DEL. A geroscience perspective on COVID-19 mortality. J Gerontol A Biol Sci Med Sci. 2020.

Tang D, Comish P, Kang R. The hallmarks of COVID-19 disease. PLoS Pathog. 2020;16:e1008536.

UN Bonn (United Nations organization in Bonn). Invest in the overlooked and unsung: build sustainable people-center long-term care in the wake of COVID-19. 2020. https://wwwunbonnorg/news/invest-overlooked-and-unsung-build-sustainable-people-centred-long-term-care-wake-covid-19 Accessed 27 April 2020. 2020.

Voko Z, Pitter JG. The effect of social distance measures on COVID-19 epidemics in Europe: an interrupted time series analysis. Geroscience. 2020.

Wells CR, Sah P, Moghadas SM, Pandey A, Shoukat A, Wang Y, et al. Impact of international travel and border control measures on the global spread of the novel 2019 coronavirus outbreak. Proc Natl Acad Sci U S A. 2020;117:7504–9.

Williamson EJ, Walker AJ, Bhaskaran K, Bacon S, Bates C, Morton CE, et al. OpenSAFELY: factors associated with COVID-19 death in 17 million patients. Nature. 2020.

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.