# Uruguay's Digital Strategy for COVID-19

SPECIAL EDITION COVID-19

DIGITAL HEALTH CASE STUDIES

EDITION 04

**Acknowledgments: The Inter-American Development Bank (IADB) team would like to thank everyone who participated in interviews and provided key information for this study.**

*Note*: Most of the information collected in this report reflects the current situation in January 2022.

Written by: Déborah Friedmann[1].

In collaboration with: Valentina Caredio[2].

Technical edition: Luis Tejerina and Pablo Orefice.

Design: www.souvenirme.com

Copyright © 2022 Inter-American Development Bank. This work is licensed under a Creative Commons IGO 3.0 Attribution-NonCommercial-NoDerivatives (CC-IGO BY-NC-ND 3.0 IGO) license (https://creativecommons.org/licenses/by-nc-nd/3.0/igo/legalcode) and may be reproduced with attribution to the IDB and for any non-commercial purpose. No derivative work is allowed.

Any dispute related to the use of the works of the IDB that cannot be settled amicably shall be submitted to arbitration pursuant to the UNCITRAL rules. The use of the IDB's name for any purpose other than for attribution, and the use of IDB's logo shall be subject to a separate written license agreement between the IDB and the user and is not authorized as part of this CC-IGO license.

Note that link provided above includes additional terms and conditions of the license.

The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.

[1] Uruguay, 1975. She has a degree in journalism and communication from the Universidad ORT Uruguay and a diploma in Latin American studies from the Universidad de Montevideo. She is the coordinating editor of the newspaper *El País* and teaches an advanced course on written communication at the Universidad de Montevideo.

[2] Uruguay, 1993. She has a degree in journalism and communication from the Universidad de la República. She works as an SEO analyst and journalist for the newspaper *El País* and teaches digital journalism and digital marketing at Integra Escuela.

# Uruguay's Digital Strategy for COVID-19

June, 2022.

SPECIAL EDITION COVID-19

DIGITAL HEALTH CASE STUDIES

EDITION 04

# CONTENTS

# CONTENTS

# ABBREVIATIONS

| | |
|---|---|
| **AGESIC** | Agency for e-Government and an Information and Knowledge Society |
| **ANTEL** | National Telecommunications Administration |
| **ASSE** | State Health Services Administration |
| **CUTI** | Uruguayan Chamber of Information Technology |
| **EHR** | Electronic Health Record |
| **GACH** | Honorary Scientific Advisory Group |
| **GIS** | Geographic Information System |
| **HCEN** | National Electronic Health Record |
| **ICA** | Ingenieros Consultores Asociados |
| **ICT** | Information and Communications Technology |
| **ICU** | Intensive Care Unit |
| **IDB** | Inter-American Development Bank |
| **IDE** | Spatial Data Architecture |
| **JUNASA** | National Health Board |
| **MIDES** | Ministry of Social Development |
| **MIRA** | Comprehensive Risk and Impact Monitor |
| **MSP** | Ministry of Public Health |
| **PCR** | Polymerase Chain Reaction |
| **PNC** | National Coronavirus Plan |
| **SINAE** | National Emergency System |
| **SIV** | Vaccine Information System |
| **SUMI** | Uruguayan Society of Intensive Care Medicine |
| **UNDP** | United Nations Development Programme |

# EXECUTIVE SUMMARY

**The COVID-19 pandemic reached Uruguay just after a presidential election, making an already a complex situation even more challenging.** On March 9, 2020, four days before the first cases of SARS-CoV-2 (hereafter, the coronavirus) were reported in Uruguay and only eight days after the new administration took office, the Ministry of Public Health (MSP, from the Spanish) launched the country's national contingency plan, called the National Coronavirus Plan (PNC, from the Spanish).

With a focus on citizens and transparent management of the pandemic, the contingency plan involved creating new communication channels for health care delivery and integrating laboratories and providers on a single platform.

**The multichannel strategy employed a range of tools:** the Coronavirus UY mobile app for citizen use, shared inboxes for information on suspected and confirmed COVID-19 cases to improve patient care management, a website, a chatbot, a call center, and channels on WhatsApp and Facebook Messenger. The strategy also had a robust backend[3] to integrate all stakeholders, including citizens, government, laboratories, and healthcare providers. An emotional support telephone helpline was also set up, operating 24 hours a day, seven days a week.

Trackers, monitors, and a data lake (a repository of information) were also central to the strategy, to both manage the pandemic and resources and keep the population informed. **Three dashboards were created to track cases**, bed occupancy in intensive care units (ICUs), and vaccinations.

**Approximately one year after its first recorded cases, Uruguay officially kicked off its COVID-19 vaccination campaign on March 1, 2021.** The PNC's omnichannel strategy was also used for vaccine scheduling, giving people the option to book appointments via telephone, a website, or WhatsApp.

**Despite a few setbacks at the beginning of the vaccine's rollout—such as the overload of the vaccine scheduling system—the PNC's digital response can be considered a success story because of how quickly it launched, how smoothly it worked, and how it solved specific problems that arose along the way.**

[3] Behind-the-scenes systems and processes for managing users and data.

## CASE STUDY INTERVIEWEES[4]

| Name | Title |
|---|---|
| Rosario Berterretche | Medical Coordinator of Salud.uy and Former Director of Information Systems of the State Health Services Administration (ASSE; 2014–2020) |
| Pablo Brugnoni | Technical Coordinator of Space Data Infrastructure |
| Javier Emicuri | Former General Manager of Administración Nacional de Telecomunicacones (ANTEL, 2015–2020), Former President of HG S.A., Former President of Innovación, Tecnología y Consultoría (ITC S.A.), Former President of Accesa, and Former President of ANTEL USA |
| Luis González Machado | Former Director of National Health Board (JUNASA; 2020–2021), Former Director and Advisor to the Uruguayan Chamber of Health Institutions and Companies (2011–2019), and Former Member of the JUNASA (2015–2019) |
| Nicolás Jodal | CEO of GeneXus and Coordinator of the Coronavirus UY app development team |
| Roberto Lafluf | Advisor to the President of the Republic |
| Pablo Orefice | Former Director of Salud.uy and Senior Digital Health Consultant at the Inter-American Development Bank (IDB) |
| Fernando Paganini | Coordinator of the Honorary Scientific Advisory Group (GACH) |
| Omar Paganini | Minister of Industry, Energy, and Mining |
| Hebert Paguas | General Director of the Presidency of Uruguay and Executive Director of the Agency for e-Government and an Information and Knowledge Society (AGESIC) |
| Martín Pazos | Director of the e-Government Division of the Ministry of Public Health (MSP) |
| Lorena Ponce de León | First Lady of Uruguay and Promoter of the COVID-19 emotional support helpline |
| Sergio Rico | Director of the National Emergency System (SINAE) |
| Daniel Salinas | Minister of Public Health |
| José Luis Satdjian | Deputy Secretary of the MSP |

[4] All quotes included in the case study were taken from the interviews conducted by the authors.

# 1. INTRODUCTION

# 1. INTRODUCTION

**Forty-eight hours after the first COVID-19 cases were detected in Uruguay, a meeting was held that would prove key to the response that followed.** At the meeting, private sector participants proposed creating a mobile app to support citizens in the fight against the pandemic, an idea government officials had already been discussing. Once the proposal was given the green light, developers worked around the clock to make it a reality. Just five days after the meeting, the Coronavirus UY app was released for public comment.

In time, the app would come to serve as a regional blueprint for using digital health tools to respond to a pandemic. It was part of Uruguay's larger digital strategy, which included real-time integration of data from laboratories and healthcare providers, trackers, mapping, a chatbot, and emotional support, as well as features for scheduling vaccine appointments, generating vaccine certificates, and tracking vaccination coverage.

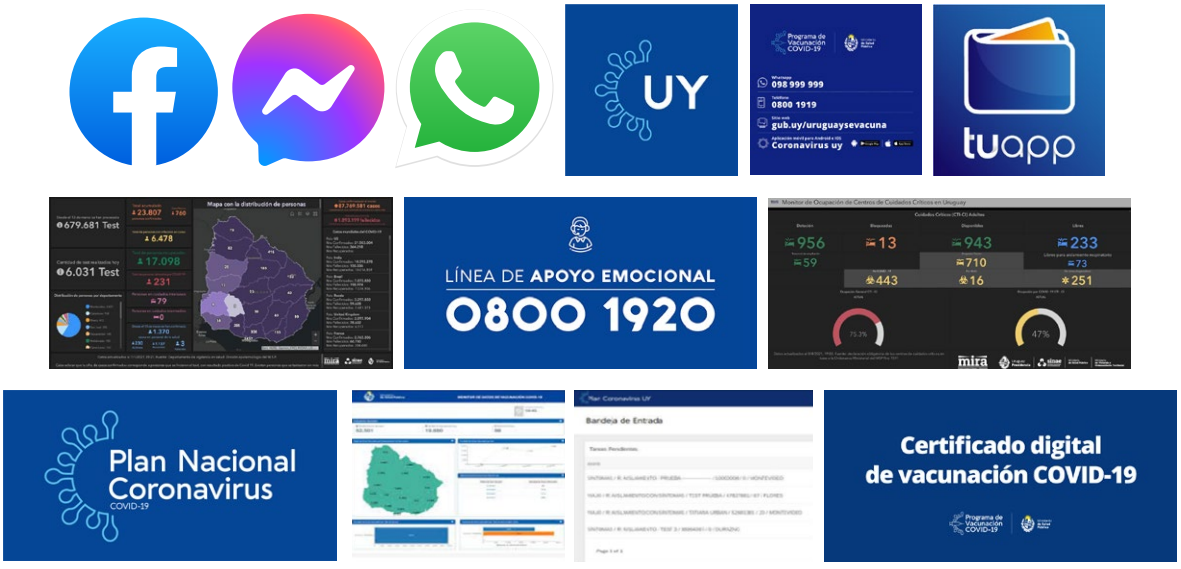
To build the app, officials were able to piggyback on previous decisions and investments made as part of Uruguay's ongoing digital transformation of the healthcare sector.

**This publication describes how Uruguay organized its digital response in the days leading up to and following the COVID-19 outbreak; how it made key decisions, including their rationale; and which factors made the response possible.**

## 1.1. Digital Transformation of Healthcare in Uruguay

In the 2000s, Uruguay began shifting toward a governance model that used technology as a catalyst for transformation and made ordinary citizens the central focus. This process was kick-started by the creation of the Agency for e-Government and

### FIGURE 1: Tools Used in Uruguay during the Health Crisis




*Source:* "Uruguay: El camino hacia la salud digital," presentation, Pablo Orefice, 2021.

an Information and Knowledge Society (AGESIC, from the Spanish) in 2005.[5] Fifteen years later, in 2020, the country ranked second in the Americas in the E-Government Development Index of the United Nations,[6] behind only the United States, and ahead of Canada. In Surfshark's 2020 Digital Quality of Life Index, Uruguay took the top spot among Latin American countries.[7]

The 2011–2015 Digital Agenda for Uruguay[8] played an important role in this process, particularly in the digital transformation of the country's healthcare system. This agenda identified information and communications technology (ICT) as holding "great potential to improve health services management." Also key was the creation in 2012 of the Salud.uy program,[9] a joint initiative of the Presidency of Uruguay, the MSP, the Ministry of Economy and Finance, and AGESIC to foster widespread use of ICT in the health sector to improve service quality and continuity of care.

**According to data from Salud.uy,[10] the vast majority of healthcare providers (81 percent) have an IT department, and at least 88 percent of professionals use a computer during patient care.**

The implementation of the National Electronic Health Record (HCEN, from the Spanish) system was another milestone. By the end of 2020, 95,298,354 clinical events had been recorded in the HCEN,[11] **representing 80 percent of healthcare activities in the country, and 95 percent of Uruguay's population had at least one clinical document on the platform.**

## 1.2. How the HCEN Contributed to the Digital Response to the Pandemic

**The HCEN played a pivotal role in Uruguay's digital strategy against COVID-19.** The country's technological infrastructure—consisting of a high-speed data network called Red Salud that connects all providers and an electronic health record (EHR[12]) system implemented by 65 percent of public institutions and 79 percent of private facilities—provided real-time information that allowed officials to react quickly.

In addition, the maturity of Uruguay's preexisting digital ecosystem sped up processes of making decisions and creating tools like the Coronavirus UY mobile app. All key actors agree that without the HCEN and proprietary EHR systems previously developed by providers, implementing Uruguay's digital strategy against COVID-19 would have been much more complex and sluggish.

**Finally, the national health record system and its data made it possible to provide citizens with transparent information via visualization tools and public reports, fulfilling one of the PNC's main objectives.**

> ***"We were building on a digital infrastructure that was already set up, but not all countries have an HCEN. There are a lot of things that have to be done that we already had ready to go. Uruguay is one of the most digitally advanced countries in the world, and the pandemic has allowed us to move up the ranks even more."***
> Nicolás Jodal, CEO of GeneXus.

[5] https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/institucional/creacion-evolucion-historica

[6] https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/comunicacion/noticias/uruguay-avanza-12-puestos-indice-mundial-gobierno-digital

[7] https://marcapaisuruguay.gub.uy/uruguay-es-1o-en-latinoamerica-en-indice-de-calidad-de-vida-digital

[8] https://www.gub.uy/uruguay-digital/sites/uruguay-digital/files/documentos/publicaciones/Agenda%2520Digital%25202011-2015.pdf

[9] Salud.uy is run by AGESIC.

[10] Information provided by Salud.uy for this case study.

[11] Data collected by Salud.uy for this publication.

[12] Salud.uy, "Informe Medición TIC Salud 2018."

# 2. THE NATIONAL CORONAVIRUS PLAN

# 2. THE NATIONAL CORONAVIRUS PLAN

## 2.1. Origins of the Plan

**The COVID-19 pandemic arrived in Uruguay just after the administration change on March 1, 2020, which exacerbated an already complex situation. From day one of his administration, President Luis Lacalle Pou declared his commitment to transparent government and information.**

Minister of Public Health Daniel Salinas wasted no time in convening public and private providers, unions, and universities and the Pasteur Institute to define and set in motion a strategy to fight the coronavirus. For its part, Salud.uy had been working since February 2020 to prepare its digital response to the virus's imminent arrival in the country.

**On March 9, 2020, four days before the first cases of coronavirus were reported in Uruguay, the MSP announced the launch of the National Contingency Plan for Infection with the Novel Coronavirus (SARS-CoV-2)**,[13] commonly referred to as the National Coronavirus Plan (PNC). The PNC aimed to establish a national response framework for suspected or confirmed cases of COVID-19, promote inter-institutional coordination, ensure reliable and timely information, and regulate the actions and procedures to be taken at each stage.

With limited information and widespread uncertainty about the virus' morbidity and mortality rates and how it spread, the MSP sprang into action, conducting risk assessments and convening other agencies.

The PNC had established three levels of response, depending on the severity of the health situation—the alert and preparedness level, the imminent risk of spread level, and the national multisectoral coordinated response level. It also outlined the actions to be taken at each level.[14]

### 2.1.1 Institutions' Role in the Strategy

**The coordination and joint work of various actors was essential to the strategy's success.** Of particular value were the contributions of the National Emergency System (SINAE, from the Spanish), the permanent body tasked with coordinating public institutions for integrated disaster risk management.

Under the government's digital response strategy for the pandemic, the MSP was in charge of coordinating with the SINAE to centralize and monitor information. Some of the data was to be shared with the public—citizens came to depend on the daily pandemic status report, for example—while other data was kept confidential and used to help officials make decisions.

During the health emergency, the SINAE worked together and coordinated with other government agencies, particularly the National Directorate of Land Use Planning, the Ministry of Defense, the Ministry of the Interior, the Ministry of Social Development, the MSP, the State Health Services Administration (ASSE, from the Spanish), the Departmental Emergency Coordination Center, and the Departmental Emergency Committees. The SINAE also worked with the private sector—receiving donations from the Uruguayan Chamber of Information Technology (CUTI, from the Spanish) through the company Ingenieros Consultores Asociados (ICA, from the Spanish)—and with civil society through the Project Management Institute.

[13] https://www.gub.uy/ministerio-salud-publica/coronavirus

[14] Actions related to surveillance, lab testing, clinical management, infection control, point-of-entry surveillance, risk communication, and management.

[15] See Appendix I.

**While some actors had experience collaborating on past projects, the national health crisis prompted an unprecedented level of synergy and unity.** Teams worked tirelessly, 24 hours a day, seven days a week, even on holidays and weekends. During the process, it was clear to all participants that the MSP was in charge of setting the directions and guidelines, while AGESIC took the lead on the project's IT aspects. Having a single agency—with a long track record with the private sector—handle all e-government issues streamlined the processes.

Meanwhile, Salud.uy's role as liaison, facilitator, and coordinator between these two actors was also instrumental in the digital strategy's success, which required developing and implementing various components and tools in a very short time span. **Another major player was the National Telecommunications Administration (ANTEL, from the Spanish), often through companies in which it holds a 100 percent stake.**[16]

> ***"The project was a remarkable effort between the public and private sectors. There was an incredible level of synergy and unity. It didn't matter whether it was nighttime, the weekend, or even a national holiday. Everyone worked together to make the digital strategy available as soon as possible for the greater good of society, and the value and commitment of each individual came to the fore. We all did our little part to provide a powerful response to this emergency situation".*** Pablo Orefice, former director of Salud.uy and senior digital health consultant at the IDB.

> ***"The pandemic strengthened the SINAE as an institution. It cemented many relationships that might have been somewhat weak before and are now very solid."*** Sergio Ricco, director of the SINAE.

### 2.1.2. The Role of the GACH in Uruguay's Digital Response

**On April 16, 2020, one month and three days into the health emergency, the Honorary Scientific Advisory Group (GACH, from the Spanish)** was created to analyze the pandemic, study COVID-19's impact on Uruguay, and recommend ways to keep the virus in check in the country. The multidisciplinary team of more than 50 science experts was led by Dr. Rafael Radi, with Fernando Paganini in charge of data and Dr. Henry Cohen in charge of health.[17] Each week the group met with government officials, including President Lacalle Pou on occasion.[18]

To prepare its scientific recommendations, the GACH relied on a network of pro bono experts from different fields and scientific institutions in Uruguay. Experts, academics, and officials from the MSP and AGESIC were invited to join a data subgroup of the GACH. This subgroup fielded requests from the rest of the GACH. It focused on ways to improve the information provided to the country's health monitoring program and coordinated with the MSP to obtain this data, which was subsequently used in a number of analyses.

When the GACH began its work, there was already some progress on digital transformation, but an integrated computer system was still a long way off. Similarly, some of the data in the country's health monitoring system was updated automatically, but other data had to be entered manually. This state of affairs improved as new tools addressed in the PNC framework were added. The GACH also recommended ways to make the system better.

[16] ANTEL holds several state-owned companies that operate under private law.

[17] Radi is a biochemist and president of the National Academy of Sciences of Uruguay, Paganini is a mathematician who additionally holds a master's degree and PhD in electrical engineering, and Cohen is a Master of the World Gastroenterology Organisation.

[18] The GACH gave scientific advice on health and data science matters to the Transición UY government task force, whose members included Hugo Odizzio (engineer), Gonzalo Baroni (economist), Aparicio Ponce de León (B.A.), Roberto Lafluf, and Isaac Alfie (economist), who served as group coordinator. The task force evaluated all GACH reports and recommendations and then submitted them to the Uruguayan president for final decision-making. See https://www.gub.uy/presidencia/politicas-y-gestion/mision-del-grupo-asesor-cientifico-honorario-gach

Specific GACH contributions under the PNC included assessing the privacy of the Coronavirus UY mobile app, providing guidance on calculating the Harvard metric,[19] developing a vaccine effectiveness study, and providing advice on processing backlogged cases in the app.

On June 16, 2021, with the country's vaccination drive well underway, the GACH decided together with the presidency to dissolve the advisory group, slightly over one year after it was launched.[20] Although the group was no longer active, the experts remained available for any future queries or needs.

> ***"We would request information to make forecasts for the government. At first, we were seen as this group that was always just asking for information, but we were soon able to start giving recommendations on how make improvements. The relationship ended up being more of a back-and-forth and interactive collaboration."*** Fernando Paganini, coordinator of the GACH.

### 2.1.3. Tools Created to Address the Health Emergency

**During the pandemic, Uruguay developed a digital strategy** (see Figure 2) that entailed creating new communication channels for care. The aim of these channels was to reach more people with high-quality information, avoid congestion in healthcare facilities, and keep phone lines open for the people who needed them most.

To this end, **a virtual assistant was built in March 2020 to share information on the virus and its spread in the country**. The virtual assistant also offered recommendations and a questionnaire designed by the MSP for people with potential symptoms. In addition, a standard data entry form was created to centralize epidemiological information from all public and private healthcare channels. Finally, the Coronavirus UY app[21] was developed to keep citizens informed, provide access to the MSP symptoms questionnaire, and guide users in their interactions with the healthcare services.

**To assist the most vulnerable households,** the Ministry of Social Development in April 2020 launched the mobile app tuapp,[22] which included an e-wallet feature that the government used to give citizens cash transfers for groceries. This app[23] was used early in the pandemic to support people who did not receive other government benefits during the country's voluntary confinement period.[24]

**The digital health strategy thus yielded benefits for users, providers, and the government.** Users enjoyed a multichannel experience, care with fewer bottlenecks, and symptom monitoring. **Providers received care communications** through a single, streamlined inbox, and they were provided with new telemedicine options that made it easier to ensure access to care for patients with suspected and confirmed cases and reduced the risk of workplace infection. Lastly, the government benefited from having a unified analysis of the supply, allocation, and availability of resources in real time; centralized decision-making; and interoperability. All of these benefits are summarized in Figure 3.

According to AGESIC's 2020 annual report,[25] Uruguay's digital response to the coronavirus allowed its healthcare system to provide proper care to patients with clinically suspected cases and organize patient loads using prioritization criteria, which optimized the services received by the public.

[19] A tool that uses four different colors to communicate the incidence of COVID-19 per 100,000 people based on the seven-day rolling average of cases: fewer than one daily new case per 100,000 is green; 1 to 9 is yellow; 10 to 24 is orange; and 25 and above puts an area in the red zone.

[20] On July 8, 2021, the national government held an event at the Sodre auditorium to publicly recognize the group's contribution. The three coordinators gave a speech to conclude their work. See https://www.gub.uy/presidencia/comunicacion/publicaciones/discursos-cierre-cargo-coordinadores-del-gach

[21] See https://play.google.com/store/apps/details?id=uy.gub.salud.plancovid19uy&hl=es_UY&gl=US for Android devices and https://apps.apple.com/us/app/coronavirus-uy/id1503026854 for iOS devices.

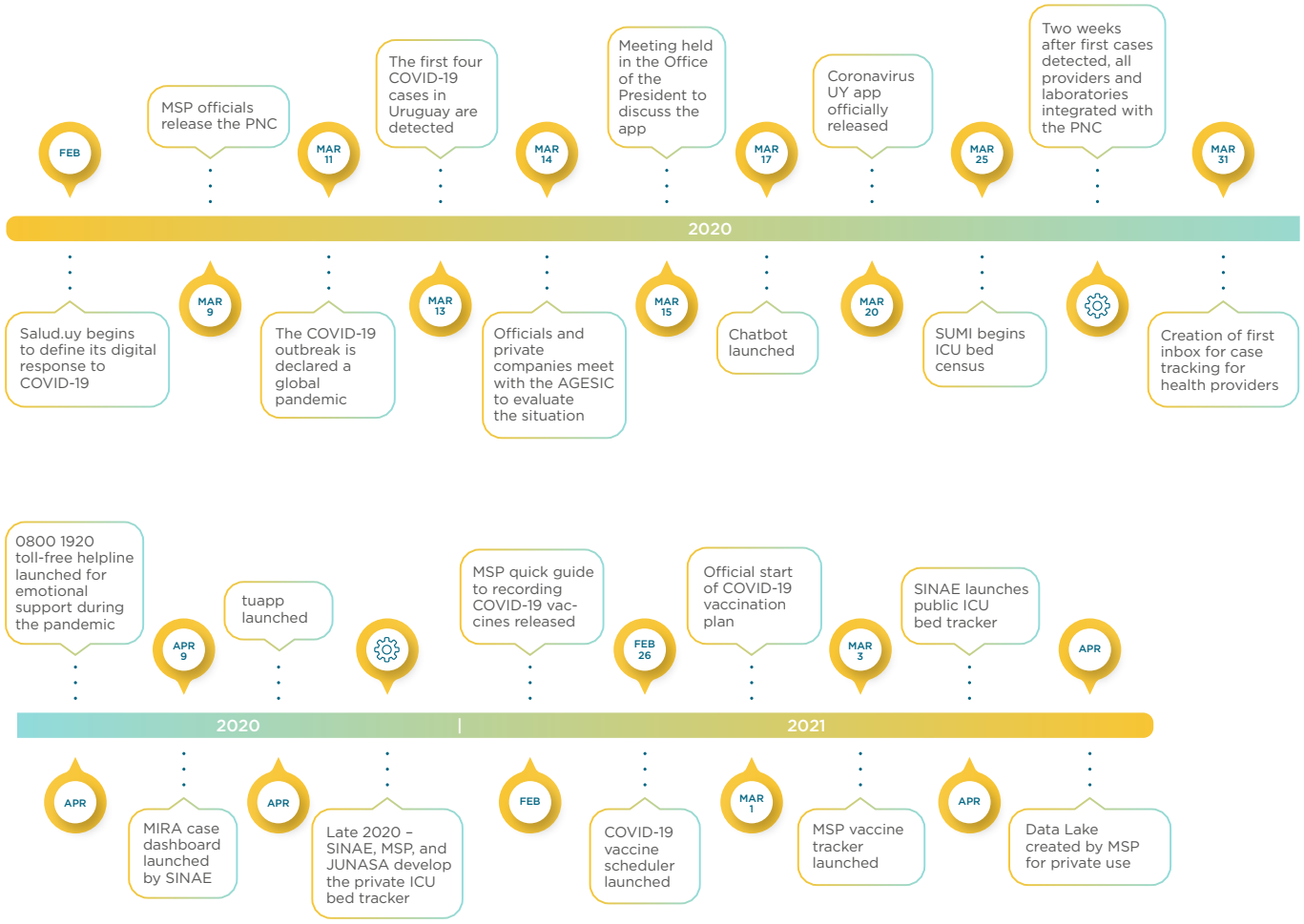
[22] https://www.tuapp.com.uy/ (Link functional only in Uruguay).

[23] Between April 2020 and January 2021, approximately 2,000,000 food baskets—including baskets distributed through tuapp—were delivered, benefiting 340,000 people.

[24] Unlike other countries, Uruguay never had a mandatory lockdown. Instead, the government called on citizens to exercise "responsible freedom." President Lacalle Pou referred to this concept at the UN General Assembly in September 2021: https://ladiaria.com.uy/politica/articulo/2021/9/lacalle-pou-en-la-onu-la-libertad-responsable-como-centro-y-una-critica-sobre-el-acceso-a-las-vacunas/

[25] Yearly report 2020-Salud.uy-AGESIC.

## FIGURE 2:
## Tools Created during Uruguay's Health Crisis




*Source:* Authors on the basis of interviews and document reviewed for the study.

## FIGURE 3:
## Benefits of the PCN's Digital Strategy

**For users**

- Multichannel experience
- Prompt care without bottlenecks
- Symptom monitoring
- Telemedicine

**For health care providers**

- Single inbox for patient care
- Centralized analysis of resources in real time
- Drive-through testing
- Telemedicine (greater protection and productivity for healthcarehealth care workers)

**For the government**

- Centralized decision-making
- Health risk management module
- Interoperability with existing systems

*Source:* "Uruguay: El camino hacia la salud digital," presentation, Pablo Orefice, 2021.

## 2.2. The PNC's Citizen-Centered Strategy

**At the heart of the strategy's design was a single objective: to put citizens first.** The government resolved to share updates on COVID-19 developments in the country with the public,[26] but the principle would be taken much further and woven into all elements of the digital strategy. It was the reason behind, for example, the government's decision to return PCR (polymerase chain reaction) test results to users as quickly as possible, determine who had symptoms in order to get them tested, and provide information to minimize the risk of infection. Local authorities also received information on outbreaks and intensive care unit (ICU) bed occupancy rates so they could take action to protect citizens.

**The government's position was that widely available information would help people respond favorably to measures intended to stop the spread of COVID-19, such as social distancing, masks, handwashing, and vaccination.**

> ***"We knew bad news was coming and thought it best for people to have information as soon as we ourselves did, as that really helps keep rumors and doubts at bay. We thought that if we handled the outbreak with transparency, people would respond in a level-headed way. If we handled it with fear, we were going to see distrust, doubts, and conflict."*** Omar Paganini, Minister of Industry, Energy, and Mining.

> ***"We decided to share the information we had because it was key for the preventive measures. We opted to share everything as soon as possible: day-to-day information, test scheduling, test results (...) and the same with vaccines."*** Daniel Salinas, minister of public health.

## 2.3. Integrating Laboratories and Providers into the PNC

**In order to have accurate and timely data each day to keep the population well informed, it was necessary to work fast to bring together private laboratories and providers on the same platform.**

In the pandemic's first two weeks, the MSP was able to centralize the information it received in spreadsheets from 43 comprehensive providers and 6 laboratories. During the same period, a technological solution was developed for sending test results.

While the preexisting HCEN infrastructure proved helpful when developing this solution, those in charge of e-government struggled to figure out how to connect private laboratories to the MSP. They finally settled on a direct connection using virtual private networks.

The MSP and Salud.uy worked to design and develop an interoperable solution for storing both general information from COVID-19 tests and positive results. The aim of this solution was to provide the health leadership body with up-to-the-minute information on the pandemic's progression.

After determining that healthcare providers would continue using the same HCEN platform, while private laboratories would be given a connection to the MSP, there were several next steps. Standards had to be defined, interoperability and automation were improved, and guidelines[27,28] and training were provided to ensure digital information was sent in a timely manner. Upon receiving this data, the MSP processed it and sent it to the SINAE to be drafted into the daily status report on COVID-19 in Uruguay.

[26] The Uruguayan president mentioned this intention on several occasions. For example, in a press conference on July 21, 2020, President Lacalle Pou said, "The government feels it is important to keep citizens informed about the current situation. Throughout this pandemic, we have been completely transparent, both when the news was good and when it wasn't. We take this approach because information and communication are key to alleviating anxiety."

[27] An example of technical guidelines, in this case for COVID-19 lab reports, can be found at https://centrodeconocimiento.agesic.gub.uy/documents/207224/0/Gu%C3%ADa+t%C3%A9cnica+-+Informe+de+laboratorio+COVID+v4.0.0_20210317.pdf/8579fba1-76eb-80d2-bde8-11e77d55d236

[28] See Appendix II.

## 2.4. The Strategy's Omnichannel Approach

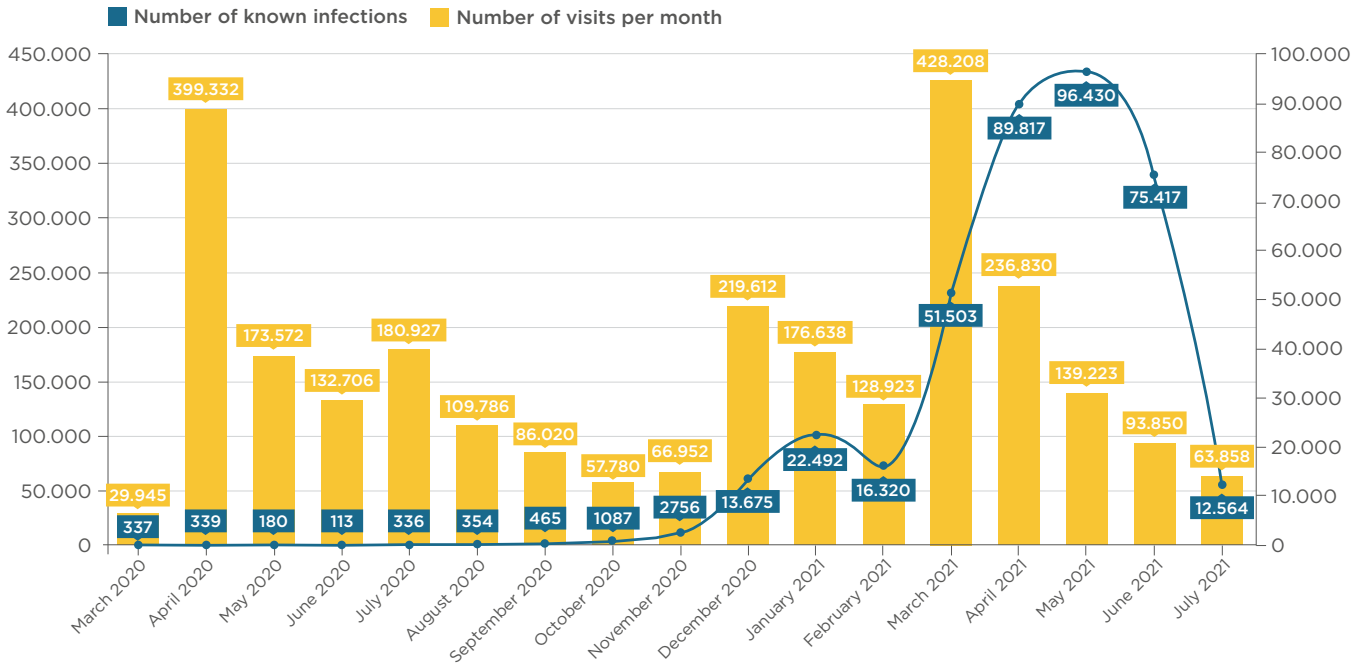
**The PNC's digital strategy hinges on a wide range of channels that all share the same database.** This omnichannel[29] approach was developed to deliver important information to different population groups without overburdening in-person services and phone lines.

**The multichannel strategy employed a range of tools:** a mobile app, a website, a chatbot, a call center, and channels on WhatsApp and Facebook Messenger, with a robust backend to integrate all stakeholders, including citizens, government, laboratories, and healthcare providers.[30]

Between March 1, 2020—**just days before the first cases were confirmed in Uruguay—and July 31, 2021, the PNC website[31] (managed by the MSP) received 2,700,000 visits**, as shown in Figure 4. The average length of visits was one minute and twenty-five seconds.[32]

> ***"On Friday, March 13, we were discussing how to deal with the pandemic. I told Roberto Lafluf, advisor to the president, that for this disease we needed to give daily reports and have the data to create them. However, the MSP wasn't equipped to collect the information in real time (...) so, a software tool was jointly developed to generate daily reports on lab test results".*** José Luis Satdjian, deputy secretary of the MSP.

### FIGURE 4: Visits to the PNC Website versus COVID-19 Cases, by Month




*Source:* Authors. On the basis of data from PNC and the Coronavirus Uy app.

[29] Omnichannel systems are designed to offer multiple connected service channels to ensure a seamless user experience.

[30] IDB, *COVID-19: Coronavirus UY-Digital solutions*, https://socialdigital.iadb.org/es/sph/covid-19/soluciones-digitales/6303

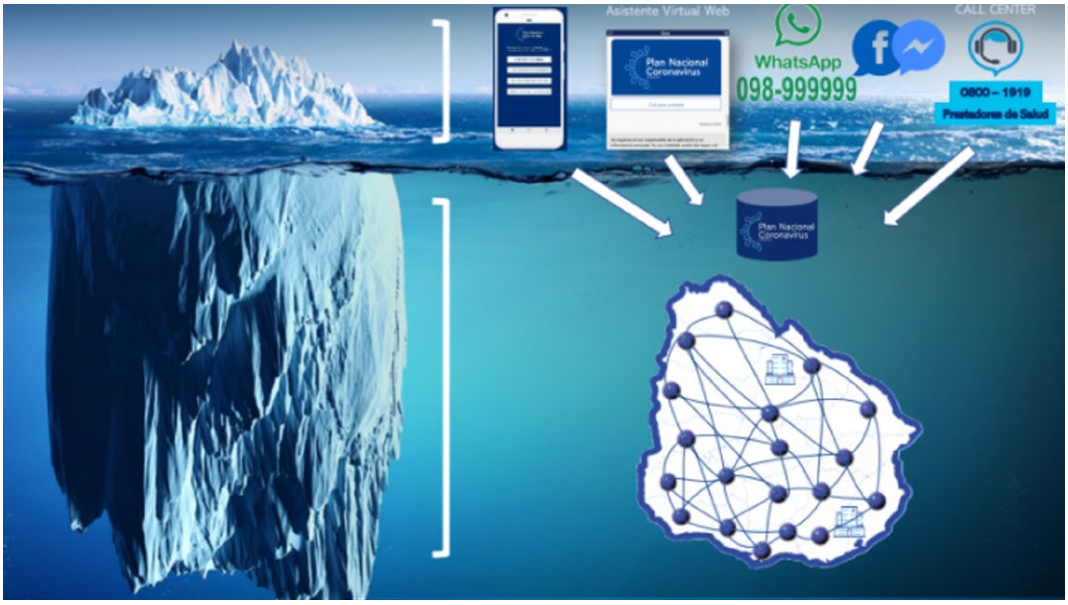
[31] https://www.gub.uy/ministerio-salud-publica/coronavirus

[32] AGESIC and MSP, *Agenda Uruguay se Vacuna*.

As shown in Figure 5, **this strategy was created to centralize requests for care and information through a multichannel system**, but also to ensure continuous monitoring without overloading any one channel. For example, it helped avoid overcrowding at health centers and kept phone lines from collapsing.

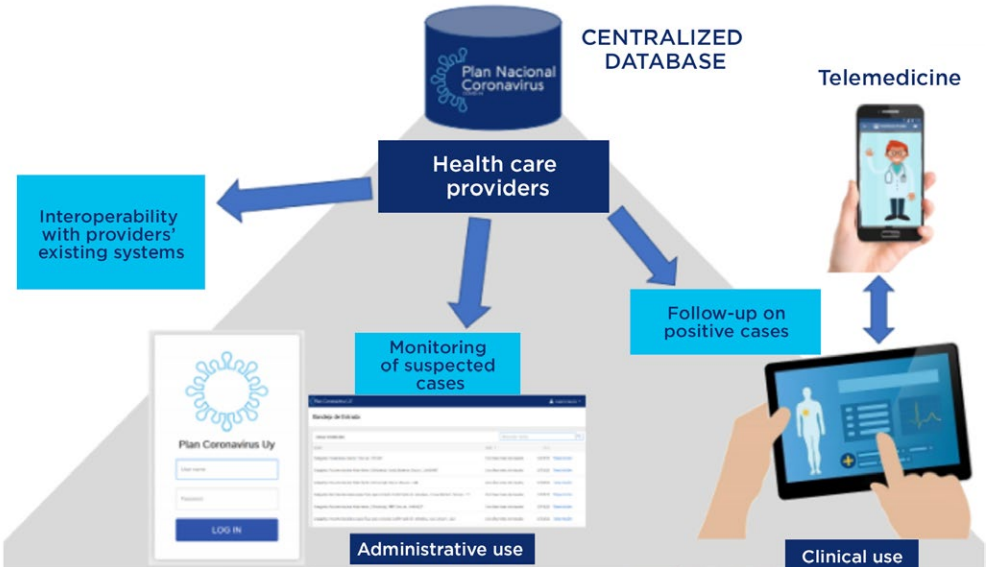
**The main benefits of the PNC's omnichannel approach** (see Figure 6) are the ability to track positive cases and monitor possibly infected persons, as well as provide telemedicine and ensure interoperability among providers, laboratories, and the MSP.

## FIGURE 5: Omnichannel Strategy




*Source:* "Uruguay: El camino hacia la salud digital," presentation, Pablo Orefice, 2021.

## FIGURE 6: The PNC's Omnichannel Strategy




*Source:* "Uruguay: El camino hacia la salud digital," presentation, Pablo Orefice, 2021.

***"We started with the premise of no standalone applications. Everything had to be connected, and all channels had to be easily accessed by the public. There was to be no siloing, no special rules for this or that thing. It had to be the same across the board".*** Pablo Orefice, former director of Salud.uy and senior digital health specialist at the IDB.

## 2.5. Creation of the Coronavirus UY app

### 2.5.1 Origins and Inspiration

Even before the pandemic reached Uruguay, Salud.uy and the private sector saw the appeal of **having an app to provide an additional channel for combatting misinformation and connecting users with healthcare providers without saturating their communication channels.**

The concept of Coronavirus UY was unique because government envisioned the app not as an isolated tool but as part of a larger strategy to integrate information from providers, laboratories, and users. Specifically, the government saw it as an all-encompassing process that would leverage the health sector's digital resources to help authorities identify epidemiological situations and trends, provide rapid treatment, and ensure clinical follow-up.

At the same time, private sector leaders were studying the success of South Korea's[33] approach and evaluating their own options. **Since early March 2020, they had been convinced that a mobile app was the digital answer that Uruguay needed.**

When the first coronavirus cases were detected in the country on March 13, 2020, the public and private spheres converged naturally around the issue of COVID-19. This synergy was aided by previous good rapport, similar levels of maturity, and, above all, a shared sense of responsibility.

The next day, a meeting was held at AGESIC's offices to evaluate the situation. It was attended by public sector officials from AGESIC, the MSP, and the Office of the President as well as Nicolás Jodal, CEO of GeneXus and a private sector leader. At the meeting, **representatives of the Office of the President decided to make the app a top priority, with the primary goal of preventing the collapse of the healthcare system.** In other words, they decided to develop a tool to provide a digital response to those who suspected they had the coronavirus, instructing them to fill out a questionnaire and then providing a guide on the next steps to follow. On the morning of March 15, AGESIC convened a meeting in the president's office to continue discussing the issue.

### 2.5.2 The App's Team and Development

The private sector representatives decided to show up at the next day's meeting—attended by officials from AGESIC, Salud.uy, ASSE, the SINAE, ANTEL, the MSP, and the Office of the President, as well as Jodal—with something different from a typical project proposal. They worked all night on a prototype of the app itself to give a rough idea of how it would work and what users would be able to do on it.

**The government approved the proposal and made clear that it wanted the private sector to participate in the entire digital strategy, which involved much more than just the app.** Next would come the biggest challenge: getting a first version up and running as swiftly as possible.

The government provided guidelines—for example, what questions about symptoms to include and the logic flow to use based on participant answers—whereas the private sector was responsible for developing the app, although public officials also provided input.

From the beginning, the private sector leaders wanted to participate on a pro bono basis. The team's (public and private) overriding focus was on rapidly delivering a product to help address the pandemic, and receiving payment for their work would have required them to go through the standard public procurement processes, slowing them down. Indeed, more professionals were willing to work on the project than were needed. In hindsight, it is clear that the decentralized nature of the

[33] The Self-Quarantine Safety Protection app developed in South Korea had one clear objective: to prevent the collapse of hospitals and stop the unmitigated spread of COVID-19. Once users enter their data in the app, doctors remotely evaluate their symptoms and make a diagnosis. See https://gacetamedica.com/profesion/coronavirus-la-app-con-la-que-corea-del-sur-esta-consiguiendo-frenar-la-curva/#:~:text=Conocida%20como%20'self%2Dquarantine%20safety,dan%20un%20diagn%C3%B3stico%20en%20remoto.

work and high levels of motivation helped clinch the effort's success, but these arose organically. It was an extraordinary response to an extraordinary situation.

The team had a small core of about 10 people, and they were joined by companies according to the needs of the moment, such as testing or data quality assessment. In total, 15 companies and 150 specialists worked on the project, though not all at the same time.

To develop the app with maximum speed, several teams worked simultaneously on the same feature—for example, video calls—and the design of whichever team finished first was used in the final product. Many believe this unique and innovative methodology could be replicated in other initiatives.

**Uruguay's ecosystem is one in which companies know and compete with each other but also mutually support each other to export software. Several of the companies had previous experience working for the state, and they are all connected as CUTI members. These factors made the process rather intuitive.**

> ***"The government defined the guidelines and requirements—how things needed to be. The private sector focused on developing solutions and had seat at the table alongside all other actors. And that's how we moved forward. In one week, 10 days, the first version of the app was ready."*** Pablo Orefice, former director of Salud.uy and senior digital health consultant at the IDB.

> ***"We brought on people as we needed them. If we had to test the app, we called a company and offered them the chance to participate pro bono. They always said yes. And so on and so forth. We often had to turn people down—many people wanted to collaborate, but we needed to keep the team small."*** Nicolás Jodal, CEO of GeneXus.

> ***"It's not like in other sectors of the economy where competitors just don't get along. Here, there's good synergy when needed."*** Omar Paganini, minister of industry, energy, and mining.

### 2.5.3 Structure and Updates over Time

**On March 20, one week after Uruguay's first COVID-19 cases, the government and private companies unveiled the app to the public.**[34,35] They announced that Coronavirus UY was already available for Android and would be available for iOS in a matter of hours, connecting citizens with possible COVID-19 symptoms[36] to their healthcare providers. The app's purpose was clear-cut: to reduce wait times for consultations and care, using a system that guaranteed users' privacy.

**In the app's first version, users could obtain general information and self-report three things:** having traveled to a "high risk" country, having symptoms, or having had close contact with someone who tested positive. This data was then sent to their healthcare provider,[37] who subsequently contacted and monitored the user, instead of having the patient take the initiative to contact them.

That same day (march 20th), Jodal announced the app's second version, which people who tested positive for the coronavirus could use to receive care. This feature was added to help keep the health system from imploding, a situation that never came to pass. In the second version, users entered information on their health status, such as their temperature. The second version of the app also included a telemedicine tool, allowing physicians from a patient's provider network to communicate with the user via video call to more easily provide care. Data that the patients entered could be shared between all members of the National Integrated Health System and the MSP.

[34] https://www.gub.uy/presidencia/comunicacion/fotos/gobierno-presento-aplicacion-digital-facilita-consultas-usuarios-coronavirus

[35] The app was presented at a press conference by Daniel Salinas, minister of public health; Álvaro Delgado, secretary to the presidency; Nicolás Jodal, CEO of GeneXus; Hugo Odizzio, executive director of the AGESIC at the time and current president of the Social Security Bank; and Rodrigo Ferrés, deputy secretary to the presidency.

[36] Total reports of any symptom through the app as of November 2021: 397,133.

[37] Uruguay has a National Integrated Health System, which allows citizens to be seen by the provider of their choice.

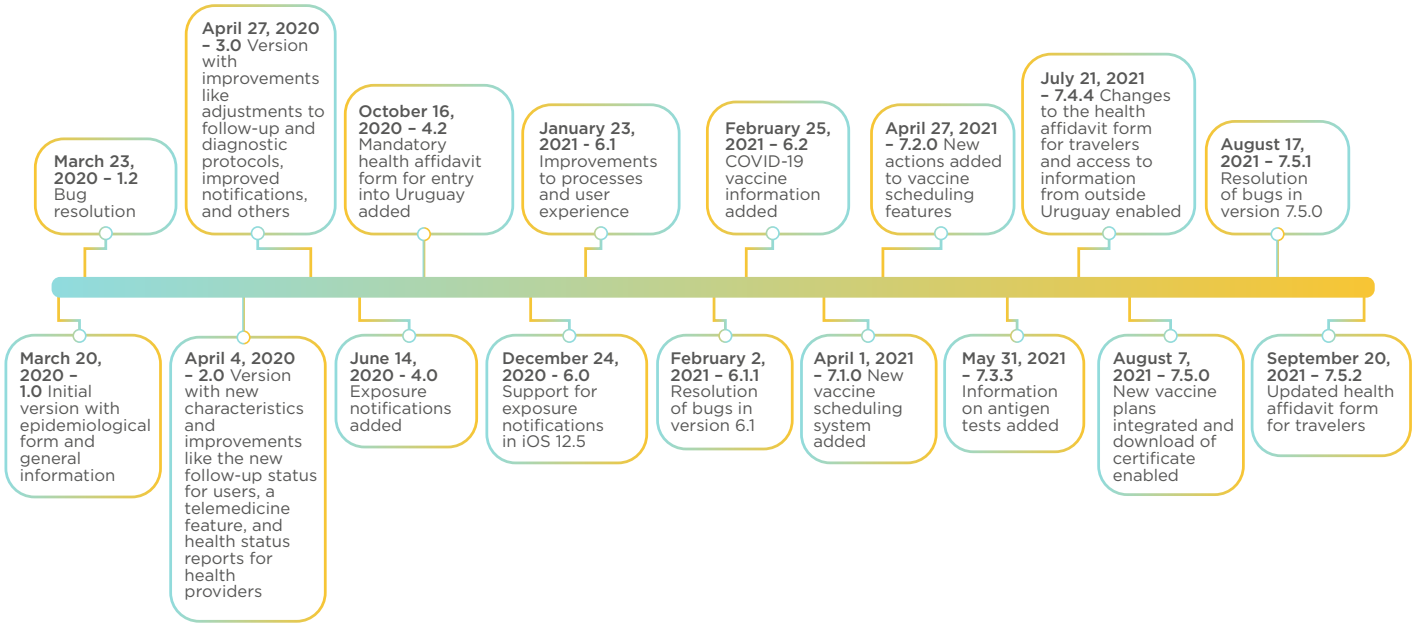
**In the app's early days, when there were just 300 active cases in the country,[38] approximately 10,000 people were being monitored by the system.** By the time cases reached their peak,[39] 300,000 people were using the app. Twice a day, the app asked patients about their symptoms, which were subsequently reviewed by their personal healthcare provider. If necessary, patients would later be contacted by video call.

**New features, such as user manuals, were also quickly added and announced to the public through a variety of channels.[40]** Figure 7 shows the timeline of updates to the app, which approximately 1.4 million people had downloaded by November 2021.

Another key milestone came when the team explored adding exposure notifications to the app. As of September 15, 2021, these notifications had been activated by 1,403,856 users.[41,42] However, the government staunchly opposed any digital mechanisms that could entail state surveillance of citizens, a tricky issue to navigate from a technological point of view. The solution arrived when Google and Apple collaborated to develop exposure notifications that did not use the GPS and preserved users' anonymity.

The two tech giants were impressed that **Coronavirus UY had already been downloaded more than 800,000 times**—a significantly higher rate per capita than in other countries—so they contacted the Uruguayan government in June 2020 to inform

## FIGURE 7: Coronavirus UY Updates




*Source:* Released iOS versions. Always (except for a few specific cases) an Android version was released at the same time. In the first versions it may be that the version numbers of iOS and Android do not coincide, although the functionalities they have do coincide.
*Note:* These are release dates for the iOS version. With few exceptions, Android versions were always released in tandem. In early versions of the app, the iOS and Android version numbers did not always match, although the features were the same.

[38] On April 1, 2020, Uruguay had 303 active cases nationwide.

[39] On May 29, 2021, Uruguay reached its highest number of active cases: 37,675.

[40] See the user manual at https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/comunicacion/publicaciones/app-coronavirus-manual-usuario-nueva-funcionalidad

[41] Data provided by Salud.uy for this publication.

[42] Turning on notifications indicates the use of the feature.

them of their plans to test their new technology in four countries, one of which was Uruguay, making it the first in Latin America and the Caribbean and third in the world to introduce the new system. **The CEOs of both companies wrote letters to President Lacalle Pou commending Uruguay for its innovative pandemic response strategies and thanking him for his willingness to participate in the project.**[43,44]

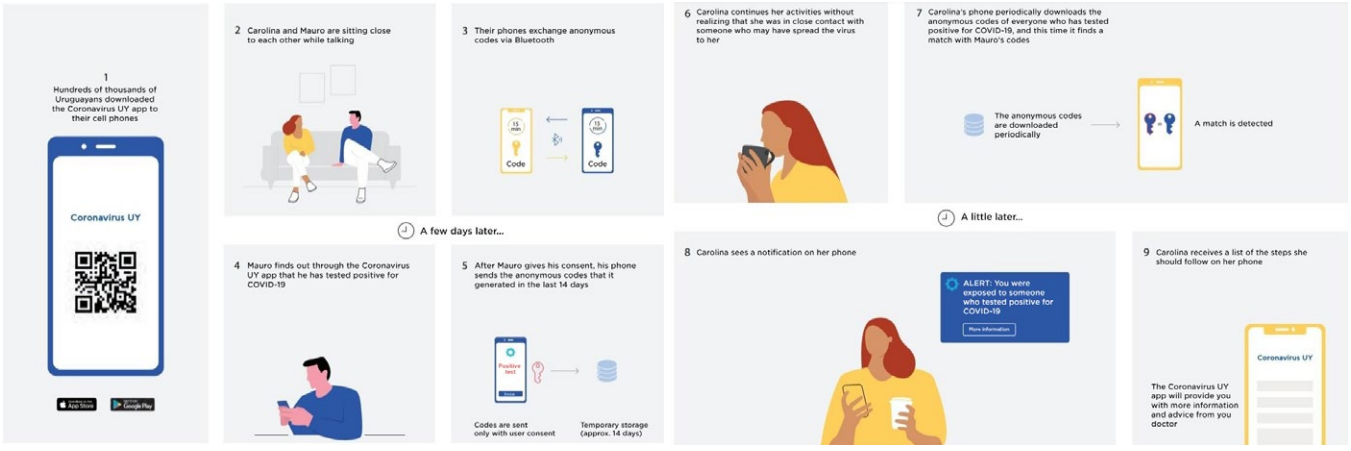
The anonymous tracking feature was included in the fourth version of the Coronavirus UY app, released in June 2020, to inform users of any potential exposure to the virus. To opt-in, users had to give their explicit consent in the app to be notified if they had been in contact—within two meters for 15 minutes or more—with someone who has tested positive for COVID-19.

Once a user enables exposure notifications in the app, the user's cell phone emits Bluetooth Low Energy signals,[45] which are then picked up by other enabled devices in close range, as shown in Figure 9. These signals contain randomly generated codes unique to each device (for example, 3d394444d3-1e88-4e27-b3aa-2386f39a0c77-c39e7442), which change every 10–20 minutes and cannot be used to identify a person's name or location.

**Of course, the system only works if those who test positive for COVID-19 report their positive status and opt-in to the notification system.** Once they have done so, their cell phone shares the random key containing this information with all cell phones that have the setting turned on. Each cell phone then checks all the random keys associated with positive COVID-19 cases against its own list of close contacts. If there is a match, the user receives a notification of a possible exposure. Each step of the process is anonymous, and all information collected is protected under the provisions of Law No. 18.331 on Personal Data Protection and the app's privacy policy.[47]

**Building public awareness about this feature proved a challenge.** To get the word out, the team reached out to tech leaders—even partnering with the Universidad de la República on a case study on information security and data protection—and influential public figures to explain the system in depth and make clear that people would not be tracked.

## FIGURE 8:
## How Coronavirus UY Exposure Notifications Work




*Source:* Coronavirus UY app user guide.

[43] Letter from Google CEO Sundar Pichai to President Lacalle Pou, https://www.uruguayxxi.gub.uy/uploads/estatico/Carta%20Google.pdf

[44] Letter from Apple CEO Tim Cook to President Lacalle Pou, https://www.uruguayxxi.gub.uy/uploads/estatico/Carta%20Apple.pdf

[45] https://socialdigital.iadb.org/en/sph/resources/research-publications/8058

[46] https://www.impo.com.uy/bases/leyes/18331-2008

[47] UNAOID, *Recommendations for the Processing of Personal Data During the National Health Emergency*, https://www.gub.uy/unidad-reguladora-control-datos-personales/comunicacion/publicaciones/recomendaciones-para-tratamiento-datos-personales-ante-situacion

The app saw another key breakthrough with the release of its sixth version in December 2020. The update came with a new feature providing anyone (except health workers) who received an exposure notification with a digital prescription valid for seven days for a free COVID-19 test at any authorized laboratory. The diagnostic process was also improved in this version, with text messages notifying users when their test results were ready and explaining how to view them. The positivity rates of tests prompted by exposure notifications were similar to those observed in traditional contact tracing, which officials took as a sign that the system was working as intended.

Just two months later, the app would also play a central role in the country's vaccination strategy. Through the app, users could visit the MSP website to book their COVID-19 vaccine appointment, receive appointment reminders, and access their digital vaccination certificate.[48] In March 2021, a vaccine tracker was added to the country's daily coronavirus data, which had been published since March 2020.

As of September 15, 2021, the app had been downloaded 2,534,660 times (2,357,839 downloads in Uruguay and 176,821 in other countries[49]), with 1,200,000 users opting to turn exposure notifications on. The app's information section drew the highest number of daily visitors: each day, 800,000 people checked these updates, which included case and vaccination trackers.

### 2.5.4 Future Applications

**The app familiarized many Uruguayans with using these types of tools, and similar products and developments already being applied in other areas as a result.** For example, the design and architecture of the technology used to handle the high search volumes experienced during times of overwhelming demand for vaccine appointments could be used to deal with similar problems the state faces.

The app's success also positioned Uruguay as a country at the forefront of digital health. Several countries followed Uruguay's experience with the app with interest, and officials fielded numerous questions about how it had developed specific aspects. One possible path for the app is for it to be migrated to an MSP platform for communication between the MSP and health professionals and users.

> ***"Uruguay's response to the pandemic got the attention of the tech world, with several tech companies singling out Uruguay as an example of excellence. When we added the vaccination part, we used technology from Amazon, and the company was well aware of who we were. They knew exactly what we were doing and wanted to know what we were going to use their technology for."*** Nicolás Jodal, CEO of GeneXus.

> ***"The experience was very good for Uruguay's reputation. We hope to continue developing the relationship in the future and hope Google's infrastructure investment will be followed by others. But you have to take these things one step at a time. This was an opportunity that turned out well."*** Omar Paganini, Minister of Industry, Energy, and Mining.

[48] See Appendix IV.

[49] Some users may have downloaded the app on more than one device or may have downloaded, deleted, and then downloaded it a second time. AGESIC estimates that by November 2021, it had been downloaded by approximately 2,000,000 people.

## 2.6. Creating Shared Provider Inboxes for Handling Cases

**A unique component of the PNC was the creation of shared inboxes for handling cases,** as shown in Figures 9 and 10. With this tool, whenever a person registers symptoms (through any means), a case is automatically created for them and assigned to their usual healthcare provider. The provider follows up on the case according to the established workflow, for example, by scheduling a teleconsultation to evaluate the reported symptoms, decide whether the patient should be tested for COVID-19, and give any necessary recommendations. If the test result is negative, the workflow is closed; if positive, it continues with future evaluations and monitoring of the patient while the patient self-isolates.

**While healthcare providers that have not implemented COVID-19 workflows and triage protocols in their systems can still use the inboxes as a tool, providers who did modify their systems to include these protocols can take advantage of interoperability to report status changes.**

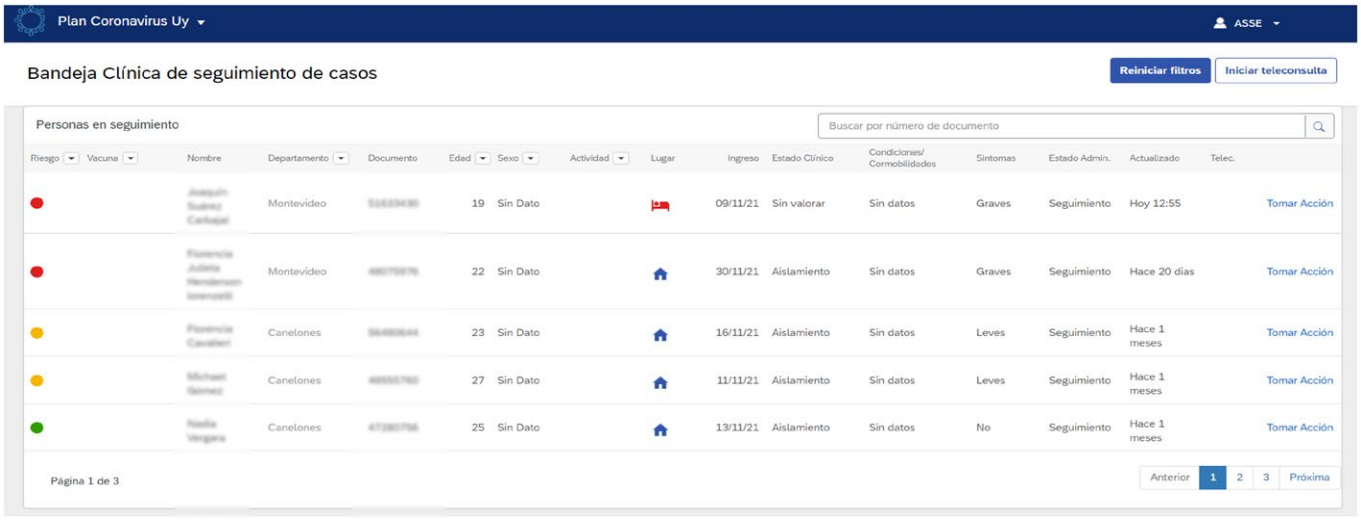
The inboxes[50] were designed, implemented, and optimized by the Salud.uy technical team together with its IT service and infrastructure providers. The first version of the clinical inbox was developed in partnership with the IT area of ASSE and the MSP's epidemiology division.

The digital strategy's omnichannel nature made it possible to have all information in one place and create clinical inboxes for handling cases, letting providers see at a glance which users had tested positive—all of whom were listed in a single document[51] —and which were possible cases. Providers could then follow up as needed. The clinical inboxes also made it easy to see which users had asked to be contacted because of their symptoms or recent exposures.

One function of the inboxes is to provide doctors and the MSP with access to users' existing coronavirus-related information so they can act rapidly to minimize wait times for consultations and care.

The inboxes were also created to facilitate case management at the administrative and clinical levels in order to keep the healthcare system from becoming overwhelmed. After the first version (for

### FIGURE 9: A Shared Inbox for Handling COVID-19 Cases

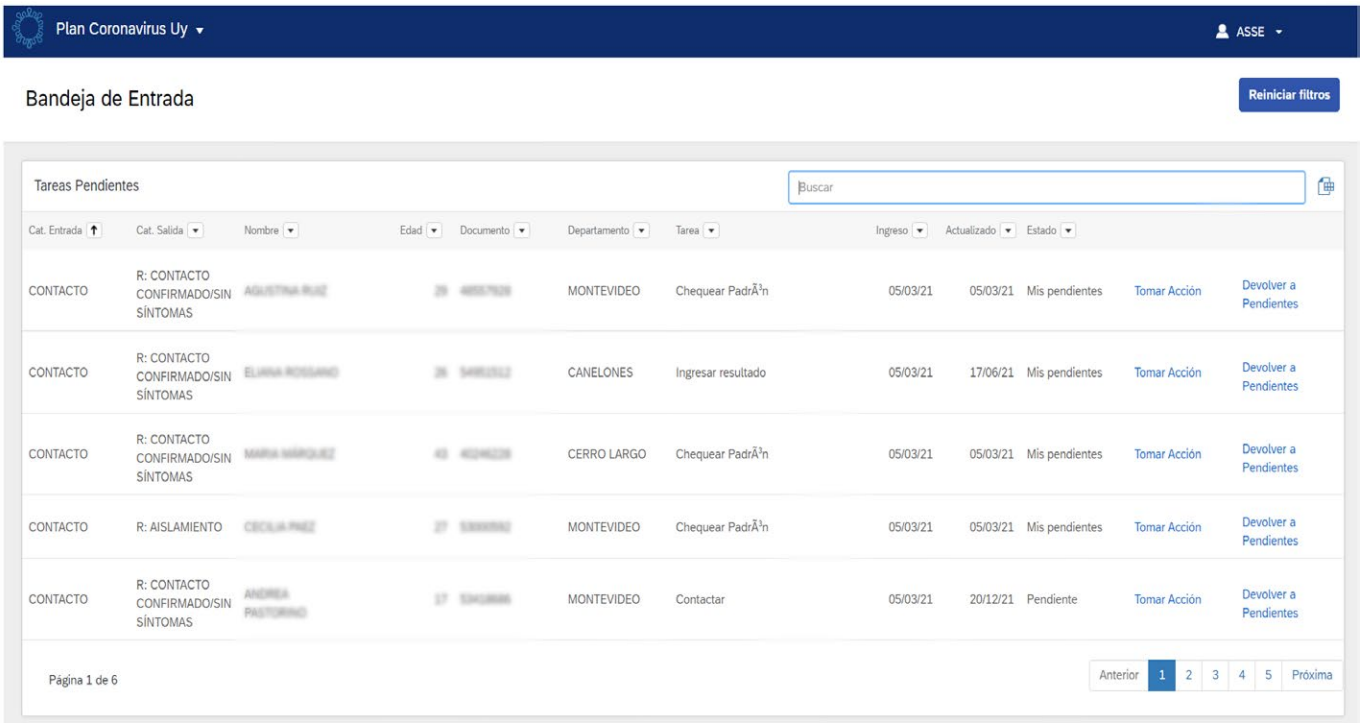



*Source:* Salud.uy
*Note*: This sample image of the clinical case management inbox does not contain real names or ID numbers.

[50] Both the clinical and regular inboxes for managing possible COVID-19 cases

[51] All PNC channels feature the same epidemiological questionnaire to establish a user's basic health status and perform a preliminary risk assessment.

## FIGURE 10:
## A Regular Inbox




*Source:* Salud.uy
*Note*: This sample image does not contain real names or ID numbers.

case management by providers) was launched in March 2020, the system was developed further to include an inbox for coordinating PCR and antigen test samples, with functionality that allowed providers to leave comments. Dedicated inboxes were also created for lab results and vaccine information.

By mid-2021, the system had undergone 20 iterations since its initial release, and more than 60 coordination and training sessions for healthcare personnel had been held.[52] Early versions of the app tended to focus on basic functionalities—such as administrative management for the regular inbox and clinical management for the clinical inbox—while later versions introduced features that better addressed provider needs and improved performance.

**Achieving interoperability was rather straightforward for providers, as they had already been required to develop EHR systems to be compatible with the HCEN.** They were thus able to start using the inboxes quickly, thanks to technological solutions that allowed structured documents to be uploaded to the inboxes through a notification system.

> ***"My experience was from the provider's side, and, honestly, we had everything we needed. We just had to tweak a few things, but we were able to make those adjustments very quickly. We could input information and make it immediately available to the ministry. But without the HCEN, I think it would have been extremely complex."*** Rosario Berterretche, medical coordinator of Salud.uy and former director of information systems at ASSE (2014–2020).

[52] Pablo Orefice, "Uruguay: El camino hacia la salud digital," 2021.

### 3.6.1. Future Applications

**This system developed for managing COVID-19 cases could help both providers and the MSP handle other diseases.** While the tool is useful for monitoring, it also enables institutions to collaborate and exchange disease-specific information for rapid decision-making.

> ***"It may have to be retooled, but I think it managed to integrate information from many different sources, which I feel is extremely important for tracking certain diseases."*** Rosario Berterretche, medical coordinator of Salud.uy and former director of information systems at ASSE (2014–2020).

> ***"The inboxes fulfilled their role of delivering, grouping, managing, and processing pandemic-related health information for healthcare providers and the MSP. They also made clear that the entire sector needs to move toward health surveillance, epidemiological surveillance, and meeting health targets. They showed how important it is for healthcare providers to be able to monitor changes in the health status of those under their care. That's where I think the future of the inboxes is headed."*** Pablo Orefice, former director of Salud.uy and senior digital health consultant at the IDB.

## 2.7. Using a Bot to Provide Additional Communication Channels: WhatsApp, Facebook, and the Website

**On March 17, 2020, four days after the country's first known COVID-19 case was reported, the MSP announced the launch of a chatbot (derived from "chat robot") designed to answer Uruguayans' coronavirus-related questions.**

Accessed through the websites of the MSP, the SINAE, and healthcare providers, the tool gave users information on the disease and its spread in Uruguay, containment measures and recommendations, and an MSP epidemiological questionnaire created for people with possible symptoms. The chatbot was part of the PNC's digital strategy, and it was developed quickly to alleviate high volumes of calls from people requesting information at a time when public uptake of the Coronavirus UY app was hard to predict.

The companies ANTEL, Accesa, and Isbel soon developed—in partnership with the MSP and Salud.uy—a solution to also integrate the chatbot into WhatsApp and Facebook Messenger (the two most-used messaging platforms in Uruguay),[53] making it even more convenient to communicate with people. The integration required applying to Facebook, the owner of WhatsApp, to quickly set up a phone number for disseminating information to mass audiences.

The channel would also prove essential for surmounting the major challenge posed by vaccine scheduling (see section 5.2). This time, however, the tool would rely on IBM's Watson technology, which can handle user questions framed in much more conversational language.

**The chatbot was a tremendous success. As of September 2021, it had 5,200,000 interactions, with use peaking during the vaccine rollout period.** When the channel only provided access to COVID-19 information, it received 2,500 to 10,000 queries per month. However, in March 2021, when the mass vaccination program began, the number increased to 1,800,000, with 36 percent of vaccine bookings made through the bot.

[53] See Appendix IV.

## 2.8. Emotional Support during COVID-19

### 2.8.1. The Idea's Origins – Support Team and Design

On March 14, 2020, First Lady Lorena Ponce de León met with several close associates to discuss the foreseeable mental health effects of the country's voluntary lockdown, which, they agreed, would need to be addressed to support those most affected.

After the meeting, this group contacted several leading psychologists, who began to build a network of volunteers to support those in need. In parallel, Vice President Beatriz Argimón started a project to set up an emotional support helpline.

The two women decided to join forces to expand access to mental health care. Together with the MSP, ASSE, Salud.uy, and Hey Now Bots of the Isbel group (which had also worked on the WhatsApp and SMS campaigns organized by the MSP), they designed the toll-free support line 0800 1920. This helpline went live in April 2020 and is still active as of the publication of this report. It is aimed at people who need emotional support to deal with stress, anxiety, or depression due to coronavirus-related social distancing and self-isolation.[54]

The line operates 24 hours a day, 7 days a week; has nationwide coverage; is free to use; is confidential; and is staffed by 150 volunteer psychologists and five psychologists hired to ensure care between the hours of 12 a.m. to 8 a.m. The professionals use an app to answer calls. In the project's first phase, consultations were conducted over the phone, but video consultations were added in later phases.

**The most common reasons for calling were** symptoms of depression, anxiety, loneliness, and feeling isolated, with a caller breakdown of 73 percent women and 23 percent men. Two months after the support line's launch, ASSE reported that 8,100 calls had been received, an average of 14 per hour nationwide. As of June 2021, 270 psychologists had provided a total of 29,400 consultations through the helpline, which ASSE has announced it will continue to operate.[55]



[54] Doctari, a telemedicine app founded in Uruguay, offered its platform to ASSE free of charge for mental health consultations.

[55] https://www.asse.com.uy/contenido/Linea-de-Apoyo-Emocional-0800-1920-ha-atendido-29-400-llamadas-y-continuara-funcionando-13109

# 3. MONITORING AND MAPPING OF CASES AND ICU BEDS

# 3. MONITORING AND MAPPING OF CASES AND ICU BEDS

## 3.1. The Comprehensive Risk and Impact Monitor

**On October 3, 2019, the SINAE presented the Comprehensive Risk and Impact Monitor** (MIRA, from the Spanish) platform—see Figure 11. This tool was developed with the support of the United Nations Development Programme (UNDP) Innovation Facility to centralize information on emergencies, improve emergency communications, and generate quality indicators to enhance officials' integrated risk management.[56]

**According to the SINAE, the MIRA is an interinstitutional geographic information system (GIS) with a national scope.** The monitor's web-based architecture means it can be accessed from any internet-enabled device, without the need to install software.

The GIS platform that the MIRA was developed on lets users georeference the data they upload. The monitor has a geographic search engine and notification manager and can be used to generate automated reports, integrate surveys from drones and other types of geospatial data, send text message alerts to residents of a specific area, and analyze and integrate into social media.

Thanks to the MIRA, the SINAE ended up being a key player in Uruguay's citizen-centered digital pandemic strategy. The agency's creation—together with the MSP and Salud.uy—of two dashboards in the platform[57] that track cases and ICU bed occupancy helped the government fulfill its commitment to transparency with the population.

### FIGURE 11: The MIRA Home Screen


*Source:* https://mira.presidencia.gub.uy/sinae/manual.pdf.
*Note*: The image is from the emergency events section of the MIRA user guide-SINAE.

[56] See Appendix VI.

[57] https://www.gub.uy/sistema-nacional-emergencias/mira

## 3.2. The MIRA and the SINAE before the Pandemic

**In the past, government data was scattered across multiple systems, making it impossible to cross-reference data and act swiftly in adverse situations.**

The MIRA was created to address this weakness, allowing the government to take organized action in meteorological, hydrological, earthquake, or fire emergencies. Among other features, the platform can be used to receive claims from flooded areas, keep track of the number of people affected and properties damaged, assign tasks to response teams, and use georeferenced information effectively. Before the March 13, 2020, declaration of a public health emergency, the MIRA was for government use only, but that has since changed.

In the years since its creation, the SINAE has largely stayed out of the public eye, save for brief steps into the spotlight for its disaster response after a tornado hit the city of Dolores in 2015 and following the floods of 2016 and 2019. It was not until the pandemic arrived in 2020, however, that the agency's work expanded on a massive scale, making it one of the linchpins of the PNC. While this turn of events increased the SINAE's workload, its focus remained the same. The pandemic brought the SINAE into closer coordination with other government agencies, which resulted in more information being available on the MIRA platform.

> ***"I think the general impression among Uruguayans was that the SINAE dealt with floods and nothing else. The pandemic strengthened the SINAE as an institution. It cemented many relationships that might have been somewhat weak before and are now very solid."*** Sergio Ricco, director of the SINAE.

## 3.3. The Coronavirus Dashboard: The MIRA's First Transformation

**Incoming SINAE officials recognized the MIRA's potential as a tool for managing the COVID-19 crisis.** They proposed that the monitor be expanded from tracking things like flood-damaged homes to tracking coronavirus infections. To make this possible, they began working with the UNDP and ICA, the Uruguayan partner of GIS mapping software company ESRI. With the help of UNDP funding, less than one month later, the SINAE was ready to launch the coronavirus case tracker for Uruguay and the world.[58]

The tool went live on April 9, 2020. It is still operational and has become a national reference point for both the public and the media for data on the status of the pandemic. On average, it is viewed nearly 96,000 times each day,[59] with a total of 34,965,983 visits logged between April 9, 2020 and April 9, 2021 (see Figure 12).

**The dashboard has two layers:** a public one (see Figure 13) for general access and a private one for decision-makers at government agencies.

The public layer provides a snapshot of the number of tests performed and results, confirmed cases of COVID-19, active cases, recovered patients, hospitalizations in ICUs and intermediate care, cases among healthcare personnel (active, recovered, and deaths), and global data (confirmed cases and deaths worldwide, as well as specific data from the hardest-hit countries).

The MSP-supplied data displayed in the dashboard is also used to compile a daily report called the Uruguay COVID-19 Status Report. By publishing the report on its social media pages every afternoon, the SINAE helps the Uruguayan government meet its objective of ensuring transparency.

Meanwhile, the private layer (see Figure 14) is for internal use by institutions and the SINAE. This version contains health information such as georeferenced cases and data on vulnerable populations. It also tracks cases in informal settlements, prisons, and similar settings and lists the location

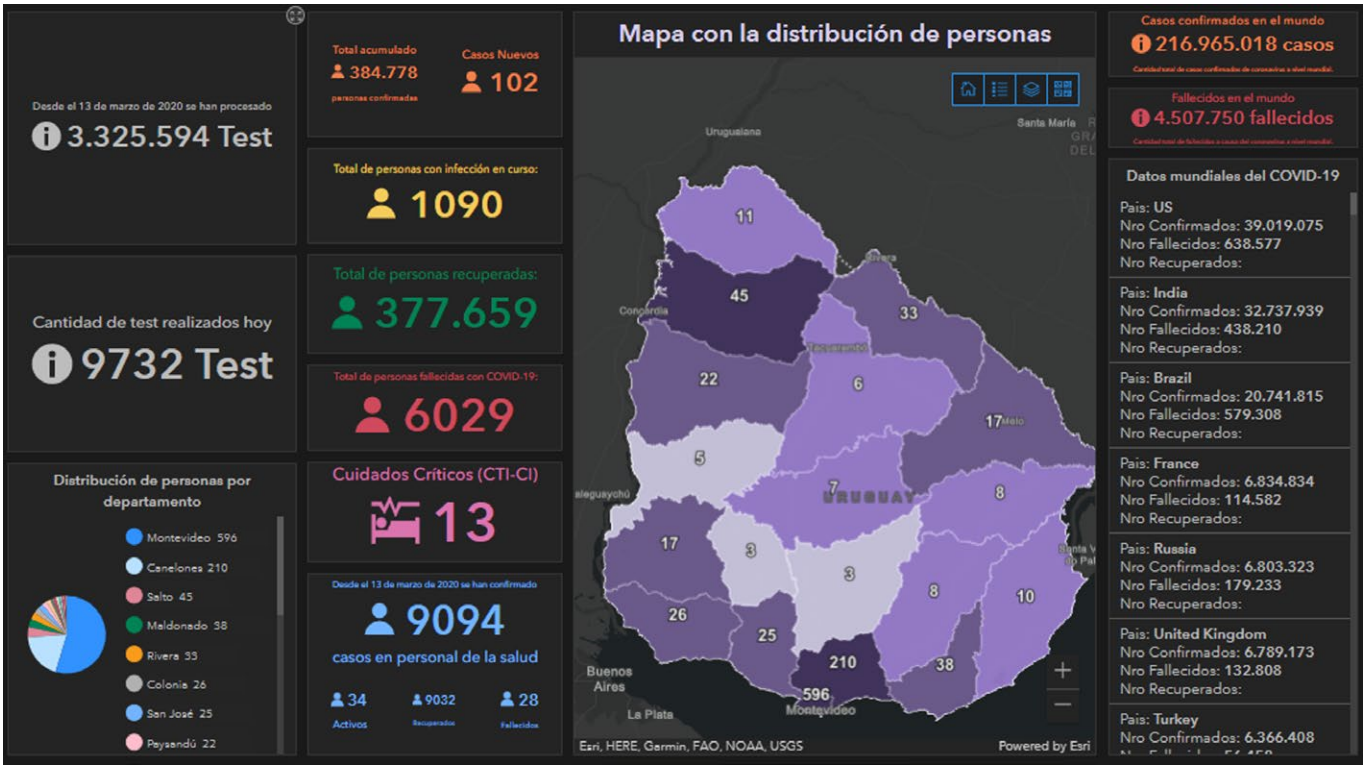
[58] https://www.gub.uy/sistema-nacional-emergencias/pagina-embebida/visualizador-casos-coronavirus-covid-19-uruguay

[59] Average from April 9, 2020 to April 9, 2021.

## FIGURE 12:
## Daily and Total Visits to the SINAE Case Tracker, April 9, 2020–April 9, 2021

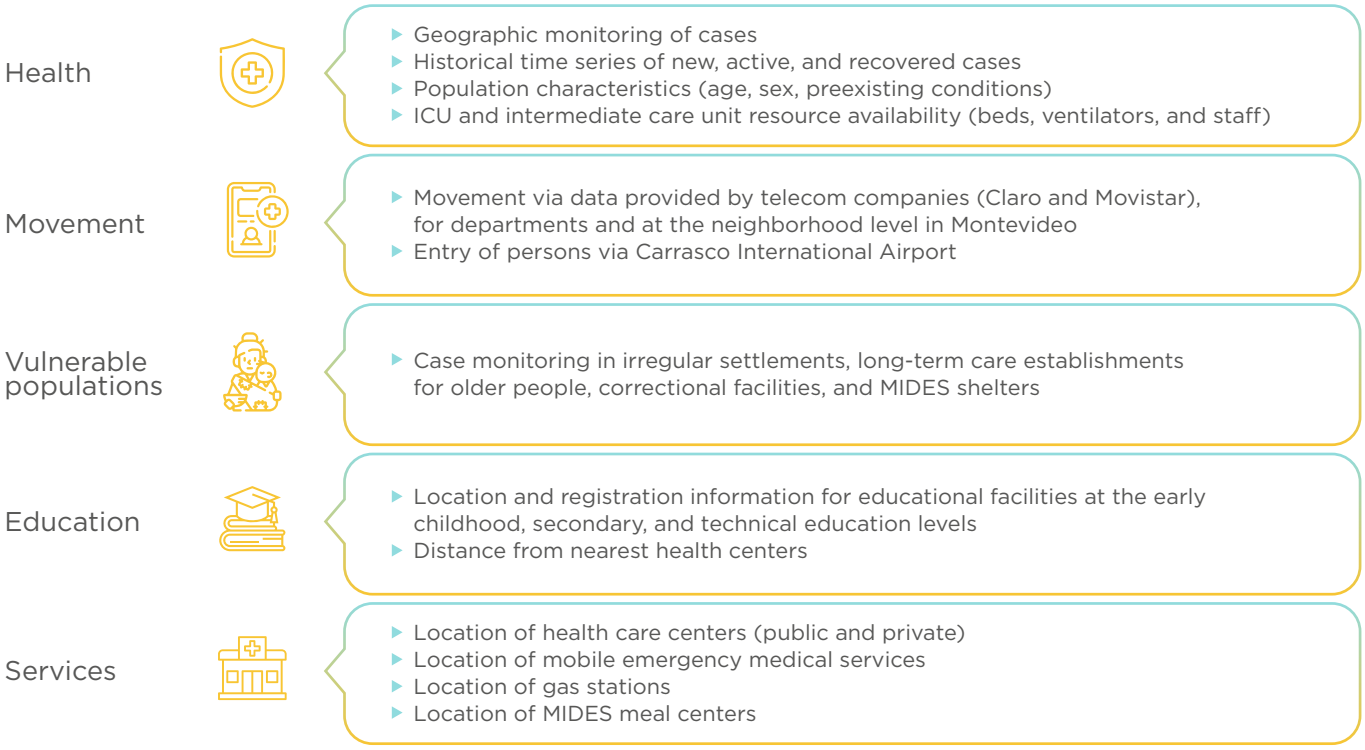

*Source:* "COVID-19 Case Dashboard," August 30, 2021.

## FIGURE 13:
## View from the Public SINAE Case Tracker




*Source:* "COVID-19 Case Dashboard," August 30, 2021.

## FIGURE 14:
## View from the Private Layer of the SINAE Dashboard




*Source:* https://storymaps.arcgis.com/stories/c9b5696c06d043a1b521720c9dd09a0f.

of public care centers and meal centers run by the Ministry of Social Development (MIDES, from the Spanish). This information is integrated into the MIRA so it can generate historical time series and automated reports.

With this information, officials are able to take rapid and comprehensive action. For example, when a case is identified in a community (Figure 15), an intervention is carried out with MIDES, ASSE, the SINAE, and Salud.uy. The monitor reveals where the case is located, and ASSE provides daily health care to the person and their family. MIDES delivers food baskets and cleaning products, and the MSP monitors the course of the patient's disease through rigorous follow-up.

**Both the public and private layers of this case dashboard are governed by the same standards as the MIRA to guarantee the integrity, confidentiality, and availability of the information:**

- **Integrity:** this is protected through usernames and password authentication, with differentiated user types.
- **Confidentiality:** personal data is protected in accordance with the Personal Data Protection Law.
- **Availability:** the system is hosted in the infrastructure of the e-government division of the Office of the President and backed up daily.

These safeguards notwithstanding, an external penetration test (ethical hacking) was conducted to identify attack vectors through which these pillars could be compromised. The test found no high-impact, low-attack complexity vulnerabilities (which pose the highest risk). It did detect certain lower-risk vulnerabilities, so the SINAE can work to fix them.

## FIGURE 15:
## View from the SINAE Platform for Case Monitoring within Communities

*Source:* https://storymaps.arcgis.com/stories/c9b5696c06d043a1b521720c9dd09a0f.

## 3.4. ICU Bed Dashboard: The MIRA's Second Transformation

Another MIRA module was created to monitor the infrastructure and resources available at the country's ICUs. When this dashboard was launched in late 2020, it was only available for private use, with a public layer added later in April 2021.

When the MSP and the National Health Board (JUNASA, from the Spanish) realized that the SINAE had a dashboard for the health sector's Winter Plan—established in past years to avoid overloading ICUs during flu season—but that it was not fully developed, they partnered to upgrade and adapt it for the COVID-19 pandemic. Drawing lessons from other countries' experience, officials considered the resource a key tool in the effort to avoid overwhelming health services.

While the tool was being developed, the MSP in January 2021 announced the creation of the National Critical Care Centers Coordinating Committee under the General Directorate of Health, with members from all the health institutions, the JUNASA, and the Uruguayan Society of Intensive Care Medicine (SUMI, from the Spanish). Members of the committee were notified of the type of information needed for the new dashboard, and specialized technicians were hired for daily monitoring and follow-up.

To obtain the necessary information, the MSP specified in Ordinance No. 1591[60] that public and private institutions must self-report the status of their ICUs in the MIRA at least once daily. While this requirement brought challenges for the institutions, they proved solvable: each institution managed to obtain a username and password and submit the information on time, although the MSP occasionally had to remind them to send in the data.

As shown in Figure 16, the dashboard shows officials the real-time availability of resources at every ICU, from beds to ventilators and health personnel. It also highlights any ICUs that are nearing or over their capacity and breaks down patients' reasons for hospitalization (COVID-19, acute respiratory failure of uncertain cause, or other diagnosis) and age (adult, pediatric, or neonatal).

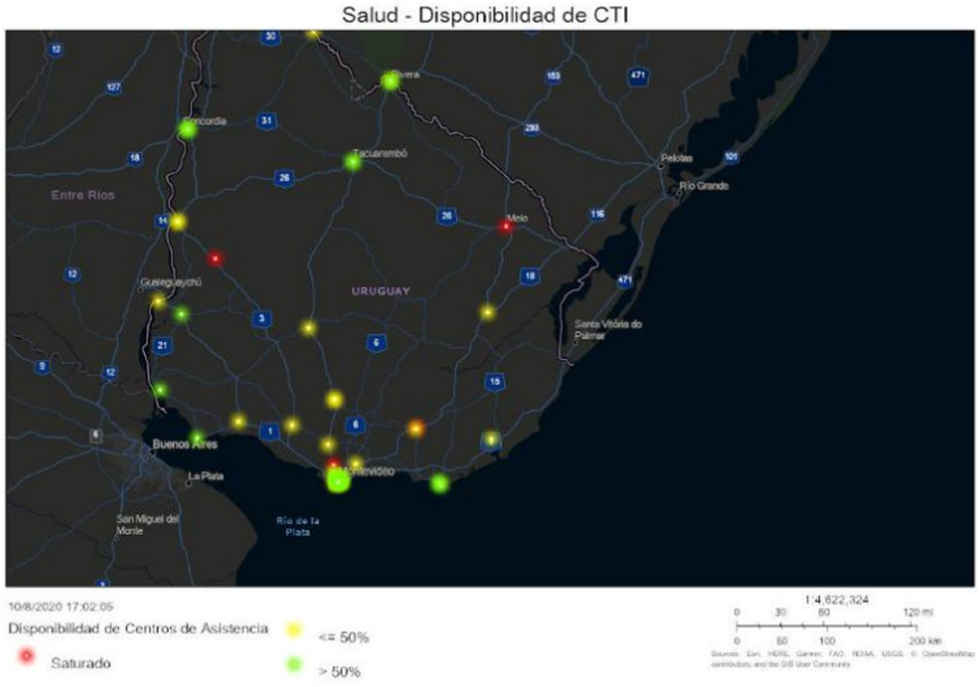
[60] https://www.gub.uy/ministerio-salud-publica/institucional/normativa/ordenanza-n-1591020-exhorta-postergar-demanda-servicios-medicos-esenciales

## FIGURE 16:
## View from the Private Layer of the Bed and Resource Tracker


*Source:* Provided by MSP.
*Note:* The figure shows a view from the private layer of the ICU bed occupancy dashboard from July 2021.

A traffic-light system was also implemented (see Figure 17) to indicate the status of the country's 54 ICUs.[61] Green was used for ICUs where more than 50 percent of beds are available, yellow where less than half of beds are available, and red where they are at capacity.

## FIGURE 17:
## View from the Private Layer of the Availability of Intensive Care Unit (traffic-light system)




*Source:* https://storymaps.arcgis.com/stories/c9b5696c06d043a1b521720c9dd09a0f.
*Note:* The figure demonstrates the traffic-light system adopted to show ICU bed availability.

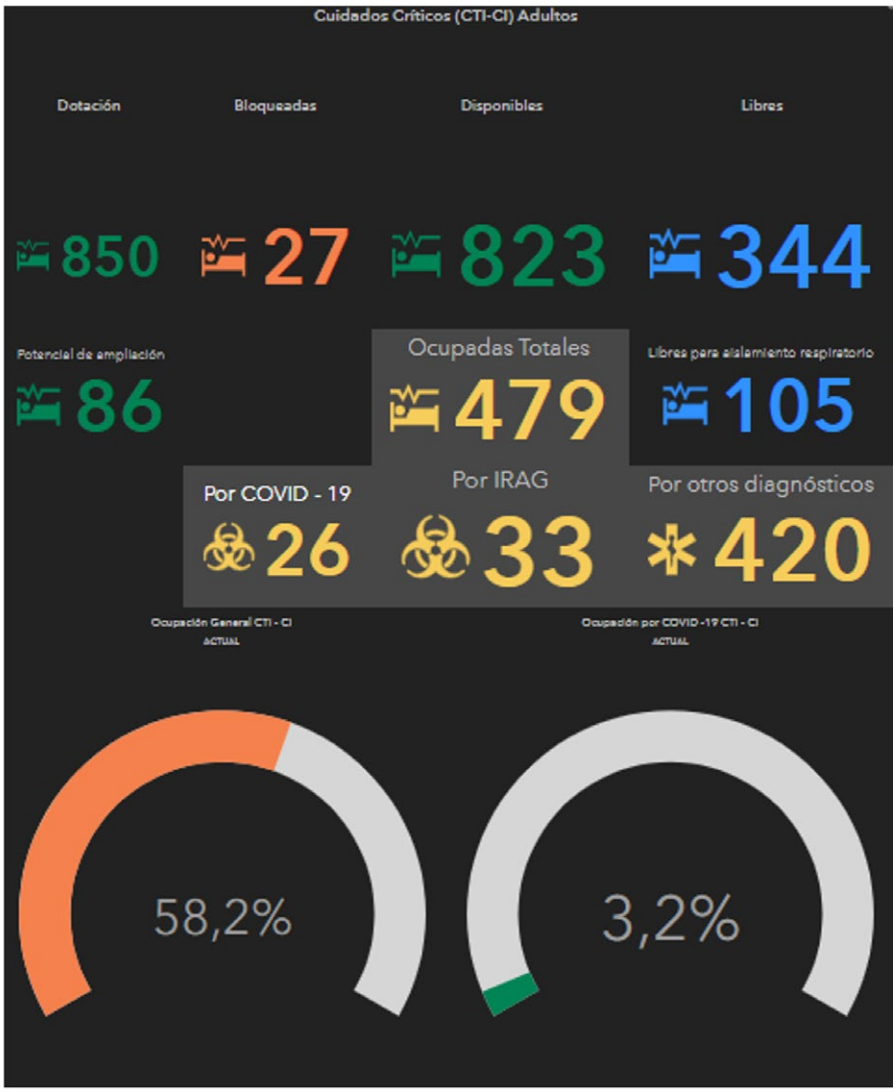
[61] View from the Private Layer of the Availability of Intensive Care Unit (traffic-light system).

If the ICU nearest to a patient is at capacity, the system lists the best available ICU options, taking into account distance and time criteria.

All information displayed in the tool is supplied by healthcare providers and synchronized with the PNC to ensure continuous monitoring of the virus's spread in the country.

In April 2021, part of the ICU module was made public on the SINAE website (see Figure 18). The main difference between this dashboard and the private one is that it features less information,[62] and the data is not georeferenced. However, it still fulfills its function of keeping citizens informed of the country's health situation.

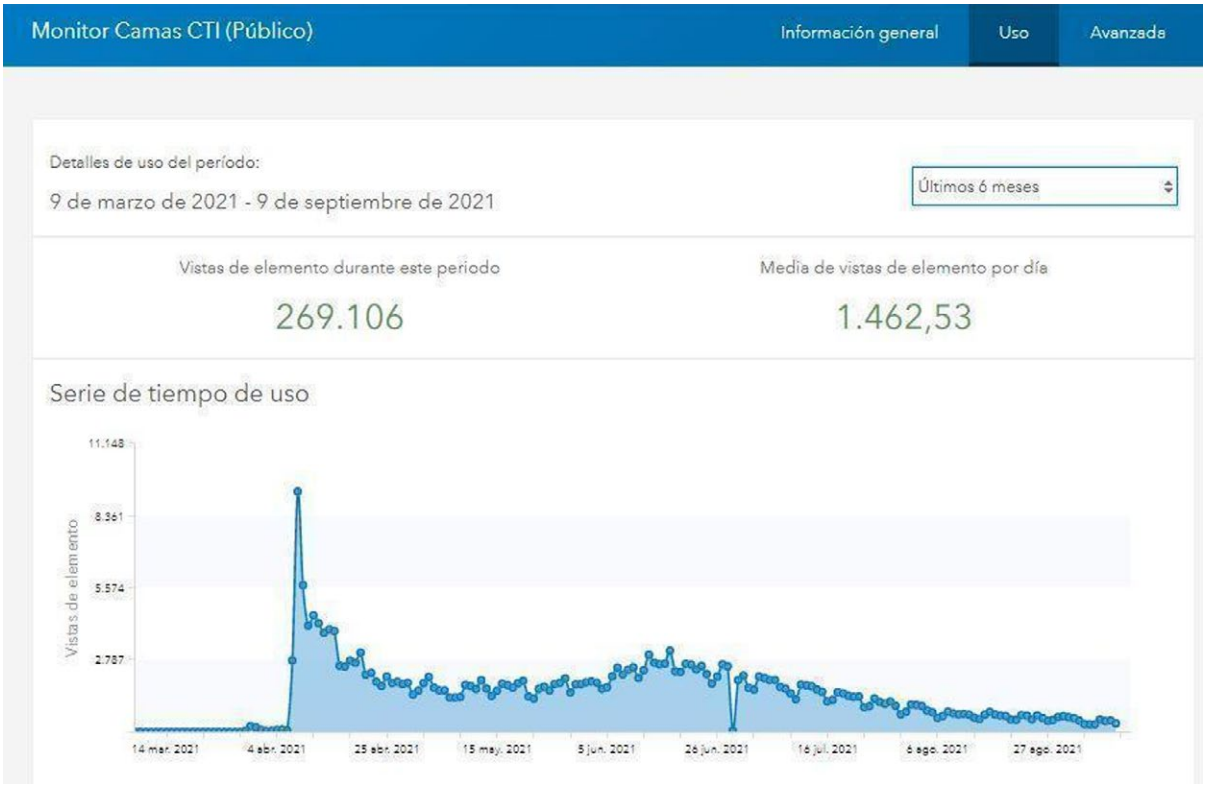
## FIGURE 18:
## View from the Public Layer of the ICU Bed Tracker




*Source:* https://www.gub.uy/sistema-nacional-emergencias/pagina-embebida/visualizador-ocupacion-cci-personas-adultas.

[62] The public layer shows 5–10 percent of the private dashboard's information.

## FIGURE 19:
## View from the Public Layer of the ICU Bed Tracker




*Source:* Provided by MSP.

The public bed occupancy dashboard has been visited 269,106 times from March 9 to September 9, 2021, with an average of 1,462.53 visits each day, as shown in Figure 19.

## 3.5. SUMI Census

From March 25, 2020 to August 31, 2021, the SUMI issued a daily ICU bed census report with the number of patients in the ICU, total beds in use, and beds in use for COVID-19 patients,[63] as well as the total number of all types of beds, beds in use, and available beds in the entire hospital.[64]

Four days after the SINAE dashboard launch,[65] the SUMI addressed questions about differences in the two reports, clarifying that several factors could explain the discrepancies, even when the entities were pursuing the same goal.

**The differences were:**

- **Data source:** The SUMI collected the data from critical care professionals, while the MIRA information is entered directly by hospitals' medical directors.
- **Cutoff time:** The MIRA's cutoff time is 5 p.m., while the SUMI received reports throughout the day.
- **Epidemiological discharge:** The MIRA follows the MSP criteria that state that a person in the ICU may be considered virus-free after 28 days, at which they point they are no longer considered a "COVID-19 bed" and are transferred to another isolation area to complete their recovery. The SUMI, on the other hand, considered those admitted for COVID-19 to be COVID-19 patients until their bed was vacated following death or a move to a lower level of care.

[63] See Appendix VI.

[64] https://sumi.uy/datos-estadisticos-uci-uruguay-2/

[65] April 8, 2021.

**In any case, the SUMI clarified that these were not significant differences.**

In August 2021, 17 months after the start of its census, the SUMI ceased issuing the report, declaring the pandemic cycle to be complete. This supposed return to phase I of the pandemic cycle means that the organization currently considers the pandemic is under control. However, SUMI leaders stated that they will resume issuing the report if the situation so warrants.[66]

## 3.6. COVID-19 Geoportal

In the five years prior to the pandemic, the Spatial Data Infrastructure (IDE, from the Spanish), a decentralized agency of the Office of the President, had been developing a geoportal containing up-to-date geographic information on Uruguay (images, digital models, maps, water bodies, and satellite images) stored on an interoperable data platform with high levels of resolution and accuracy. In parallel, the agency was working on a new address system for the country.

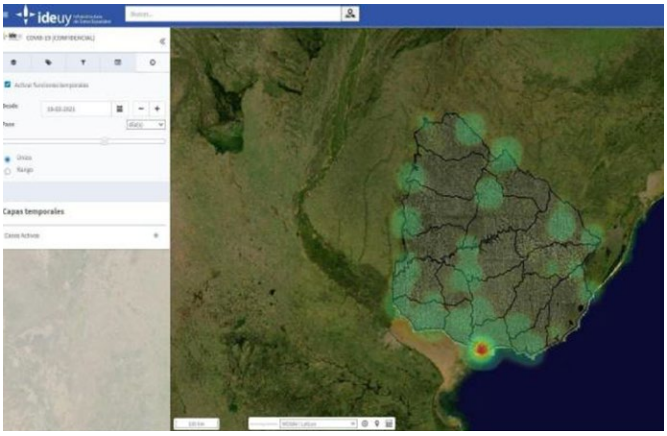
When the pandemic reached Uruguay, the IDE argued that if they knew the addresses of people who tested positive for the virus, they could georeference them to improve decision-making and cross-reference the data with other variables, such as age or socioeconomic level.

In this context, the IDE created the COVID-19 geoportal (shown in Figures 20 and 21) using data from the PNC and the MSP's epidemiology division to construct a georeferenced case map that was used by the GACH presidential advisory group. Along the way, they developed several side projects, such as tracking the spread of positive COVID-19 cases in Brazil, georeferencing nursing homes and construction sites when they became COVID-19 hot spots, and georeferencing the locations of vaccinated and unvaccinated people.

Each day, positive cases were located on the map using people's addresses, and the IDE was even able to georeference people with irregular and nonexistent addresses thanks to its georeferencing experience. To protect data confidentiality, census tracts (measuring 200–300 square meters) were used when sharing the relevant data with other agencies.

### FIGURE 20 Y 21: COVID-19 Geoportal (private)

**a) COVID-19 Geoportal from Uruguay (private)**



**b) COVID-19 Geoportal from Montevideo (private)**

*Source:* Spatial Data Infrastructure (IDE).

[66] https://www.smu.org.uy/durante-17-meses-el-reporte-diario-de-la-sociedad-uruguaya-de-medicina-intensiva-brindo-informacion-sobre-ocupacion-y-casos-covid-en-cti/

# 4. VACCINATION AND SCHEDULING

# 4. VACCINATION AND SCHEDULING

## 4.1. Drawing Up Uruguay's Vaccination Plan

**On March 1, 2021, Uruguay officially launched its COVID-19 vaccination drive.**[67] In the country's initial vaccination plan, only the Pfizer-BioNTech and Sinovac vaccines were available. The supply was negotiated directly between the government and laboratories. Uruguay also received AstraZeneca vaccines through the COVAX sharing scheme, some of which it donated to Paraguay.[68]

**All adults ages 18 and older were determined eligible to receive a vaccine in the rollout's first phase,** to be carried out in a gradual and staggered manner in the shortest possible time. However, the plan depended on the arrival of the different vaccines and was modified as needed, always prioritizing the high-risk groups.[69]

**On July 9, 2021, Uruguay began vaccinating children ages 12–18 with Pfizer-BioNTech doses.** In mid-August, the MSP announced that those who had received the Sinovac-developed CoronaVac vaccine could complete their vaccine series with a dose of Pfizer-BioNTech. On September 8, Uruguayans learned that booster shots were available for people ages 60 years and older who had completed their primary series with two doses of either Pfizer or AstraZeneca, as long as at least six months had passed since their last dose. At the end of October, eligibility for booster shots was expanded to include everyone ages 18 and older. In addition, immunocompromised people vaccinated with CoronaVac became eligible to receive two booster doses, while those vaccinated with Pfizer could receive one booster dose.

At the end of November, **the government announced that as of December 1, tourists entering the country with a complete vaccination schedule could receive their first booster dose as well.**

Finally, on December 30, Pfizer's pediatric vaccines for children ages 5–11 arrived in the country. Vaccination of this population began on January 12, 2022.

## 4.2. Vaccine Scheduling

**In 2020, during the COVID-19 health emergency, Uruguay had organized a campaign to encourage people to schedule their flu shot appointments digitally instead of through the in-person system they had used in previous years.** So AGESIC had developed a digital scheduler for booking vaccine appointments that worked seamlessly and helped avoid crowds, which effectively provided a preview of what was to come with the COVID-19 vaccines.

On February 26, 2021, it became possible for the first time to use the scheduler—the same as in the flu vaccination campaign—to request a date, place, and time to receive a COVID-19 vaccine. In line with the PNC's omnichannel strategy, Uruguayans could book their appointments via telephone, a website,[70] or a WhatsApp channel, and all appointments were sent directly to the MSP.

[67] See Appendix VII.

[68] https://www.elpais.com.uy/informacion/salud/uruguay-dono-vacunas-covid-paraguay.html

[69] To meet the initial target for 70 percent of the population to have two COVID-19 vaccine shots, the MSP developed a strategy to send, starting in May 2021, vaccination teams to towns in the interior of the country to achieve nationwide coverage.

[70] In 2021, the website https://www.gub.uy/uruguaysevacuna received 10.1 million visits between February 26 and July 31, with visits averaging four minutes and four seconds in length. Meanwhile, the scheduler tool received 13.5 million visits and an average visit length of four minutes and 29 seconds.

**The PNC strategy team knew that system overload was a real risk because of the large number of people who needed to be vaccinated.**[71] As the days went by and more groups became eligible, the system began to be overburdened. To ease this strain, the public and private sector teams that had developed the Coronavirus UY app were called in.

On March 19, the Office of the President announced an overhaul to better cope with high demand volumes. This consisted of various conceptual changes—most importantly, a switch from a synchronous to an asynchronous setup—and the inclusion of a virtual waiting room to buffer user requests. Previously, citizens had indicated their preferred date, time, and location, and the system would immediately book the appointment for them, if available. Since the update, users have entered their data and preferences only once. Epidemiological and logistical criteria (age group, vaccine availability, and location) are then applied to determine the user's place in line to avoid stressing the system. Once the day and time for the appointment are assigned, the user receives a text message (via SMS and WhatsApp) and email.

Table 1 **shows how many times each channel was used to request vaccination appointments.**

> ***"We had some previous experience using digital scheduling for flu vaccinations. This made it possible to avoid crowds, which was of critical importance with this pandemic".*** Martín Pazos, director of the e-Government Division of the MSP.

> ***"Once again, we were faced with a challenge: Uruguayans needed to be able to request a date and time to get vaccinated. The technological part couldn't have any issues, so we worked hard with the private sector to design and develop a solution that would be effective and allow people to schedule their appointment according to the MSP's strategy for prioritizing different groups. And we pulled it off."*** Pablo Orefice, former director of Salud.uy and senior digital health consultant at the IDB.Digital del BID.

## TABLE 1:
## Channels Used to Book COVID-19 Vaccination Appointments

| Channel used | Number of appointments booked | Percentage |
|---|---|---|
| Website | 3,668,494 | 49.51% |
| Call center | 98,048 | 1.32% |
| App | 828,232 | 11.18% |
| Chatbot (WhatsApp) | 2,814,483 | 37.99% |
| **Total** | **7,409,257** | **100%** |

*Source:* Data provided by the MSP for this case study.
*Note:* Data as of December 30, 2021.

[71] The initial vaccination plan was to provide 2,000,000 people with two doses each. Therefore, the scheduling tool had to be able to make 4,000,000 appointments in a short time.

## 4.3. COVID-19 Vaccine Registry System

The fact that Uruguay has had a registry of immunization records (the Vaccine Information System, SIV, from the Spanish) for all citizens since before the pandemic greatly expedited its COVID-19 vaccination program.[72]

In February 2021, prior to the arrival of COVID-19 vaccines, the agency put out a **quick guide to vaccine registration for COVID-19**[73] to ensure that all health professionals recorded vaccinations in the SIV in the same way.

## 4.4. The Vaccine Tracker

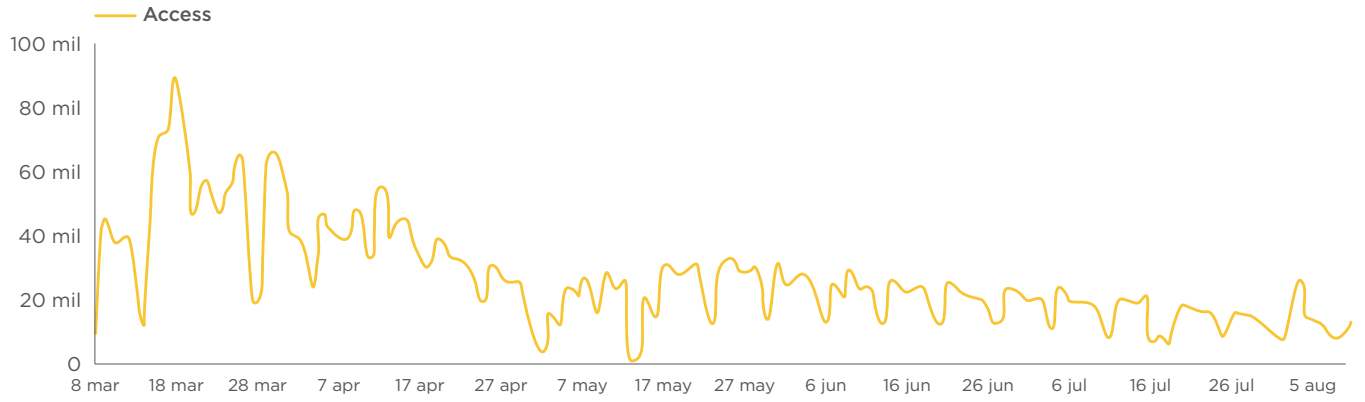
**On March 3, 2021, two days after the vaccine program began, the MSP released its COVID-19 vaccine tracker.**[74] Once again, the decision to create this tool and make it public was aligned with the PNC strategy's core objective: to keep citizens informed at all times.

While the public health agency's epidemiology division already had a dashboard for monitoring vaccine utilization at the national level, it had to be adapted to provide real-time information on COVID-19 vaccination.

When the tool was made public, the spike in traffic to the website caused performance issues. The MSP thus worked with AGESIC and Salud.uy to move it to AGESIC website, as its platform could handle higher levels of traffic without crashing. **In five months, the dashboard was visited approximately 4,000,000 times.** Figure 22 shows the daily activity pattern.

The team ran into a second obstacle when the tracker was added to the information section of the Coronavirus UY app. The tool's high number of visits through different channels considerably slowed the system. To address this, a decision was quickly made to instead replicate the tracker data on the app. This approach solved the problem.

### FIGURE 22: Daily Visits to the MSP's COVID-19 Vaccine Tracker




*Source:* "Agenda Uruguay Se Vacuna" report by AGESIC and the MSP.

[72] In 2017, the MSP launched a new electronic immunization registry known as the SIV. The registry began to be implemented in vaccine clinics during a flu vaccination drive in March 2017, and from October of that year, the SIV was phased in to register all vaccines administered in the country.

[73] https://docs.msp.gub.uy/guia_rapida_covid.pdf

[74] https://monitor.uruguaysevacuna.gub.uy/

## FIGURE 23:
## View from the Public Layer of the MSP's COVID-19 Vaccine Tracker


*Source:* MSP, "COVID-19 Vaccine Tracker," September 3, 2021.

> ***"Internally, it allowed us to track the vaccination program's progress. I think the program was a success for the whole country, not just the MSP".*** José Luis Satdjian, deputy secretary of the MSP.

The dashboard's public layer (see Figure 23) currently displays the number of vaccinations given each day and the running total of people vaccinated in the country, breaking down the figures by dose (first, second, and booster doses). It also shows the number of vaccine appointments scheduled for the next day, total vaccinations by department, vaccination rate by age groups, and changes in doses administered, among other data. Unlike the SINAE dashboards, the MSP's tracker is updated multiple times a day.

Meanwhile, the private layer allows users to view no-show rates for vaccine appointments and future appointments for each area in the country, among other data.

> ***"We created some internal dashboards to help us make quick decisions on certain issues. The tracker provided insight into why, for example, in certain areas so few people showed up to their appointments, despite high booking numbers."*** Martín Pazos, director of the e-Government Division of the MSP.

## 4.5. Digital COVID-19 Vaccine Certificate

Like all vaccines administered in the country, COVID-19 vaccination is entered on a person's official immunization record card. But in addition to this record, citizens can access a digital vaccine certificate through the Coronavirus UY app[75] or the MSP website after receiving two doses of the COVID-19 vaccine.[76]

[75] The app's button for accessing vaccine certificates has been used approximately 4.8 million times, according to AGESIC data as of November 2021.

[76] https://certificado.coronavirus.gub.uy/

Officials decided to issue these certificates in digital format so people could more easily provide proof of their vaccine doses, namely by having them conveniently stored on their cell phones. The certificates made it possible to resume various activities, such as events that restricted admission to those with proof of having completed the primary series of COVID-19 vaccines.

The authorities are now looking into generating a "green pass" or vaccine "passport" based on this digital certificate that would be accepted by all countries and the World Health Organization.

> ***"Uruguay is very advanced, not just for the region but globally. There are countries where you get vaccinated, and they give you a piece of paper. In others, they don't give you anything. We have the advantage that vaccinations are registered in our HCEN, and we also have a digital certificate we can show anywhere in the world. This paves the way for having a health passport."*** Hebert Paguas, executive director of AGESIC and general director of the Presidency of Uruguay.

## 4.6. The Data Lake: A Repository of Information

Following a joint effort between the MSP, AGESIC (MSP's e-government division), and Salud.uy, the Data Lake **repository of information on the pandemic in Uruguay** was launched in April 2021. Unlike other tools in the PNC strategy that focused on generating information for the public, the Data Lake is mainly used for epidemiological purposes to guide decisions regarding health and the country's vaccination program.

At its core, the Data Lake (see Figure 24) is a business intelligence platform that **can be used to swiftly combine large volumes of data in different ways to generate epidemiological indicators and help officials better understand what is happening with the pandemic**. Before the tool's creation, the data available to decision-makers and researchers was scattered and was not cross-referenced.

Today, **the tool cross-references information on vaccination coverage, vaccine effectiveness, COVID-19 case profiling, vaccine scheduling, and the identification of coronavirus deaths**. Furthermore, the MSP's e-government division is working to continue growing the Data Lake by adding more information. For example, they intend to include economic data from the pandemic to ensure a comprehensive and complete picture of the situation.

### FIGURE 24: Main Menu of the Data Lake

> ***"If I learned anything in the pandemic, it's that you can't improve what you don't measure. This tool gives us high-quality data to make decisions based on accurate information."*** José Luis Satdjian, deputy secretary of the MSP.

> ***"The vaccination system is here to stay."*** Nicolás Jodal, CEO of GeneXus.

> ***"The whole digital structure is working and holds enormous potential to be applied to similar situations, such as for a different vaccination program or if a new virus were to emerge tomorrow."*** Roberto Lafluf, advisor to the president.

## 4.7. Future Applications

**The vaccination system implemented during the COVID-19 pandemic increased Uruguay's baseline capacity.** All technological development during the pandemic—whether of the scheduling system, the vaccine tracker, or the Data Lake—is knowledge that remains in the country, and many of the tools can be used for other purposes.

To this end, the country is currently participating in the Regional Public Goods project[77] **that seeks to define an interoperability standard so the COVID-19 vaccine certificate can function as a health passport.**



[77] The Regional Public Goods Initiative of the IDB is based on the premise that the countries of Latin America and the Caribbean share numerous development challenges and opportunities that can be addressed more efficiently and effectively through regional collective action and cooperation.

# 5. LESSONS LEARNED

# 5. LESSONS LEARNED

**More than two years after the outbreak of the pandemic, the Uruguayan government considers its digital response to have been a key factor in its management of the health crisis, providing it with real-time data to change course as necessary and inform health policy decisions.**

> ***"We've made great progress and are far ahead of other countries in Latin America. At the international level, I think the speed of our achievements reflects well on us. The development, the integration of all actors for interoperability...we had a solid foundation, and these are things that take time. Our excellent starting point gave us an advantage over others."*** Martín Pazos, director of the e-Government Division of the MSP.

Uruguay's technological capabilities, in conjunction with its public-private synergies, are what allowed it to respond quickly to COVID-19. The HCEN, institutional framework, and the governance scheme created for the country's digital transformation all predated the pandemic and provided a foundation for the country's response to its challenges.

> ***"COVID-19 helped because it gave us a common and urgent goal. That and the leadership from the president—because this wasn't a project that no one cared about, but one the central government was watching closely, with the president's advisor directly involved. So that too really smoothed the way for us."*** Omar Paganini, minister of industry, energy, and mining.

**In the interviews for this publication, actors emphasized the comprehensive response to the health emergency made possible by the work of the public and private sectors and collaborations between public entities.** These synergies are a lesson learned from Uruguay's pandemic experience, which leaves capabilities in place for future situations requiring a rapid response. Additionally, President Lacalle Pou and his advisors were directly involved in the country's response, and many interviewees described the president's leadership as having played a crucial role in its success.

> ***"Having a comprehensive approach was key, as was the support with the digital tools used as part of that approach. Taking a holistic view and looking for solutions jointly worked well for us."*** Roberto Lafluf, advisor to the president.

**The PNC's omnichannel approach is another important takeaway from Uruguay's experience.** By sharing information across multiple channels, the government was able to respond quickly to citizens' needs. This was yet another development made possible by Uruguay's progress on digital transformation in pre-pandemic years. But the PNC—and especially the process of developing the Coronavirus UY app—forced the government to deepen and accelerate its previous experience building a technologically and digitally integrated system. As a result of the tech solutions developed under the PNC, the country now has a database linking health system users, and the system has even added new components such as laboratories. The various dashboards that were created were another essential tool in the fight against the pandemic, providing access to reliable and up-to-date information.

> ***"Keep it simple and look for rapid solutions to get the government's strategy into the hands of citizens as quickly as possible, although usability, algorithms, one-day turnaround times, and long hours often made it hard to deliver with the speed that was needed. We had to prioritize."*** Pablo Orefice, former director of Salud.uy and senior digital health consultant at the IDB.

**For the SINAE, the interagency collaborations provided valuable lessons on how to act in emergency situations.**

> ***"It helped us learn to work together, be it a pandemic or a flood affecting the country. We didn't face any stumbling blocks along the way—everything went smoothly. Now the challenge is to keep up the momentum we generated."*** Sergio Ricco, director of the SINAE.

The technological tools developed through these partnerships proved to have a great impact on people's lives, as well as on political leadership and epidemiological outcomes. For example, the MIRA—which gathered significant momentum during the pandemic—has gained key health surveillance capacities, ensuring that Uruguay is better prepared for future threats.

> ***"The experience left no doubt that globalization and technological tools have a great impact on people's lives, on political leadership, and on epidemiological control. We learned the importance of technology in this type of fight and that we must continue our development process in order to stay on the cutting edge."*** José Luis Satdjian, deputy secretary of the MSP.

**The pandemic also made clear that the country's digital transformation is a necessity and must be accelerated.** It further underscored the importance of developing mobile connectivity and communications infrastructure, an area that is among Uruguay's strengths.[78] This point was illustrated by the Coronavirus UY app's widespread adoption, as people have found it far more convenient to use tech solutions on a cell phone than a computer.

**Despite a few setbacks along the way—such as the overloading of the vaccine scheduling system—the PNC's digital response can be considered a success story because of how quickly it got off the ground, how well it worked, and how it devised solutions for specific problems that arose.** Examples include the virtual waiting room developed to remedy delays in the vaccination scheduling process, the technological monitoring used when surging cases made personalized follow-up impractical, and the shared inboxes created to give providers easy access to their patients' information and improve care.

> ***"Not only are we responsible for pushing the pace of the transformation, but we are also being pushed to speed up the process as well. That's the most important lesson learned. Saying 'I want to digitally transform Uruguay' went from being a nice thing to say to being a necessity."*** Hebert Paguas, executive director of AGESIC and general director of the Presidency of Uruguay.



[78] According to the Office of the President, Uruguay has the best telecommunications infrastructure in Latin America, including its data center, universal business access to fiber optic networks, and the transformation of ANTEL into an international provider following the installation of a submarine communications cable.

# REFERENCES


ACDE (Asociación Cristiana de Dirigentes de Empresa). "¿Cómo se gestó la app Coronavirus.uy?" https://www.acde.org.uy/single-post/c%C3%B3mo-se-gest%C3%B3-la-app-coronavirus-uy.

AGESIC (Agency for e-Government and an Information and Knowledge Society), Centro de Conocimiento. "Guía técnica informe de laboratorio para COVID-19." https://centrodeconocimiento.agesic.gub.uy/documents/207224/0/Gu%C3%ADa+t%C3%A9cnica+-+Informe+de+laboratorio+COVID+v4.0.0_20210317.pdf/8579fba1-76eb-80d2-bde8-11e77d55d236.

Amazon. "Con AWS, Uruguay pone sistema de solicitud de agenda de vacunación en operación en tiempo récord." https://aws.amazon.com/es/solutions/case-studies/agesic-msp/.

ARCGIS, SINAE (National Emergency System). "Covid-19 Uruguay. Gestión de información." https://storymaps.arcgis.com/stories/c9b5696c06d043a1b521720c9dd09a0f.

ASSE (State Health Services Administration). "Informe a dos meses de la Línea de Apoyo Emocional 0800 1920." https://www.asse.com.uy/contenido/A-dos-meses-de-creada-la-Linea-de-Apoyo-Emocional-0800-1920-registra-8-100-llamados-14-por-hora-en-todo-el-pais-12371.

ASSE (State Health Services Administration). "Línea de Apoyo Emocional 0800 1920 ha atendido 29.400 llamadas y continuará funcionando." https://www.asse.com.uy/contenido/Linea-de-Apoyo-Emocional-0800-1920-ha-atendido-29-400-llamadas-y-continuara-funcionando-13109.

CUTI (Uruguayan Chamber of Information Technology). "Isbel y Doctari anuncian alianza estratégica para promover soluciones de Telemedicina." https://cuti.org.uy/noticias/de-socios/isbel-y-doctari-anuncian-alianza-estrategica-para-promover-soluciones-de-telemedicina/.

*Desayunos informales*. "Uruguay podría ser el primer país en usar la aplicación de Google y Apple contra el coronavirus." Teledoce. https://www.teledoce.com/programas/desayunos-informales/primera-manana/uruguay-podria-ser-el-primer-pais-en-usar-la-aplicacion-de-google-y-apple-contra-el-coronavirus-buscamos-el-equilibrio-en-seguridad-y-libertad/.

*El País*. "Uruguay donó 12.000 vacunas contra el COVID-19 a Paraguay." https://www.elpais.com.uy/informacion/salud/uruguay-dono-vacunas-covid-paraguay.html.

*El Telégrafo*. "Sinae centralizará información de afectados en situaciones de riesgo con plataforma digital MIRA y apoyo de organismos." https://www.eltelegrafo.com/2019/10/sinae-centralizara-informacion-de-afectados-en-situaciones-de-riesgo-con-plataforma-digital-mira-y-apoyo-de-organismos/.

France24. "Con el covid bajo relativo control, Uruguay comienza a aplicar tercera dosis." https://www.france24.com/es/minuto-a-minuto/20210816-con-el-covid-bajo-relativo-control-uruguay-comienza-a-aplicar-tercera-dosis.

Gub.uy. "Plan de vacunación." https://www.gub.uy/uruguaysevacuna.

Gub.uy, AGESIC. "Actualizaciones de la App Coronavirus UY." https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/comunicacion/noticias/actualizaciones-app-coronavirus?fbclid=IwAR3ZxpN5Y9Ch06nCy-kqzGvzumwsgerESfYjA9M2RzumTDl2TETrJnjp5EA.

Gub.uy, AGESIC. "*Encuesta de Uso de Tecnologías de la Información y la Comunicación 2019*." https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/datos-y-estadisticas/estadisticas/encuesta-uso-tecnologias-informacion-comunicacion-2019.

Gub.uy, AGESIC. “La estrategia digital frente al coronavirus COVID-19.” https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/comunicacion/noticias/estrategia-digital-frente-coronavirus-covid-19.

Gub.uy, AGESIC. “Memoria Anual 2020” https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/sites/agencia-gobierno-electronico-sociedad-informacion-conocimiento/files/2021-05/Memoria%20Anual%202020.pdf

Gub.uy, AGESIC. “Nueva versión App Coronavirus UY.” https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/comunicacion/noticias/nueva-version-app-coronavirus.

Gub.uy, MSP. “0800-1920, línea gratuita de apoyo emocional frente a la COVID-19.” https://www.gub.uy/ministerio-salud-publica/comunicacion/noticias/0800-1920-linea-gratuita-apoyo-emocional-frente-covid-19#:~:text=0800%2D1920%2C%20l%C3%ADnea%20gratuita%20de,19%20%7C%20Ministerio%20de%20Salud%20P%C3%BAblica.

Gub.uy, MSP. “Certificado digital de vacunación COVID-19.” https://www.gub.uy/ministerio-salud-publica/comunicacion/publicaciones/preguntas-frecuentes-vacunacion-covid-19/preguntas-frecuentes-12.

Gub.uy, MSP. “Comenzó vacunación de menores de 18 años con 157.000 jóvenes inscriptos.” https://www.gub.uy/ministerio-salud-publica/comunicacion/noticias/comenzo-vacunacion-menores-18-anos-157000-jovenes-inscriptos.

Gub.uy, MSP. “Comunicado sobre Plan de Vacunación.” https://www.gub.uy/ministerio-salud-publica/comunicacion/noticias/comunicado-sobre-plan-vacunacion-contra-covid-19.

Gub.uy, MSP. “Información sobre la Aplicación Coronavirus UY.” https://www.gub.uy/ministerio-salud-publica/politicas-y-gestion/informacion-sobre-aplicacion-coronavirus.

Gub.uy, MSP. “Plan Nacional de Contingencia para la Infección (COVID-19) por el nuevo Coronavirus (SARS CoV2).” https://www.gub.uy/ministerio-salud-publica/comunicacion/publicaciones/plan-nacional-contingencia-para-infeccion-covid-19-nuevo-coronavirus.

Gub.uy, MSP. “Preguntas frecuentes vacunación COVID-19.” https://www.gub.uy/ministerio-salud-publica/comunicacion/publicaciones/preguntas-frecuentes-vacunacion-covid-19/preguntas-frecuentes-13.

Gub.uy, MSP. “Respuesta de Uruguay en 2020 a la Pandemia de COVID-19.” https://www.gub.uy/ministerio-salud-publica/comunicacion/publicaciones/respuesta-uruguay-2020-pandemia-covid-19.

Gub.uy, MSP. “Se reitera información sobre terceras dosis.” https://www.gub.uy/ministerio-salud-publica/comunicacion/noticias/se-reitera-informacion-sobre-terceras-dosis.

Gub.uy, MSP. “Tercera dosis de vacunación contra covid-19.” https://www.gub.uy/ministerio-salud-publica/comunicacion/noticias/tercera-dosis-vacunacion-contra-covid-19.

Gub.uy, Presidencia. “Gobierno presentó aplicación digital que facilita consultas de usuarios por coronavirus ante prestadores de salud.” https://www.gub.uy/presidencia/comunicacion/noticias/gobierno-presento-aplicacion-digital-facilita-consultas-usuarios-coronavirus.

Gub.uy, SINAE. “Monitor Integral de Riesgos y Afectaciones.” https://www.gub.uy/sistema-nacional-emergencias/politicas-y-gestion/monitor-integral-riesgos-afectaciones.

Gub.uy, SINAE. “Monitor Integral de Riesgos y Afectaciones.” https://www.gub.uy/sistema-nacional-emergencias/sites/sistema-nacional-emergencias/files/documentos/publicaciones/Si%CC%81ntesis%20informativa%20sobre%20el%20Monitor%20Integral%20de%20Riesgos%20y%20Afectaciones.pdf.

Gub.uy, SINAE. “Preguntas frecuentes MIRA.” https://www.gub.uy/sistema-nacional-emergencias/node/727.

Gub.uy, SINAE. “Sinae expuso en el Encuentro de Ciudades Inteligentes.” https://www.gub.uy/sistema-nacional-emergencias/comunicacion/noticias/sinae-expuso-encuentro-ciudades-inteligentes.

Gub.uy, SINAE. "Visualizador de casos de COVID: Esfuerzo por brindar información de modo amigable." https://www.gub.uy/sistema-nacional-emergencias/comunicacion/noticias/visualizador-casos-covid-esfuerzo-brindar-informacion-amigable.

Gub.uy, SINAE. "Visualizador de ocupación de camas de CCI." https://www.gub.uy/sistema-nacional-emergencias/comunicacion/noticias/visualizador-ocupacion-camas-cci.

Gub.uy, UNAOID. "Recomendaciones para el tratamiento de datos personales ante la situación de emergencia sanitaria nacional." https://www.gub.uy/unidad-reguladora-control-datos-personales/comunicacion/publicaciones/recomendaciones-para-tratamiento-datos-personales-ante-situacion.

IDB (Inter-American Development Bank). "Bienes Públicos Regionales." https://www.iadb.org/es/sectores/comercio/bienes-publicos-regionales/home.

IDB (Inter-American Development Bank). "COVID-19: Coronavirus UY." https://socialdigital.iadb.org/es/sph/covid-19/soluciones-digitales/6303.

IPGH (Instituto Panamericano de Geografía e Historia). "Oportunidades y amenazas que presenta el combate al COVID-19 para la geomática en Uruguay." https://revistasipgh.org/index.php/regeo/article/view/816/1324.

Ladiaria. "¿Cómo funciona la nueva agenda para vacunarse contra el coronavirus?" https://ladiaria.com.uy/coronavirus/articulo/2021/3/como-funciona-la-nueva-agenda-para-vacunarse-contra-el-coronavirus/.

Ladiaria. "Diferencias de reportes entre SUMI y Sinae." https://ladiaria.com.uy/coronavirus/articulo/2021/4/las-diferencias-entre-los-reportes-de-la-sumi-y-sinae-sobre-ocupacion-de-cti/.

Ladiaria. "Lacalle Pou en la ONU: La 'libertad responsable' como centro y una crítica sobre el acceso a las vacunas." https://ladiaria.com.uy/politica/articulo/2021/9/lacalle-pou-en-la-onu-la-libertad-responsable-como-centro-y-una-critica-sobre-el-acceso-a-las-vacunas/.

Ladiaria. "Vacunación en cárceles: Hasta el momento, se inoculó a 65% de las personas privadas de libertad." https://ladiaria.com.uy/justicia/articulo/2021/3/vacunacion-en-carceles-hasta-el-momento-se-inoculo-a-65-de-las-personas-privadas-de-libertad/.

Milano Gastón. "Coronavirus en Uruguay. Plan Nacional de Coronavirus". GeneXus.

MIRA (Comprehensive Risk and Impact Monitor), Presidencia. "Manual de uso del MIRA." https://mira.presidencia.gub.uy/sinae/manual.pdf.

MP (Medicina Personalizada). "Coronavirus UY: La app que nos permite tener alertas de exposición al COVID-19." https://www.mp.com.uy/2020/07/06/entrevista-a-nicolas-jodal/.

MSP (Ministry of Public Health). "Guía rápida de registro vacunal para COVID-19." https://docs.msp.gub.uy/guia_rapida_covid.pdf.

Neurona BA. "Uruguay implementó un GEOPORTAL para tomar medidas contra el Covid-19." https://neurona-ba.com/uruguay-implemento-un-geoportal-para-tomar-medidas-contra-el-covid-19/.

OECD OPSI (Organisation for Economic Co-operation and Development Observatory of Public Sector Innovation). "Uruguayan APP for COVID-19." https://oecd-opsi.org/covid-response/uruguayan-app-for-covid-19/.

Orefice, P. 2021. "Uruguay: El camino hacia la salud digital."

PAHO (Pan American Health Organization). "Establecimiento de un registro nominal de vacunación electrónico." https://iris.paho.org/bitstream/handle/10665.2/54191/OPSFPLIM210019_spa.pdf?sequence=1&isAllowed=y.

Presidencia. "Resumen de los principales avances y logros del gobierno durante el primer año de gestión." https://medios.presidencia.gub.uy/tav_portal/2021/noticias/AH_438/1%20-%20Resumen%20365%20Principales%20Avances%20Gestion%20(2)%20(1).pdf.

Salud.uy. "Manual de uso de la bandeja de entrada."

SMU (Sindicato Médico del Uruguay). "Durante 17 meses, el 'reporte diario' de la Sociedad Uruguaya de Medicina Intensiva brindó información sobre ocupación y casos COVID en CTI." https://www.smu.org.uy/durante-17-meses-el-reporte-diario-de-la-sociedad-uruguaya-de-medicina-intensiva-brindo-informacion-sobre-ocupacion-y-casos-covid-en-cti/.

Somos Uruguay. "Coronavirus uy, aplicación uruguaya desarrollada en tiempo récord." https://www.somosuruguay.com.uy/noticias-empresariales/item/983-coronavirus-uy,-aplicaci%C3%B3n-uruguaya-desarrollada-en-tiempo-r%C3%A9cord.html.

SUP (Sociedad Uruguaya de Pediatría). "Vacunación COVID en adolescentes: Información clave y respuestas a preguntas frecuentes." https://www.sup.org.uy/2021/06/04/vacunacion-covid-en-adolescentes-informacion-clave-y-respuestas-a-preguntas-frecuentes/.

*Telemundo*. "El MIRA, un visualizador con toda la información sobre Covid-19 en Uruguay." Teledoce. https://www.teledoce.com/telemundo/nacionales/el-mira-un-visualizador-con-toda-la-informacion-sobre-covid-19-en-uruguay/.

Tuapp. "Preguntas frecuentes tuapp." https://www.tuapp.com.uy/preguntas-frecuentes/ (Link only functional in Uruguay).

UNDP (United Nations Development Programme). "Aplicación del MIRA al COVID-19." https://www.uy.undp.org/content/uruguay/es/home/presscenter/articles/2020/04/nuevos_visualizadores_MIRA_COVID19.html.

UNDP (United Nations Development Programme). "MIRA: Innovadora estionma para la estion integral de riesgos en Uruguay." https://www.uy.undp.org/content/uruguay/es/home/presscenter/articles/2019/Uruguay_plataforma_MIRA/presentacion_MIRA.html.

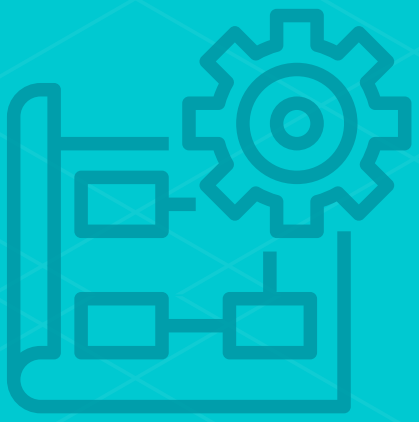
Uruguay XXI. "Calidad de vida digital: Uruguay lidera en Latinoamérica." https://www.uruguayxxi.gub.uy/es/noticias/articulo/calidad-de-vida-digital-uruguay-lidera-en-latinoamerica/.

Uruguay XXI. "Carta del director ejecutivo de Apple Tim Cook a Luis Lacalle Pou." https://www.uruguayxxi.gub.uy/uploads/estatico/Carta%20Apple.pdf.

Uruguay XXI. "Carta del director ejecutivo de Google Sundar Pichai a Luis Lacalle Pou." https://www.uruguayxxi.gub.uy/uploads/estatico/Carta%20Google.pdf.

Uruguay XXI. "Uruguay, elegido por Google y Apple para luchar contra el Coronavirus." https://www.uruguayxxi.gub.uy/es/noticias/articulo/uruguay-elegido-por-google-y-apple-para-luchar-contra-el-coronavirus/.

Uruguay XXI. "Uruguay escala posiciones y se consolida como líder regional en gobierno digital." https://www.uruguayxxi.gub.uy/es/noticias/articulo/uruguay-escala-posiciones-y-se-consolida-como-lider-regional-en-gobierno-digital/.



# APPENDIX I. URUGUAY COVID-19 STATUS REPORT

# APPENDIX I. URUGUAY COVID-19 STATUS REPORT

Uruguay Presidencia

sinae
SISTEMA NACIONAL DE EMERGENCIAS

Ministerio de Salud Pública

## Informe de situación
## Plan nacional Coronavirus
Montevideo, 27 de diciembre de 2021

**Informe epidemiológico:**

De acuerdo a la información proporcionada por el Ministerio de Salud Pública (MSP), hoy se llevaron a cabo 9.838 análisis y se detectaron 601 nuevos casos de Coronavirus COVID-19.

De los 601 nuevos casos, 307 son de Montevideo, 75 de Canelones, 39 de Salto, 33 de Maldonado, 22 de Flores, 21 de Paysandú, 18 de Treinta y Tres, 15 de Colonia, 15 de Tacuarembó, 13 de Rocha, 10 de Durazno, 10 de Lavalleja, 9 de Rivera, 5 de Cerro Largo, 4 de Soriano, 3 de Río Negro, 1 de Artigas y 1 de San José.

Desde que se declaró la emergencia sanitaria el 13 de marzo de 2020 se han procesado 4.347.842 test y se han registrado 407.981 casos positivos de Coronavirus en todo el territorio nacional. De ese total 397.586 ya se recuperaron.

Hoy se registraron 2 fallecimientos con diagnóstico de SARS-CoV-2 en nuestro país (se anexa tabla con detalle). Hasta el momento son 6.165 las defunciones con diagnóstico de COVID-19 en Uruguay.

Actualmente hay 4.230 casos activos, es decir personas que están cursando la enfermedad, 25 de ellas se encuentran en centros de cuidados críticos.

Del total de casos positivos confirmados, 10.013 corresponden a personal de la salud. 9.876 de ellos ya se recuperaron, 109 están cursando la enfermedad y 28 fallecieron.

Al día de hoy todos los departamentos registran casos activos.

ACLARACIÓN:

El total de casos positivos confirmados hasta el día de ayer era 407.381. Hoy se reportan 601 casos nuevos y un total de 407.981 casos positivos confirmados. La diferencia se explica porque, según consigna el MSP, 1 casos fueron eliminados.

**Detalle de personas fallecidas**

| SEXO | EDAD | DEPARTAMENTO |
|---|---|---|
| F | 77 | MONTEVIDEO |
| F | 62 | MONTEVIDEO |

Informe de situación en relación al coronavirus COVID-19 en Uruguay

*Source:* Sinae.

*Translation:*
Epidemiological report:

According to information provided by the Ministry of Public Health (MSP), today 9,838 tests were performed and 601 new cases of COVID-19 were detected.

Of the 601 new cases, 307 are from Montevideo, 75 from Canelones, 39 from Salto, 33 from Maldonado, 22 from Flores, 21 from Paysandú, 18 from Treinta y Tres, 15 from Colonia, 15 from Tacuarembó, 3 from Rocha, 10 from Durazno, 10 from Lavalleja, 9 from Rivera, 5 from Cerro Largo, 4 from Soriano, 3 from Rio Negro, 1 from Artigas, and 1 from San José.

Since March 13, 2020, when the pandemic was first declared, 4,347,842 tests have been processed and 407,981 positive cases of coronavirus have been recorded in Uruguay. Of this total, 397,586 have recovered.

Today, 2 deaths with a SARS-CoV-2 diagnosis were recorded in our country (see table with details attached), for a cumulative total of 6,165 deaths of people diagnosed with COVID-19 in Uruguay.

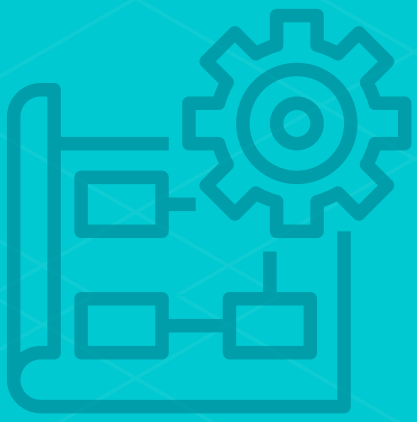
There are 4,230 active cases, i.e., people who currently have the disease, 25 of whom are in critical care centers.

Of the total number of confirmed positive cases, 10,013 are health workers. 9,876 have already recovered, 109 are currently infected, and 28 have died.

Currently, all departments have active cases.

CLARIFICATION:

The total number of confirmed positive cases as of yesterday was 407,381. Today, 601 new cases have been reported, for a total of 407,981 confirmed positive cases. According to the MSP, the reason for the difference is the elimination of one case.



# APPENDIX II. COVID-19 GUIDES PREPARED BY SALUD.UY

# APPENDIX II. COVID-19 GUIDES PREPARED BY SALUD.UY

## Guía para la codificación de COVID-19

https://bit.ly/3mnk405 DOWNLOAD

## Guía para la codificación de COVID-19 para CMD v2.0

https://bit.ly/3M7rmiW DOWNLOAD

## Guía técnica - Informe de laboratorio COVID v2.0.0

https://bit.ly/38V1fyd DOWNLOAD

## Guía técnica - Informe de laboratorio COVID v3.0.0 - 20210112

https://bit.ly/3tanTJI DOWNLOAD

## Guía Técnica Notificaciones Prestadores Integrales v3.0

https://bit.ly/3N9y09H DOWNLOAD

## Guía Técnica Notificaciones Prestadores Integrales v3.1

https://bit.ly/3x7O6uU DOWNLOAD

## Guía Técnica Notificaciones Prestadores Parciales v2.2

https://bit.ly/3GGbWB9 DOWNLOAD

## Guía Técnica Notificaciones Prestadores Parciales v3.0

https://bit.ly/3GGcg2P DOWNLOAD

## Guía Técnica Novedades COVID-19 - Prestadores Parciales v2.1

https://bit.ly/3x7vuLl DOWNLOAD

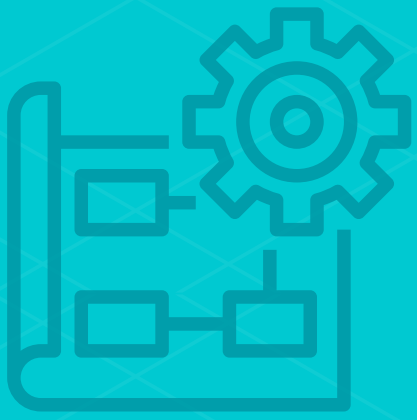
## Guia Técnica Novedades COVID-19 - Prestadores Integrales v2.0

https://bit.ly/3z8m9EF DOWNLOAD

## Motivos y diagnósticos para COVID-19 v2

https://bit.ly/3NNPiZP DOWNLOAD

*Source:* Agesic.



# APPENDIX III. COVID-19 VACCINATION CERTIFICATE

# APPENDIX III. TEMPLATE OF URUGUAY'S COVID-19 VACCINATION CERTIFICATE

Uruguay
Presidencia

Ministerio
de Salud
Pública

CERTIFICADO/CERTIFICATE

**VACUNACIÓN COVID-19/COVID-19 VACCINATION**

**Fecha de emisión/Emition date: 12/08/21**

NOMBRE/NAME: **NOMBRE DE PRUEBA**

TIPO DE DOCUMENTO/TYPE OF DOCUMENT: **CÉDULA DE IDENTIDAD**

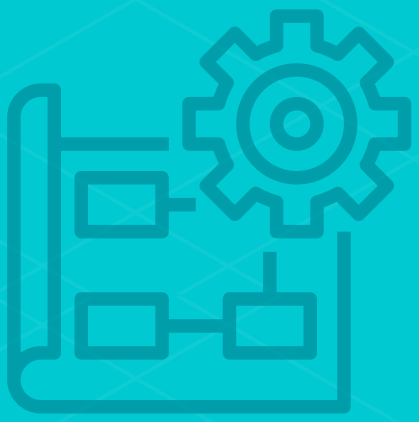
NÚMERO DE DOCUMENTO/DOCUMENT NUMBER: **11111111**

| DOSIS/DOSE | LABORATORIO/LABORATORY | FECHA/DATE |
|---|---|---|
| 2 | SINOVAC | **27/04/21** |
| 1 | SINOVAC | **30/03/21** |

El presente QR sólo puede ser leído por sistemas especiales. Su lectura habilita el acceso a información personal de vacunación COVID-19.
The present QR can only be read by special systems. Reading it enables access to personal COVID-19 vaccination information.

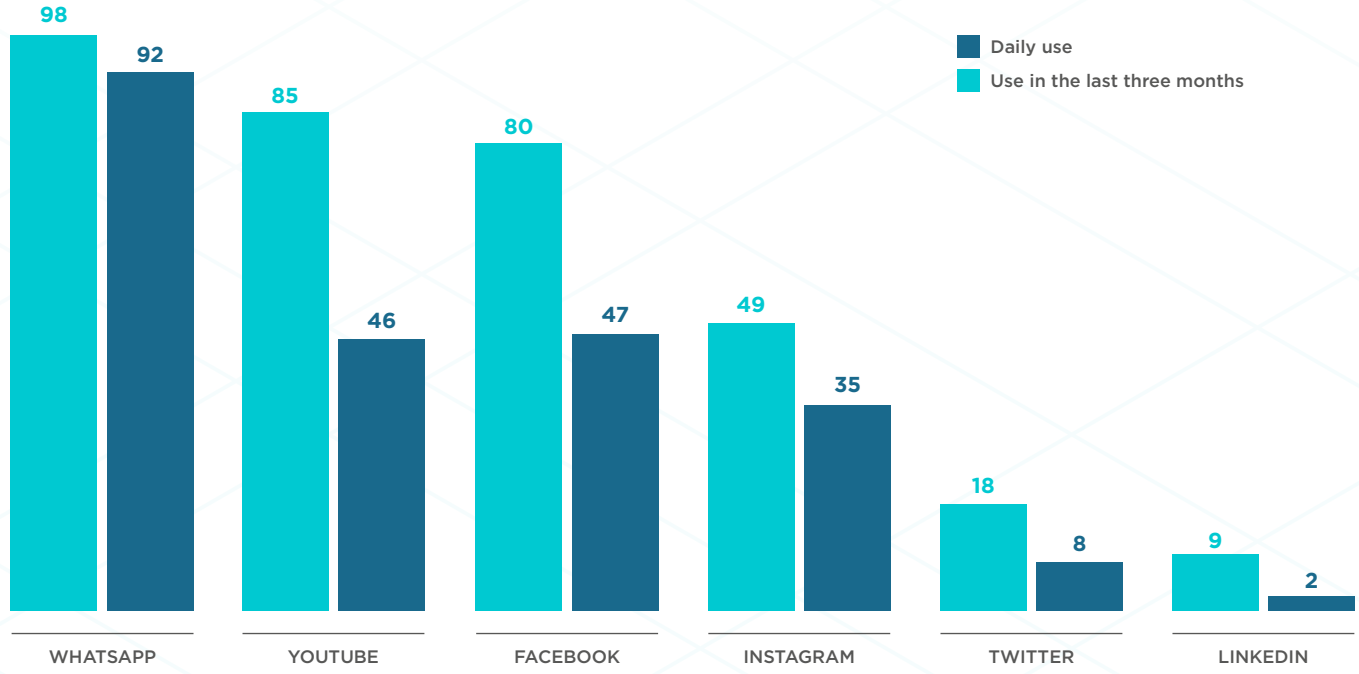
Documento firmado digitalmente por el MSP. Podrá confirmarse la autenticidad del presente documento mediante la verificación de su firma.
Document digitally signed by the Ministry of Public Health. You can confirm the authenticity of this document by verifying your signature.

*Source:* Salud.uy.

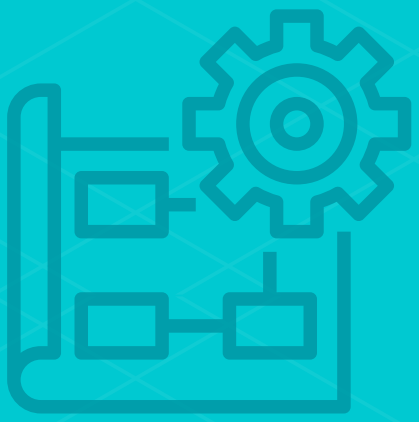


# APPENDIX IV. SOCIAL NETWORK USE BY NETWORK, 2019

# APPENDIX IV. SOCIAL NETWORK USE BY NETWORK, 2019




*Source:* AGESIC, *Encuesta de Uso de Tecnologías de la Información y la Comunicación 2019*, https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/datos-y-estadisticas/estadisticas/encuesta-uso-tecnologias-informacion-comunicacion-2019.

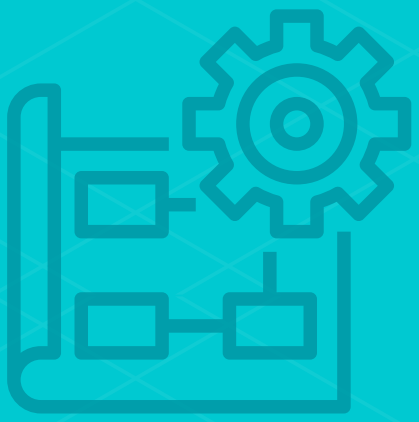


# APPENDIX V. MIRA MEMBER INSTITUTIONS AND THEIR MAIN FUNCTIONS

# APPENDIX V. MIRA MEMBER INSTITUTIONS AND THEIR MAIN FUNCTIONS

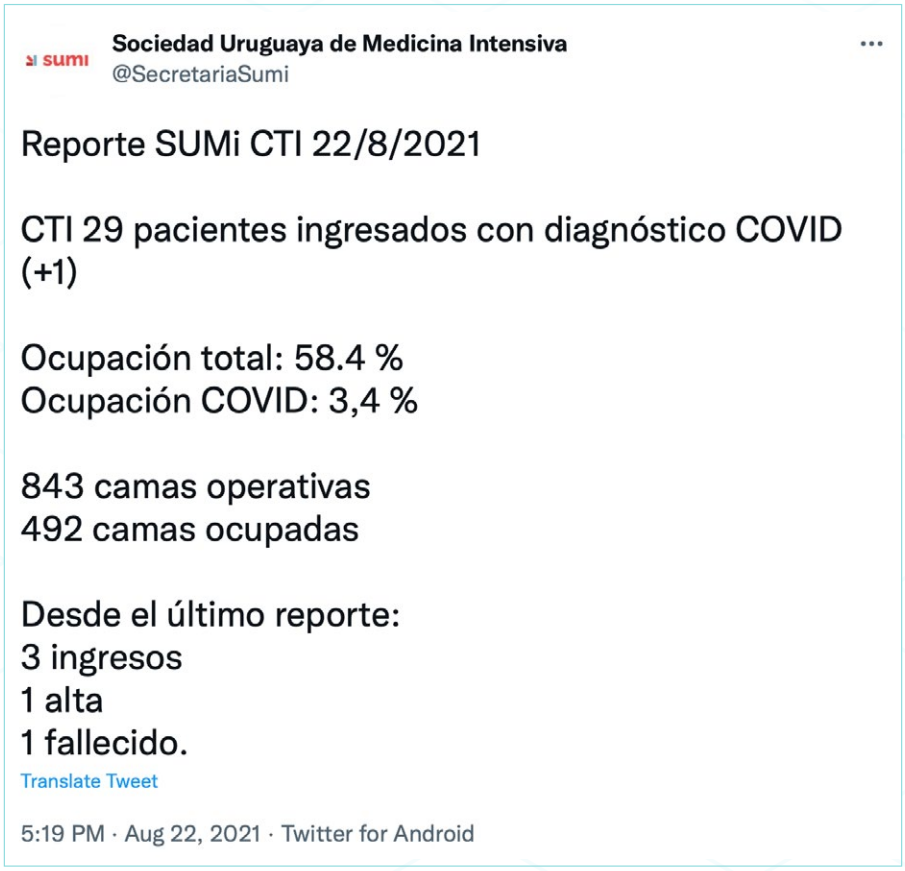
| Institution | Information they provide |
|---|---|
| IDE | Geographic information layers |
| National Postal Administration | Standardized addresses layer |
| National Statistical Institute https://www.ine.gub.uy/ | Number of homes and people per block based on the 2011 Population and Housing Census and utilities layer |
| National Directorate of Civil Identification | Identification for identifying affected people |
| Ministry of Social Development and Social Security Bank | Information on socially vulnerable people, organized by immediate families |
| Uruguayan Meteorological Institute | Weather alerts and notices |
| Departmental Emergency Coordination Centers | Log of events and personal or material damage |
| National Directorate of Traffic Police | Road closures |
| National Directorate of Water https://www.mvotma.gub.uy/dinagua | Flood risk curves and flood characteristics |
| National Directorate of Land Use Planning | Geographic analysis services |
| MSP | Overview of available resources and COVID-19 case tracking |

*Source:* Agesic.



# APPENDIX VI. SUMI HOSPITALIZATION REPORT

# APPENDIX VI. SUMI HOSPITALIZATION REPORT DURING THE PANDEMIC



Sociedad Uruguaya de Medicina Intensiva
@SecretariaSumi

Reporte SUMi CTI 22/8/2021

CTI 29 pacientes ingresados con diagnóstico COVID (+1)

Ocupación total: 58.4 %
Ocupación COVID: 3,4 %

843 camas operativas
492 camas ocupadas

Desde el último reporte:
3 ingresos
1 alta
1 fallecido.

Translate Tweet

5:19 PM · Aug 22, 2021 · Twitter for Android

*Source:* SUMI.

*Translation:*

SUMI - Uruguayan Society of Intensive Care Medicine @SecretariaSumi

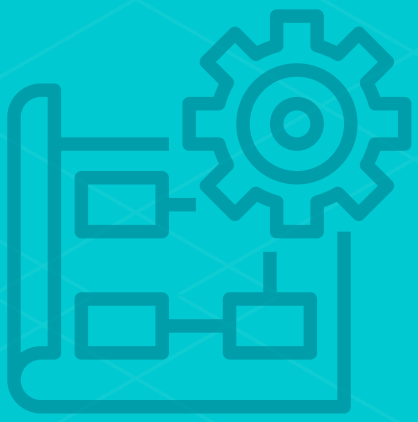
SUMI ICU Report 8/22/2021

ICU: 29 COVID-19 patients (+1)

Total occupancy: 58.4%
COVID-19 occupancy: 3.4%

843 available beds
492 beds in use

Since the last report:
3 admissions
1 discharge
1 death



# APPENDIX VII. TIMELINE OF VACCINE ADMINISTRATION, 2021–2022

# APPENDIX VII. TIMELINE OF VACCINE ADMINISTRATION, 2021–2022