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Editorial

The story behind Chile's rapid rollout of COVID-19 vaccination

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Surprisingly, Chile was among the most successful nations worldwide in terms of both, vaccine availability and implementation and rollout of the vaccine program. Since vaccines currently are the most promising tool to control the pandemic, it seems appropriate to explore the reasons behind the vaccination success in Chile.

The SARS-CoV-2 pandemic reached Chile, the most distant territory from its origin in China, at the beginning of March 2020. The virus was imported by travelers, mainly returning from summer vacations in Europe and the United States, and rapidly progressed to community transmission. By June, coinciding with the southern winter season, the first transmission peak occurred with daily incidence rates, being at that time amongst the highest globally [1].

The pandemic caught Chile in an unfortunate moment, amidst a political upheaval, which ensued in October 2019 to impulse a new social agenda. The government's popularity had plummeted causing widespread distrust in many governmental institutions. Adding to this turmoil, preexisting structural weaknesses in the health system raised concerns in the ability to adequately respond to the pandemic. Among the shortcomings of the Chilean health system were the low availability of hospital and intensive care beds, insufficient financing, and unequal distribution, resulting in high out-of-pocket spending for some patient groups [2,3]. In addition, primary health care is fragmented, dependent on local political authorities (mayors), creating difficulties for transferring resources and coordinating actions. Since the above mentioned problems within the public health system significantly impacted COVID-19 related morbidity and mortality [4], it was evident that immunization was the paramount public health priority.

As in other countries, the prompt implementation of a COVID-19 vaccination campaign faced various challenges. Although a relatively small country, Chile has large distances, stretching over more than 4200 km from North to South. Furthermore due to its small population and remote location, it is not of high priority for the international pharma industry, which resulted in vaccine shortages during outbreak situations in the past [5].

Chile's mass COVID-19 vaccination campaign started in February 2021. During the following 8 weeks, more than a third of the population received the first dose; placing Chile among the countries with the highest vaccines rates per capita (https://ourworldindata.org/covid-vaccinations). This brought significant attention by international media [6,7], since at that time, most European countries were still struggling with vaccine availability and rollout [8].

Among many factors behind Chile's success, a timely availability of vaccines was essential. Chile has an emerging market economy in transition that recently reached a high per capita income level: too rich to be priority for global health agendas or donations, too poor to compete with Europe and North America on global markets, too unimportant for big pharmaceutical companies, and too unprepared to launch an own rapid vaccine development program. It was clear that supplies would have to be assured by early contracts with vaccine developing companies elsewhere, accepting high economic and scientific risks. The recently created Ministry of Sciences facilitated a dialogue between the scientific community and political authorities. The Foreign Ministry led negotiations with international pharmaceutical companies with the strategy to assure a broad range of contracts that 1.) pursued different vaccine mechanisms to compensate for scientific failure and 2.) were from different world regions to account for political failure or incompliance and delays in trade agreements. Furthermore, an active role in vaccination trials was promoted allowing for local experience and data with specific vaccines, i.e. CoronaVac and AstraZeneca. Three vaccines have been available so far in Chile: 1.) Pfizer-BioNTech, which arrived in December 2020, however only 20,000 doses were delivered at first; 2.) CoronaVac (Sinovac), which arrived in Chile end of January 2021 with a first charge of 1.9 million doses, followed by 2 million additional doses shortly after; and 3.) AstraZeneca, which was available by the end of April 2021 with a first supply of 160,000 doses. As by mid-May 2021, about 7.5 million people received both vaccine doses, corresponding to 49% of the target population. A total of 16.6 million doses of vaccines have been applied (13.9 million CoronaVac,

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2.6 million Pfizer-BioNTech, and 90.000 AstraZeneca). Thus it was clearly the availability of CoronaVac that made Chile's early and massive rollout of vaccinations possible. Chile maintains strong trade relationships with China and did not discard Chinese vaccines for political reasons. Due to the experience of having tested CoronaVac in Chile, there was enough confidence regarding safety and access to preliminary efficacy data. Even in the absence of approvals from the US Food and Drug Administration and the European Medicines Agency, Chile's licensing agency decided to approve CoronaVac for emergency use. Possibly, even the disregard of Chinese vaccines in North America and Europe, favored the massive and early availability of this product in Chile.

Vaccination programs in Chile have a long history, marked by successes, such as the early eradication of smallpox in 1950 and poliomyelitis in 1975. Currently, several vaccines of the national immunization program are mandatory, and the Ministry of Health (MOH) must ensure universal free access to safe and effective vaccinations for the entire population. During the past decade, the MOH has invested in new vaccines and, after the H1N1 pandemic, strengthened the network of cold chambers distributed throughout the territory and implemented a national vaccination registry [9]. While most vaccines are administered on a scheduled basis, the anti-influenza campaign is carried out annually; approximately 7 million doses are applied every autumn, through the primary health care network. This network, which was enlarged to a total of 1800 vaccination points during the COVID-19 campaign, was paramount for the effective rollout across Chile's vast territory.

How successful the massive and early rollout of COVID-19 vaccines for population health really was, remains to be evaluated. The success depends on the effectiveness of CoronaVac in preventing morbidity, mortality, and transmission. Observational data from Chile look promising and are submitted to publication on this regard [10]. Furthermore, it remains to be seen, how younger generations accept vaccination, once they are made available to all age groups. As in most other democratic countries, COVID-19 vaccination is voluntary in Chile. However, in comparison to other Western high-income economies, Chile is still in transition from a more collectivistic culture to a society in which liberal individualism prevails. Intergenerational family ties could be a strong motivator for younger people to accept COVID-19 vaccines with the purpose to protect their parents and grand-parents. In addition, Chileans are accustomed to situations of emergency and their impacts on personal life, resulting from the above mentioned political conflicts and regularly occurring natural disasters such as earthquakes and tsunamis. This cultural aspect, together with the Latin American attitude of flexibility and capacity to improvise, might have contributed to the relatively low level of public and media criticism regarding COVID-19 vaccination in comparison with other Western countries. We therefore predict that Chile's vaccination program will continue to reach relatively large parts of the population. To maintain the rollout intensity seems crucial, since the numbers of infections and hospitalizations are still high, requiring strong non-pharmaceutical interventions. The reason for the current epidemic activity are uncertain, but to our opinion the most probable reasons are that cases have concentrated among unvaccinated or partially immunized groups and because high number of fully immunized people are needed to reach early herd immunity effects, especially in populations living under socio-economically precarious situations as those found in many South American countries.

In conclusion, we believe that a variety of factors including political and economic decisions, public health infrastructure, and socio-cultural aspects are necessary to understand the success (and limitations) of the COVID-19 vaccination campaign in Chile. Certainly some of those could be of help for other emerging market countries, maybe also for industrialized regions, facing the ongoing and future challenges of the SARS-CoV-2 pandemic.

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CRediT authorship contribution statement

X. Aguilera: Conceptualization, Formal analysis, Validation, Writing - original draft, Writing - review & editing. **A.P. Mundt:** Formal analysis, Validation, Writing - original draft, Writing - review & editing. **R. Araos:** Formal analysis, Validation, Writing - original draft, Writing - review & editing. **T. Weitzel:** Conceptualization, Formal analysis, Validation, Writing - original draft, Writing - review & editing.

Declaration of competing interest

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