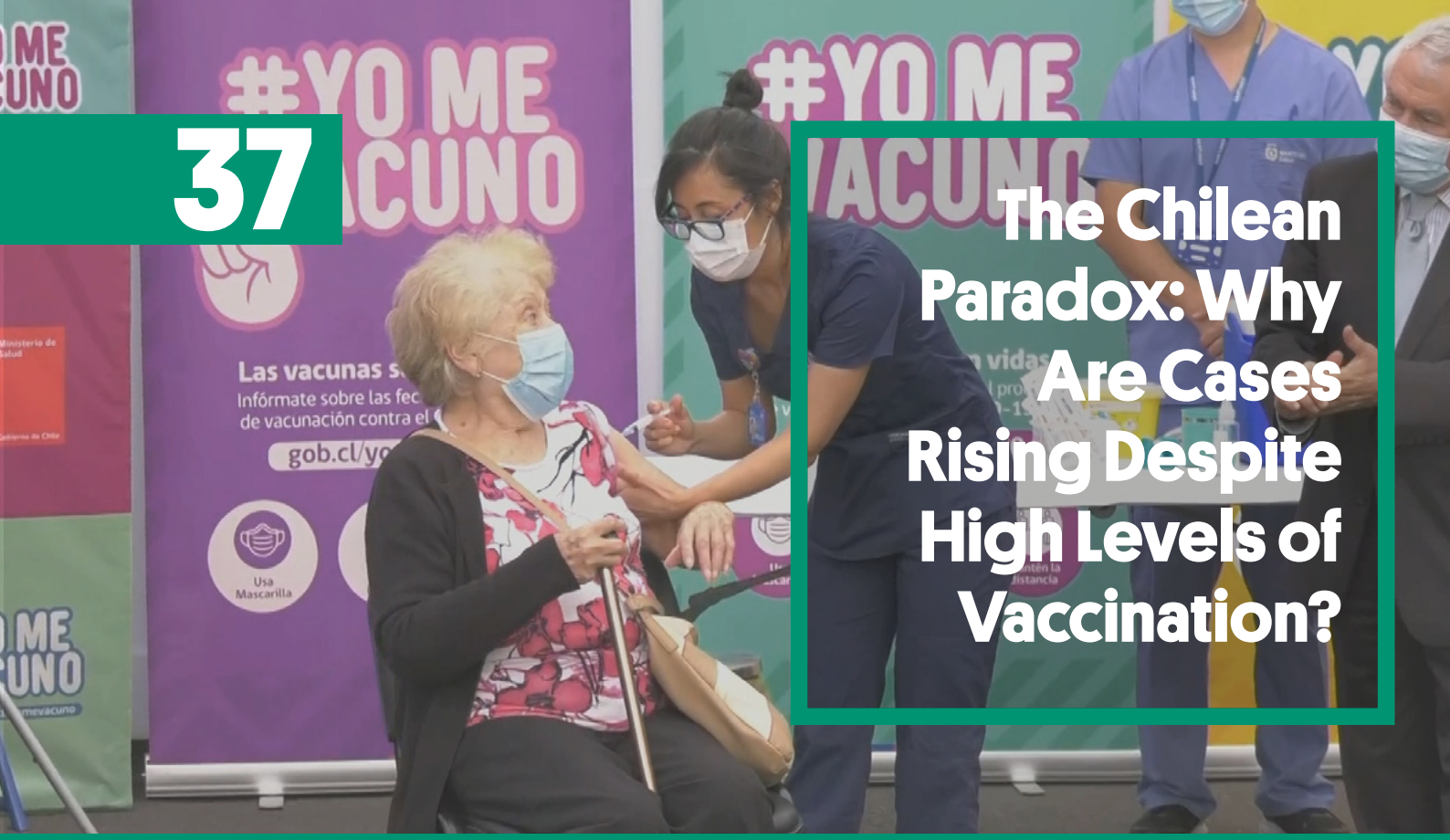


37

The Chilean Paradox: Why Are Cases Rising Despite High Levels of Vaccination?

Series | COVID-19 & response strategy

ISGlobal Barcelona Institute for Global Health

Authors: Clara Marín, with contributions from Leire Pajín Iraola, Gonzalo Fanjul, Oriana Ramírez, Jeffrey V Lazarus, Adelaida Sarukhan (ISGlobal), Báltica Cabieses (Universidad del Desarrollo), Catterina Ferreccio (Pontifical Catholic University of Chile), Paola Salas, Manuel Nájera and María Jesús Hald (Chilean Epidemiology Society)*

[This document is a one of a series of discussion notes addressing fundamental questions about the COVID-19 crisis and response strategies. These documents are based on the best scientific information available and may be updated as new information comes to light.]

9 July 2021

Photo: Mediabanco Agencia (Flickr). Vaccination in the commune of Santiago in February 2021.

Since March 2020, when the World Health Organisation (WHO) declared the COVID-19 outbreak to be a pandemic, the greatest hope for returning to normal has been the **development of highly effective vaccines** against SARS-CoV-2. In order to develop vaccines in record time, unprecedented public-private investment and capacity—with the majority being public[1] —were mobilised.

Today, with several vaccines already available, we should have reasons to start believing in the end of the global pandemic. However, despite strategies for equitable vaccine coverage, such as COVAX, the distribution of vaccines has been highly unequal, with great differences between high-income and low- and middle-income countries. Many countries in Latin America and Africa still have low vaccination rates, with one notable exception: **Chile**. With **more than half of its population fully vaccinated** by mid-2021, Chile is at the top of the list of countries with the highest immunisation rates, well ahead of Europe in terms of speed and coverage.

However, transmission of COVID-19, far from decreasing, has increased to the maximum recorded in the country, pushing intensive care units (ICUs) to the limits of their capacity with an occupancy rate of 95%[2]. The incidence rate as of

* **Clara Marín** is a medical resident in Preventive Medicine and Public Health at Barcelona's Hospital Clínic and a regular collaborator with ISGlobal's Department of Policy and Global Development. **Leire Pajín Iraola** is the Director of Global Development at ISGlobal. **Gonzalo Fanjul** is ISGlobal's Policy Director. **Oriana Ramírez** is a physician specialising in Preventive Medicine and Public Health, and Policy Analysis Coordinator and Associate Researcher at ISGlobal. **Jeffrey V Lazarus** is the head of ISGlobal's Health Systems Research Group. **Adelaida Sarukhan** is an immunologist and scientific writer at ISGlobal. **Báltica Cabieses** is a social epidemiologist at the Institute of Sciences and Innovation in Medicine, Clínica Alemana Faculty of Medicine, University for Development, regional co-lead of Lancet Migration for Latin America and a visiting scholar at the University of York. **Catterina Ferreccio** is an epidemiologist and director of the PhD programme in epidemiology at the Pontifical Catholic University of Chile. **Paola Salas**, **Manuel Nájera** and **María Jesús Hald** are members of the governing board of the Chilean Epidemiology Society.

[1] Irene Larraz. Nos preguntáis por el gráfico de la BBC que refleja que la mayor parte de la financiación de la vacuna contra la COVID-19 es pública. *Newtral.*

[2] Hospital capacity. iCOVID Chile.

13 June was 362.57 per million population, the tenth highest in the world[3]. We can safely say that Chile is experiencing the **worst moment of the pandemic**. How is this contradiction possible? ●

Figure 1. Percentage of the total population fully vaccinated as of 30 June 2021.

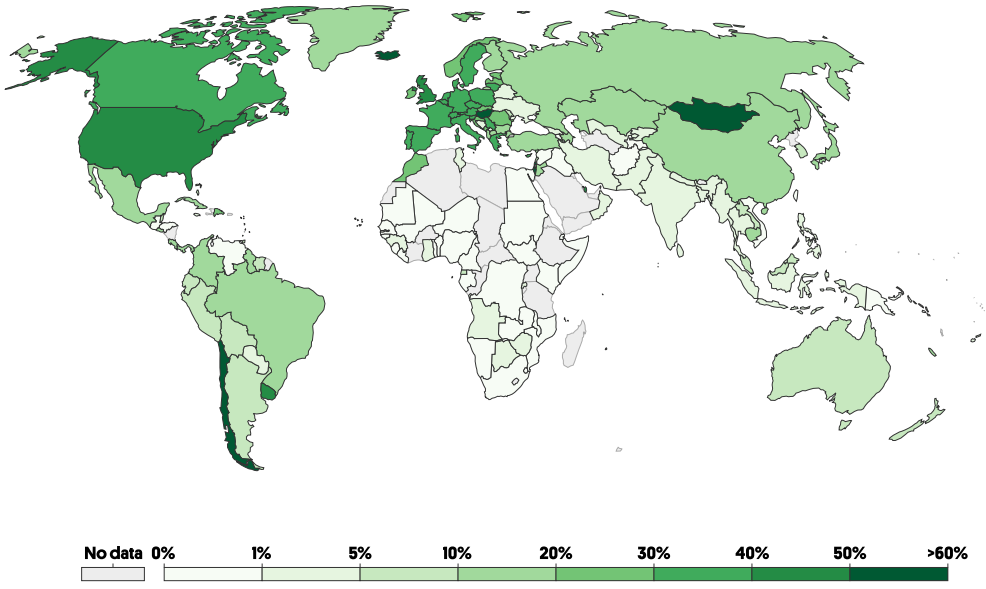
Malta: 64.8%
Bahrain: 60.1%
Israel: 57.1%
Chile: 54.6%
Mongolia: 54.1%
United Kingdom: 49.2%

Germany: 37.3%
Spain: 37.2%
France: 30.7%
Mexico: 15.2%
Colombia: 13.2%
Brazil: 12.9%
Argentina: 9%

European Union: 38.9%

Sources: *Financial Times* (Covid-19 vaccine tracker: the global race to vaccinate) and European Centre for Disease Prevention and Control (COVID Vaccine Tracker), for the European Union average figure.

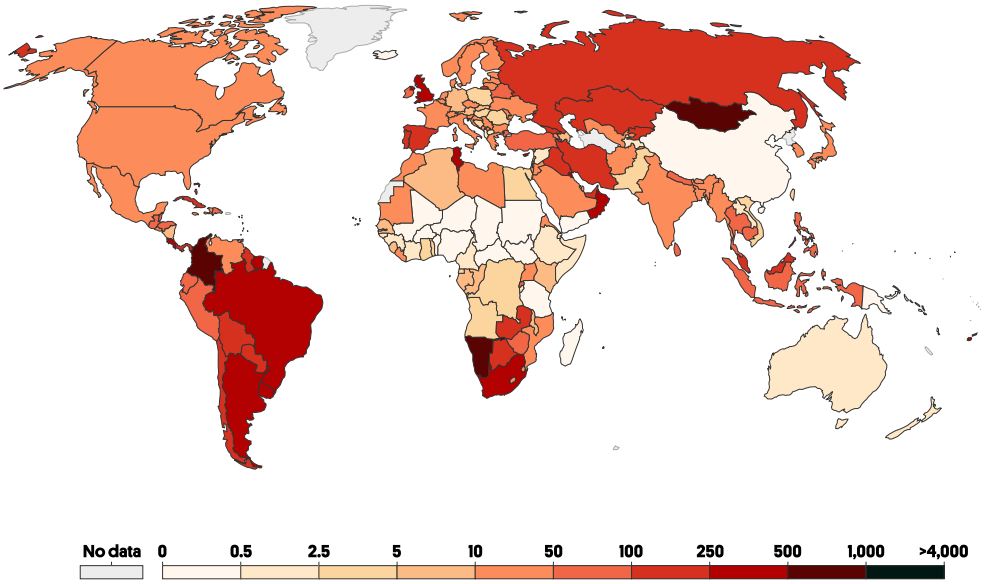
Figure 2. Share of the population fully vaccinated as of 1 July 2021.



Source: Our World in Data. Coronavirus (COVID-19) Vaccinations.

[3] Coronavirus (COVID-19) Cases. Our World in Data.

Figure 3. Daily new confirmed cases of COVID-19 per million people as of 1 July 2021.



Source: Our World in Data. COVID-19 Data Explorer.

1. What Is Happening in Chile?

"Chile was one of the first countries to begin vaccinating; more than half of its population is now fully immunised. However, weaknesses in Chile's management of the pandemic have become evident in recent months, as demonstrated by soaring case numbers across the country."

The first case of COVID-19 in Chile was confirmed on **3 March 2020**. In the following weeks, Chile reacted by implementing nationwide preventive measures: in-person classes at schools were suspended on 15 March and all borders were closed the following day. A "state of catastrophe" was declared on 18 March. Four days later, Chile became one of the first countries to impose a curfew on its citizens. Among other measures, an economic plan was approved to deal with the pandemic, a COVID-19 advisory committee to the Ministry of Health[4] was appointed by decree, and a social committee comprising representatives of the government, universities, the Chilean Medical Association, and the Pan American Health Organisation was created. On 25 March, the government announced the first lockdown orders, which to date have been issued on a commune-by-commune basis[5].

The government focused its efforts on procuring ventilators and expanding the availability of ICU beds throughout the country. Traceability was left up to the health authority and its regional representatives, not the primary health care system. Despite managing to treat all COVID-19 cases that reached hospitals, this **centralist and hospital-focused strategy** proved incapable of preventing a high mortality rate.

May was the worst month of 2020 in terms of cases and deaths, prompting the **resignation of the health minister** in June. In July, President Sebastián Piñera altered the hospital-centric strategy by delegating the test, trace and isolate (TTI) strategy to primary care and unveiling the **"Paso a Paso ("Step by Step") plan**[6], whereby non-pharmacological measures were to be determined for each commune in accordance with its particular epidemiological situation.

Chile was **praised by the international community** throughout 2020 for its management of the pandemic[7,8], and into 2021 for its vaccination strategy. In fact, Chile was one of the first countries to begin vaccinating; more than half of its population is now fully immunised. However, **weaknesses in Chile's management of the pandemic** have become evident in recent months, as demonstrated by soaring case numbers across the country. This increase began in the last few weeks of 2020 and was clearly related to the year-end festivities and the opening of shops and department stores. The numbers continued to rise as summer holiday permits were issued for travel between communes in January and February 2021. The rising caseload was briefly slowed in February by the massive outflow of people from the capital city. However, March saw the **consequences of this widespread mobility** during the summer holidays, with a large increase in the incidence rate and daily fatalities.

Since then, cases have continued to increase despite the rising vaccination rate, **causing the health system to become overwhelmed**. On 5 June, perimeter closures affecting all inhabitants of the Santiago Metropolitan Region—more than 7 million people and nearly 40% of the country's population—went into effect and all non-essential businesses were closed. Chile is experiencing a **critical moment** of the pandemic that stands in stark contrast to the success of its vaccination campaign. The factors that have brought Chile to this point are worth analysing in detail ●

[4] COVID-19 advisory committee. Chilean Ministry of Health.

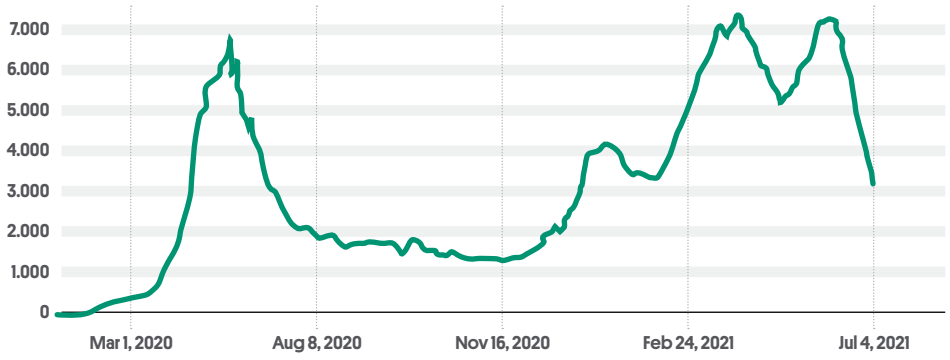
[5] Daniela Silva and Claudia Soto. Línea de tiempo: Los hitos que han marcado los 100 días del coronavirus en Chile. La Tercera. 10 June 2020.

[6] "Paso a Paso" plan. Government of Chile.

[7] John Müller. Piñera 'aplana' con el coronavirus la crisis política en Chile. *El Mundo*. 10 April 2020.

[8] Benedict Mander. Chile's coronavirus outbreak helps revive Piñera's fortunes. *Financial Times*. 22 April 2020.

Figure 4. Daily new confirmed COVID-19 cases in Chile since the start of the pandemic.



Source: Our World in Data. Chile: Coronavirus Pandemic Country Profile.

2. Chile's Vaccination Strategy

"In addition to the early arrival of a sufficient quantity of vaccines and a simple and efficient vaccination process, Chile successfully mounted an intensive communication campaign."

Chile's vaccination strategy, one of the most successful in the world, is based on three factors:

a. Diversification of vaccine sources

A decisive factor in Chile's success was early negotiation for vaccines, which began in May 2020 on three fronts: the Ministry of Health, the Ministry of Foreign Affairs and the Ministry of Science. The goal was to diversify Chile's options, without excluding any laboratory or country or entrusting the entire vaccination strategy to a single brand. In addition, Chile authorised phase III clinical trials of the AstraZeneca, Johnson & Johnson, Sinovac and CanSino vaccines to be carried out in the country. According to Health Minister Enrique París, the decision to authorise these trials allowed Chile to undertake preferential negotiations with the vaccine makers[9].

Chile therefore managed to **get ahead** of most countries in the negotiation process and have a **sufficiently diverse** range of options, so as not to be affected by production problems, lack of supply or the demands of pharmaceutical companies.

b. Role of primary care

Once the availability of vaccines was guaranteed, Chile implemented a vaccination strategy based on primary care. According to the Inter-American Development Bank, Chile has **Latin America's most efficient health system**[10]. Through a series of reforms, including the Universal Access with Explicit Guarantees (AUGE) plan[11] of 2005, Chile has in recent years fortified its primary care system as the heart of the country's health care network. Despite funding problems and the overburdening of the public health system, 98% of inhabitants have health coverage and Chile is the Latin American country with the fewest barriers to health services[12].

For its vaccination strategy, Chile simplified the process as much as possible: a **clear vaccination schedule** was established on the basis of age groups, prioritising the population at greatest risk of serious illness or death. All Chilean citizens knew in advance what day they

[9] Héctor Estepa. ¿Por qué Chile es el país que más rápido vacuna del mundo? *La voz de Asturias*. 21 March 2021.

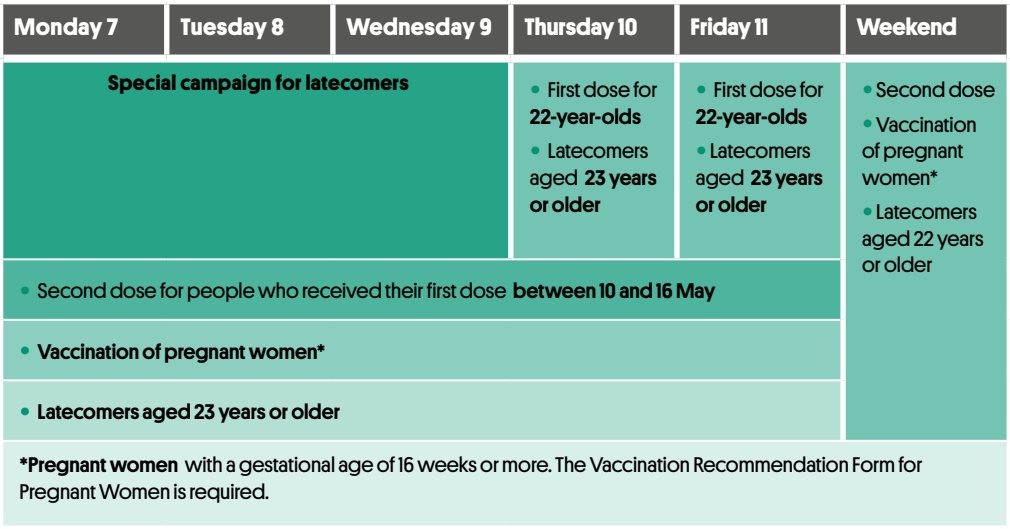
[10] Better Spending for Better Lives: How Latin America and the Caribbean Can Do More with Less. Inter-American Development Bank.

[11] AUGE. Fonasa.

[12] Aguilera X, Castillo-Laborde C, Ferrari MN-D, Delgado I, Ibañez C. Monitoring and Evaluating Progress towards Universal Health Coverage in Chile. *PLoS Med* 11(9): e1001676. 2014.

had to go to a health centre to be vaccinated. Without making an appointment, and with the option of going to any primary care centre in the country, Chileans went to the centre of their choice on the day scheduled for their age group or risk group. Thanks to an advanced information system, all centres had access to patient records that facilitated identification. However, it was not necessary to be in the system in order to be vaccinated; people needed only to provide proof of age (identification document) or an underlying condition (medication prescriptions, for example) in order to be vaccinated on the appointed date. In addition, days were assigned for the vaccination of latecomers. **The process was simple, accessible and reliable**. Since getting underway in late December 2020, Chile's vaccination campaign has maintained a steady pace without significant disruptions.

Figure 5. Vaccination schedule for the week of 7-13 June in Chile.



Source: Government of Chile. Yo me vacuno.

c. Communication strategy: the "Yo me vacuno" plan

In addition to the early arrival of a sufficient quantity of vaccines and a simple and efficient vaccination process, Chile successfully mounted an intensive communication campaign.

Chile created the "Yo me vacuno" ("I'm getting vaccinated") plan, which clearly established in advance which day each population group was to be vaccinated. Thus, the public had a **plan with clear criteria and transparent information**, which helped to **keep vaccination hesitancy to a minimum**[13].

In the early days of the pandemic, key figures from the Ministry of Health—Minister Enrique París and Undersecretary of Public Health Paula Daza—**appeared on television** in a fixed time slot every day, providing information about phase changes and any other news about COVID-19. These appearances were later scaled back to twice weekly and included complete information on the "Yo me vacuno" plan. As a result, París and Daza enjoyed broad public approval, becoming the two most highly rated members of the Chilean government[14].

[13] Pascale Bonnefoy and Ernesto Londoño. A pesar de la rápida campaña de vacunación contra la COVID-19 en Chile, los casos aumentan. *The New York Times*. 30 March 2021.

[14] Encuesta Cadem: Paula Daza es la política mejor evaluada del equipo del Presidente Piñera. *T13*. 19 April 2021.

3. What Went Wrong?

"One major problem has been the early loosening of restrictions and the high level of mobility within the country."

a) Hasty re-opening and mobility

One major problem has been the early loosening of restrictions and the high level of mobility within the country. Year-end festivities and the opening of shopping centres to large crowds set in motion an increase in cases in late 2020. During the Southern Hemisphere summer—January and February—the government issued **holiday permits** that allowed anyone whose commune was not under lockdown (phase 1) to travel to other parts of the country over the holidays. Nearly four million holiday permits were issued[15], leading to an enormous amount of mobility in the country, mainly to tourist areas. The Chilean government's intention with these permits was, firstly, to create some degree of equality, since international travel was allowed. Therefore, without the permits, people of a lower socio-economic status would not have been able to travel, whereas the more affluent would have been able to. Secondly, the government assumed that people were going to move around anyway, so the permits were a good way to keep track of people's movements. After the end of the holiday period, there was a sharp rise in cases, which precipitated the current spike and the consequent escalation of restrictions, including a return to lockdown for the entire Metropolitan Region of Santiago. More recently, however, mobility permits have been issued to fully vaccinated people, with the aim of motivating younger groups to get vaccinated.

The entire process has been worsened by an **insufficient and over-centralised traceability strategy**, which has not allowed for an effective TTI policy.

b) High inequality and "too little, too late" social support measures

As is the case throughout Latin America, Chile's high level of structural social inequality is another aggravating factor in this crisis. Despite being considered a high-income country, Chile has the highest level of income inequality in the Organisation for Economic Co-operation and Development (OECD), 65% higher than the average for high-income countries[16]. Chile has an **informal employment** rate of 26.7%[17], which, coupled with **high inequality** and a **lack of social protection**[18], means that, despite restrictions, the most vulnerable people have to go to work in order to survive, since the government has not deployed significant social assistance packages. The most widespread measure has been the **withdrawal of personal pension funds**, which are privately managed without a public counterpart, thereby reducing people's future retirement funds.

Socio-economic status is a **crucial determinant of mortality rates**[19]. The evidence shows that, in lower-income areas, testing is less common and mobility decreases to a lesser degree during lockdown periods (due to the aforementioned lack of social protection). In addition, lower-income areas have a higher **test positivity rate** and greater delays in test results, evincing the impaired capacity of health centres in these areas to cope with the pandemic. Moreover, despite the fact that nearly 77% of Chileans are registered with the public health system, just 43.88% of the country's PCR tests come from this sector. Private health care accounts for 54.42% of PCR tests[20]. The poorest communes see more deaths from COVID-19

[15] Juan Pablo Andrews. Se han entregado más de 3 millones novecientos mil permisos de vacaciones a casi dos meses de su implementación. *La Tercera*. 2 March 2021.

[16] Chile should use upturn to address low productivity and high inequality. Organisation for Economic Co-operation and Development (OCDE).

[17] Boletín estadístico: Informalidad laboral. National Statistics Institute of Chile (INE). 5 May 2021.

[18] Desiguales: Orígenes, cambios y desafíos de la brecha social en Chile. United Nations Development Programme (UNDP).

[19] Gonzalo E. Mena, Pamela P. Martinez, Ayesha S. Mahmud, Pablo A. Marquet, Caroline O. Buckee, Mauricio Santillana. Socioeconomic status determines COVID-19 incidence and related mortality in Santiago, Chile. *Science*. 28 May 2021: Vol. 372, Issue 6545.

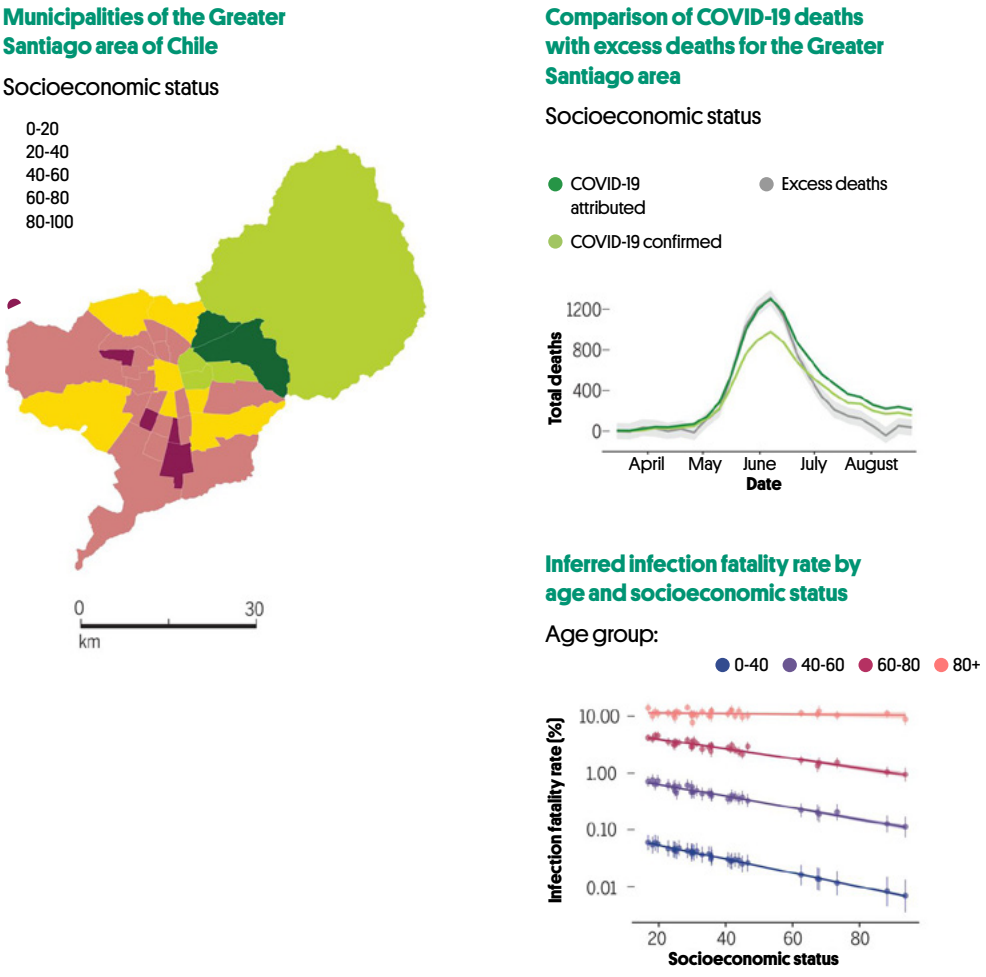
[20] Daily report. 21 June 2021. COVID-19 Action Plan. Ministry of Health. Government of Chile.

and a higher excess mortality rate than their higher-income neighbours.

Moreover, although **vaccine hesitancy** is low, those who do refuse vaccination mostly come from vulnerable groups: people registered with the public health system are less likely to be vaccinated than those affiliated with private health care[21]. Other socio-economic factors, such as educational attainment, also influence attitudes towards vaccination.

These structural problems, which are associated with social determinants of health, were not adequately addressed during the pandemic with social measures aimed at reducing their impact from the outset. As a consequence, these problems have aggravated the situation.

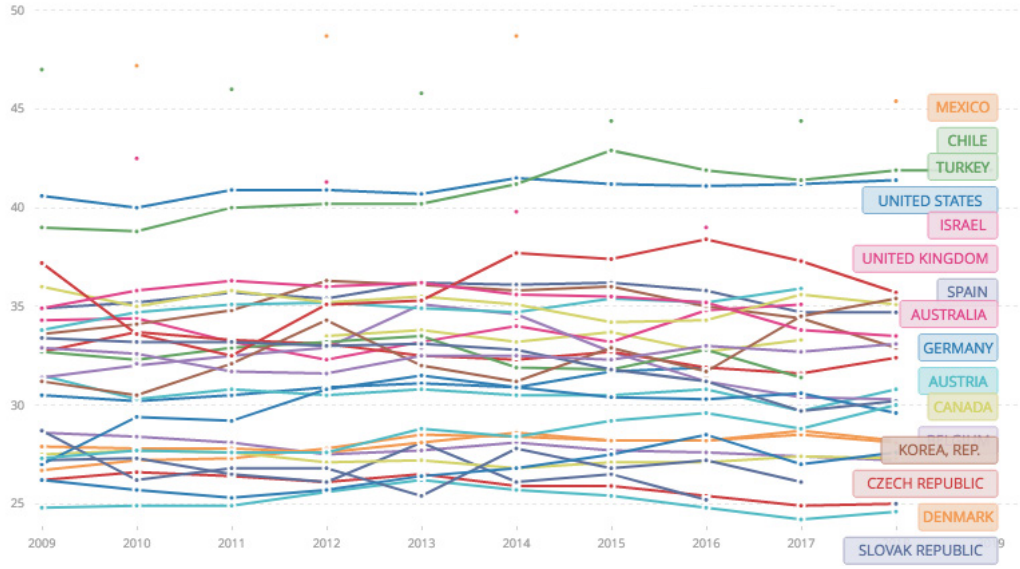
Figure 6. Effect of socio-economic inequality on COVID-19-related health outcomes.



Source: Gonzalo E. Mena, Pamela P. Martinez, Ayesha S. Mahmud, Pablo A. Marquet, Caroline O. Buckee, Mauricio Santillana. Socioeconomic status determines COVID-19 incidence and related mortality in Santiago, Chile. *Science*. 28 May 2021:Vol. 372, Issue 6545.

[21] ¿Quiénes no se están vacunando en Chile? Estudio evidencia que hombres de la Región Metropolitana afiliados a Fonasa son los más reticentes a inocularse. *La Tercera*. 5 May 2021.

Figure 7. Gini coefficient (indicator of inequality) in OECD member states. 2009-2019.



Source: World Bank. Gini coefficient.

c) Type of vaccine

Vaccination in Chile has mostly been carried out with the **Sinovac vaccine**, which is very effective (80%-90%) at preventing hospitalisation, severe disease and death but only 67% effective at preventing infection[22]. This fact is not a problem in itself, nor does it speak to the quality of the vaccine, which, according to clinical trials, is safe and effective. However, the focus on the immunisation campaign and the high rate of vaccination seem to have led to the **loosening of non-pharmacological preventive measures** and greater neglect of such measures on the part of the public, without taking into account that **this vaccine reduces contagion but does not completely stop it**. The result is greater circulation of the virus and a consequent increase in the number of cases. Since older people have the highest rates of vaccination, which protects them against the worst effects of the virus, the average age of people admitted to the ICU has fallen[23]. However, about 80% of the people occupying ICU beds are not fully vaccinated. We should also bear in mind that natural infection does not confer complete immunity, as reflected in the figures on COVID-19 re-infection, which as of 7 June accounted for 1,183 of the total cumulative cases (0.08% of all positive cases)[24].

The effectiveness of the Sinovac vaccine against the **viral variants** currently circulating globally—and also detected in Chile—has not yet been determined. For example, the Beta variant (first identified in South Africa), the Gamma variant (first identified in Brazil) and the Delta variant (first identified in India) appear to decrease the neutralising capacity of vaccine-generated antibodies. A Sinovac representative recently announced that their vaccine is three times less effective at neutralising the Delta variant in vivo, suggesting that a third dose of the vaccine will be necessary[25]. Although there is no information on the ability of the Lambda variant—declared a variant of interest (VOI)—to evade immune response, one in three cases in Chile appears to be caused by this variant[26].

d) Communication failures

Although the government's communication strategy for the vaccination campaign has been successful, its other communication efforts during the pandemic have received criticism from various sectors.

[22] OMS. Evidence Assessment: Sinovac/CoronaVac COVID-19 vaccine.

[23] Maritza Tapia. Disminuye la edad de pacientes en Unidades de Cuidados Intensivos producto de las vacunas contra el COVID-19. University of Chile. 2 June 2021.

[24] Epidemiological report #127. Ministry of Health. Government of Chile.

[25] Rocío Latorre. CoronaVac frente a delta: vocero de Sinovac afirma que "efecto neutralizante" de vacuna se reduciría tres veces ante variante. *La Tercera*. 29 June 2021.

[26] COVID-19 Weekly Epidemiological Update. Edition 44. Published 15 June 2021. WHO.

The most widely criticised aspect of the government's communication campaign has been the **lack of transparency** in the criteria that dictated non-pharmacological preventive measures in the "Paso a Paso" plan for each commune. Although phase-change criteria were established at the start of the pandemic, decision-making was ultimately centralised and there was no transparency about the reasoning behind these decisions.

Changes in the definitions of key concepts, the **inconsistency** of instructions to the public, and the **lack of explanation** of said instructions—which have undergone multiple changes—end up causing fatigue and disinterest.

Another point of criticism is the **assumption of cultural homogeneity**. Messages have not been adapted for the different populations living in Chile—in particular indigenous and migrant populations—and differences in health literacy were not taken into account in public messaging •

4. Lessons Learned From the Case of Chile

"Chile serves as a cautionary tale for other countries that are now vaccinating much of their population: it is not enough to immunise the public—at least not for the time being."

To mitigate the consequences of the rising caseload, the Chilean government has imposed **lockdowns** in the most heavily affected communes. However, there are **other factors** to take into account to reduce the impact of the situation on Chile's population and prevent future emergencies.

• **Do not rely solely on vaccination.** Despite high immunisation rates, non-pharmacological measures are crucial for functional control of the pandemic. Since it is not yet clear that herd immunity against COVID-19 can be achieved[27], vaccination rates alone should not guide decisions regarding the loosening of restrictions.

• **Stronger social safety net for vulnerable groups.** Because of Chile's economic fragility, inequality and high rate of informal employment, the most vulnerable members of society have to go to work despite the restrictions. A package of social protection measures is needed in order to prevent this.

• **Mobility strategies adapted to the epidemiological situation.** Despite the escalation of restrictions, mobility permits have been issued for vaccinated individuals. Since the most widely used vaccine, Sinovac, is less than 70% effective against infection, vaccinated individuals can still become infected, which is why the mobility permits have been strongly criticised by the Chilean Medical Association. The permit strategy has been successful in increasing the vaccination rate, but it is essential to remain vigilant and limit mobility if the incidence rate continues to rise.

• **Equitable access to vaccines**. Vaccination coverage varies in Chile by socio-economic status, creating pockets of vulnerable populations that make it difficult to control the pandemic. The causes of this phenomenon need to be investigated to guarantee equitable access to vaccines and health services, and to ensure that no one is left behind.

• **Communication strategy**. Despite undeniable achievements, such as the constant presence of the health authorities in the media and the success of the communication campaign for the "Yo me vacuno" plan, the communication strategy has been marred by significant

[27] Clara Marín, Oriana Ramírez, Carlota Dobaño, Jeffrey V Lazarus, Gemma Moncunill, Adelaida Sarukhan Will We Be Able to Achieve Herd Immunity Against COVID-19?. ISGlobal.

failures. Inconsistency and lack of transparency in messaging, a failure to explain the instructions issued to the public and a lack of cultural adaptation have generated fatigue and mistrust among the public. More transparent communications, adapted to the different realities of the country, could help to improve adherence to preventive measures and increase trust in the authorities.

• **Social participation and decentralisation of decision-making**. Chile's highly centralised management of the pandemic has prevented the situation from being addressed effectively. This centralisation has hindered regional studies of the social, economic and health-related factors of the pandemic and prevented effective social participation. Decentralisation of decision-making and a leading role for primary care in pandemic management could help to solve these problems.

The case of Chile also provides clues about how other countries should modify their vaccination and re-opening roadmaps in order to streamline these efforts and build public trust.

• **Simplify the process**. In Spain, people currently have to wait to be summoned by the public health system to be vaccinated by age group, professional group or underlying condition. Now that the most vulnerable populations (people over 60 years of age and the chronically ill) are mostly vaccinated and younger people are in the process of being vaccinated, perhaps a strategy more akin to the Chilean one—where people can go to any centre for both the first and second dose, within the period established for each age group (or at any time, if vaccination is open to all adults)—would help to speed up the process.

• **Clearer communication**. Different countries face different communication challenges. In Spain, for example, each autonomous community imposes different measures, so there is no unified message for all citizens. This challenge is compounded by the recent contradictory messaging regarding vaccination with Oxford-AstraZeneca across Europe. Building trust among citizens requires a clear, transparent and unified communication strategy that includes community involvement.

• **Do not re-open too quickly**. As we have seen, vaccination is not the only variable to consider when making decisions regarding restrictions. It is crucial to thoroughly assess the context—including the type and prevalence of viral variants circulating in the country—before loosening non-pharmacological measures, and to act quickly in the event of rising cases or hospital overload.

• **Strengthen the health system and epidemiological surveillance**. It is essential to ensure equitable access to vaccination and health services, strengthen pharmacovigilance systems to adequately monitor the effects of vaccines and disseminate results in real time, and continue epidemiological surveillance even after the epidemiological context improves. A strengthened and resilient health system with a suitable surveillance system is essential to controlling the pandemic and addressing future health threats

TO LEARN MORE

• "Yo me vacuno" plan. Government of Chile.

• "Paso a Paso" plan. Government of Chile.

• Pascale Bonnefoy and Ernesto Londoño. A pesar de la rápida campaña de vacunación contra la COVID-19 en Chile, los casos aumentan. *The New York Times*. 30 March 2021.

• Gonzalo E. Mena, Pamela P. Martinez, Ayesha S. Mahmud, Pablo A. Marquet, Caroline O. Buckee, Mauricio Santillana. Socioeconomic status determines COVID-19 incidence and related mortality in Santiago, Chile. *Science*. 28 May 2021: Vol. 372, Issue 6545.

How to cite this document:

Clara Marín. The Chilean Paradox: Why Are Cases Rising Despite High Levels of Vaccination? Barcelona Institute for Global Health (ISGlobal) Series | COVID-19 and response strategy. No. 37. July 2021.

https://www.isglobal.org/en/-/la-paradoja-chilena-por-que-aumentan-los-casos-a-pesar-de-las-altas-tasas-de-vacunacion-

ISGlobal Barcelona Institute for Global Health

A partnership of: "la Caixa" Foundation

CLÍNIC BARCELONA Hospital Universitari · UNIVERSITAT DE BARCELONA · Generalitat de Catalunya · GOBIERNO DE ESPAÑA

Parc de Salut MAR · upf. Universitat Pompeu Fabra Barcelona · Ajuntament de Barcelona