

SARS-CoV-2 Drive/Walk-Thru screening centers in Colombia: The CoVIDA project

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Abstract

Objective: The CoVIDA project is a public-private collaboration led by Universidad de los Andes that contributed to the SARS-CoV-2 epidemiological surveillance in Bogotá and nearby municipalities. We aimed to describe the development and performance of the Drive/Walk-through free RT-PCR for SARS-CoV-2 testing strategy implemented by CoVIDA.

Material and method: We performed a descriptive analysis of the characteristics and performance of the CoVIDA Drive/Walk-through testing centers. The model and the process indicators to assess the model's performance were based on international experiences and scientific literature. Two screening centers were implemented in shopping centers in the north and south of Bogotá. We reported the number of tests taken, the number of positive tests, and the number of participants that used the model by the type of occupations.

Results: In total, 36,689 nasopharyngeal RT-PCR tests for SARS-CoV-2 were performed with a 5.75% cumulative positivity. Process indicators showed an excellent performance and an important contribution in reducing barriers to access to testing.

Conclusions: the CoVIDA Drive/Walk-through testing centers supported the epidemiological surveillance in asymptomatic or mild-symptomatic population in Bogotá. Low and middle-income countries can use this model as a cost-effective and innovative solution strategy to intensify testing and help mitigate the pandemic.

Keywords: Epidemiological Monitoring [MeSH], COVID-19 Testing [MeSH], SARS-CoV-2 [MeSH], Colombia [MeSH], Drive-through, Walk-through.

Centros de tamizaje masivo para SARS COV-2 en Colombia: Proyecto CoVIDA

Resumen

Objetivo: El proyecto CoVIDA es una colaboración público-privada liderada por la Universidad de los Andes que contribuyó a la vigilancia epidemiológica del SARS-CoV-2 en Bogotá y municipios cercanos. Nuestro objetivo fue describir el desarrollo y rendimiento de la estrategia de tamizaje gratuito con RT-PCR mediante un modelo *Drive/Walk through* para SARS-CoV-2 implementado por CoVIDA.

Materiales y métodos: Realizamos un análisis descriptivo de las características y desempeño de los centros de tamizaje *Drive/Walk through* de CoVIDA. El modelo y los indicadores de proceso para evaluar el desempeño del modelo se basaron en experiencias internacionales y la literatura científica. Se implementaron dos centros de tamizaje en centros comerciales del norte y sur de Bogotá. Se reportó la cantidad de pruebas tomadas, pruebas positivas y de participantes que utilizaron el modelo de acuerdo con el tipo de ocupaciones.

Resultados: En total, se realizaron 36,689 pruebas RT-PCR nasofaríngeas para SARS-CoV-2 con una positividad acumulada del 5,75%. Los indicadores de proceso mostraron un excelente desempeño y una contribución importante en la reducción de las barreras de acceso a las pruebas.

Conclusiones: los centros de tamizaje con modelo *Drive/Walk through* de CoVIDA apoyaron la vigilancia epidemiológica en población asintomática o con síntomas leves en Bogotá. Los países de ingresos bajos y medianos pueden utilizar este modelo como una estrategia innovadora y rentable para aumentar la realización de las pruebas y ayudar a mitigar la pandemia.

Palabras clave: Vigilancia Sanitaria [DeCS], COVID-19, SARS-CoV-2, Colombia [DeCS], Drive-through, Walk-through.

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Introduction

Colombia is a middle-income country located in Latin America, with an estimated 50.7 million inhabitants in 2020¹. Since the COVID-19 pandemic began, Bogotá -the capital city with a population of 7.4 million inhabitants- has been especially affected by SARS-CoV-2 transmission. Among possible reasons are high population density, health inequalities, deficiencies in universal health care access, high percentages of public transport use, and up to 48% of informal employment among adults, impeding compliance with lockdown².

On March 6th, 2020, the first COVID-19 case in the country was confirmed in Bogotá, followed by strict lockdown declared on March 20th and until April 27th. Multiple transitions to selective isolation and gradual economic reopening were implemented until August 2020, when the first epidemic peak was observed^{1,3}. By December 2020, the city experienced a second wave, with the second epidemic peak recorded in January 2021, leading again to a city lockdown. In April 2021, despite the containment and mitigation measures implemented, SARS-CoV-2 community transmission remained highly active.

The CoVIDA project is an unprecedented public-private collaboration that implemented two Drive/Walk-through testing centers for active epidemiological surveillance. The centers offered RT-PCR SARS-CoV-2 free testing in Bogotá to decrease barriers in access to COVID-19 testing and reduce times for RT-PCR test results. This initiative started in late March 2020 and aimed to test citizens, including asymptomatic and mild-symptomatic populations conducting high mobility jobs. We aimed to describe the development and performance of the Drive/Walk-through free RT-PCR for SARS-CoV-2 testing strategy implemented by CoVIDA from May 29th, 2020 to March 20th, 2021.

Material and methods

We performed a descriptive analysis of the characteristics and performance of the CoVIDA Drive/Walk-through testing centers. This strategy was applied by the CoVIDA project as an innovative free screening model to identify transmission patterns in asymptomatic and mild-symptomatic selected populations with high mobility throughout the city of Bogotá, Colombia^{4,5}. The Drive/Walk-through model was based on various international experiences and scientific literature⁶⁻⁹ and adapted to the conditions of the study population. Two screening centers were implemented in shopping centers in the north and south of Bogotá.

The CoVIDA Drive/Walk-through screening centers were designed based on the identification data and vital sign evaluation, sample collection, sample transportation, substances and waste manipulation, and management-related guidelines for COVID-19 testing established by the Colombian Ministry of Health^{10,11}. Therefore, the CoVIDA Drive/Walk-through

screening centers complied with the human resources training, personal protective elements use, testing infrastructure and supplies, and manual of procedures development requirements. Also, approval from the District's Health Secretary was obtained. Samples were processed at the Gencore laboratory of Universidad de los Andes, which is certified by the Colombian Health Ministry for SARS-CoV-2 detection.

The CoVIDA Drive/Walk-through screening centers performed testing in two modalities: motor vehicles and walk-up testing. The process included the following steps 1) patient identification, 2) vital signs measurement (temperature, oxygen saturation, heart rate, and respiratory rate), 3) nasopharyngeal swab sampling, and 4) reporting of results and recommendations.

The process indicators to assess the model's performance included: working schedule, total testing lines/points, the mean number of tests performed per day, no-show appointments per day, total testing time, storage temperature, laboratory time, and the cost per test.

Ethical considerations

The Research Ethics Committee of Universidad de los Andes approved the CoVIDA study (Approval Number 1181, 2020). Based on the resolution 008430, 1993, and the resolution 2378, 2008, the study was classified as minimum risk research. Informed consent was obtained from each participant via telephone call.

Data analysis

Descriptive analyses were performed to report the number of tests taken during the operative time of the center, the number of positive tests, and the number of participants that used the model by the type of occupation. Also, the process indicators are described above.

Results

CoVIDA Drive/Walk-through testing centers performed 36,689 nasopharyngeal RT-PCR tests representing 55.5% of the total RT-PCR tests performed by the CoVIDA project (n=63,775). Participants screened at CoVIDA Drive/Walk-through testing centers had 5.75% cumulative positivity (n=2,109 positive tests). Table 1 presents the Drive/Walk-through process indicators. The test was free to the participant and the CoVIDA project assumed it. Total testing time was six to eight minutes long from arrival to departure. RT-PCR test result was informed to the participants 48 hours on average, based on the laboratory's processing time.

The most frequent occupations observed in the sample were contact with customers (general services) in 22.2% (n=8,134), essential office workers in 20.4% (n=7,493), and teachers/auxiliaries and students in 13.9% (n=5,120). Table 2 presents the distribution of the participants' occupations and the positivity rates by each occupational group. Occupations with the highest positivity rates were police, military, and firefighter in 9.2%, informal worker in 8.7%, and construction worker in 7.5%.

Table 1. Process indicators of the CoVIDA Drive/Walk-through testing centers

Indicator	CoVIDA Drive/Walk-through testing centers' performance
Working Schedule	Monday to Saturday 8-am – 5-pm
Total testing lines/ points	Seven
Mean number of tests performed per day	177 tests per/day (Min: 2 and Max: 349)
No-show appointments per day	Mean: 58 (Min: 1, Max: 158)
Total testing time	6-8 minutes from arrival to departure
Storage capacity	Up to 13 hours after swab sample collection to arrival at Gencore university laboratory
Storage temperature	2-8°C
Laboratory's time	Up to 48 hours
Cost per test	Free for the participants (The CoVIDA project assumed the cost of each test. Approximately \$295 000 Colombian pesos/ 74 USD.

Table 2. Distribution of participants' occupations screened at the CoVIDA Drive/Walk-through testing centers and the positivity rates by each group.

	CoVIDA Drive/Walk-through total tests performed	Positive result
	Number	Number (%)
Police / Military / Firefighter	1,363	125 (9.2%)
Informal/looking for a job	3,349	291 (8.7%)
Construction worker	456	34 (7.5%)
Contact with costumers	8,134	484 (5.9%)
Public /private driver	4,077	237 (5.8%)
Teacher/auxiliary/students	5,120	282 (5.5%)
Essential office worker	7,493	374 (4.9%)
Health care worker	2,138	99 (4.6%)
Other occupations ^a	4,559	183 (4.0%)
Total sample	36,689	2,109 (5.7%)

Other occupations: actors, cooks, farmers, musicians, operators, technicians, veterinarians, among others.

Figure 1 shows the number of RT-PCR tests performed and the number of positive tests observed by epidemiological week. Figure 2 presents the number of tests performed and the positive results by the epidemiological weeks for each occupational group.

Discussion

To our knowledge, there were no other free massive testing centers for COVID-19 in Colombia and operating for the most prolonged period in the Americas region. These testing centers expanded the capacity of testing of COVID-19 during the first two peaks of the pandemic in asymptomatic and mild-symptomatic populations in Bogotá, which has been the most affected city during the pandemic in Colombia. The CoVIDA Drive/Walk-through model reached high standards of quality in all processes indicators. In addition, the virus transmission pattern with a sample of more than 36 thousand people was consistent with the patterns and pandemic peaks reported by health authorities and, CoVIDA was the only window that reported on positivity in high-risk occupations.

The Drive/Walk-through testing centers operated for more than ten months of implementation, six days a week and eight hours a day. In Latin America, there is no report of such a prolonged testing strategy. Also, in the region, other experiences have been carried out for up to ten weeks^{12,13}.

International experiences that have used the Drive/Walk-through screening model have been previously reported in the literature. Evans et al. (2020) reported an average of 217 tests per day in the state of Nevada, US. The Arizona Department of Health Services implemented a drive-through model with 12 sampling lines, 272 to 736 individuals tested per/day, and 184 no-show appointments per/day⁶. The Kansas Department of Health and Environment reported specimen storage of up to 72 hours⁷. In Korea, a Drive-through center reported a total testing time of 10 minutes^{8,9}. In contrast, in the US, Evans L. et al. reported a testing time of up to 15 minutes¹³. CoVIDA Drive/Walk-through testing centers achieved similar performance but handled a greater number of tests per day, less sampling lines and with a scheduling spam of ten minutes.

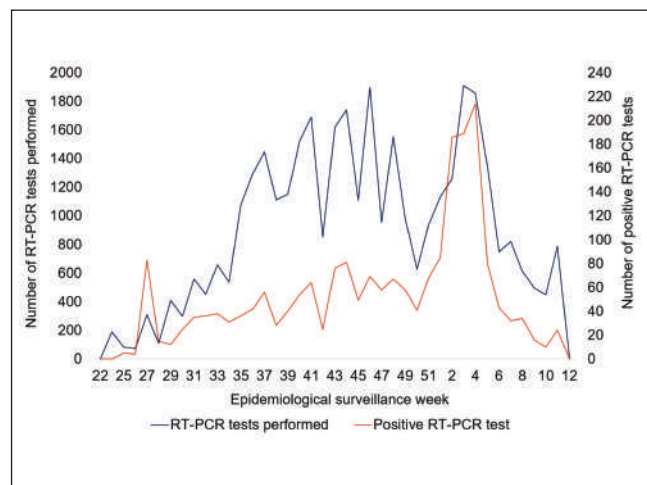


Figure 1. CoVIDA Drive/Walk-through testing center's epidemiological surveillance in Bogota Colombia: RT-PCR-tests performed and positive RT-PCR tests from week 22 (May 29th, 2020) to week 12 (March 20th, 2021)

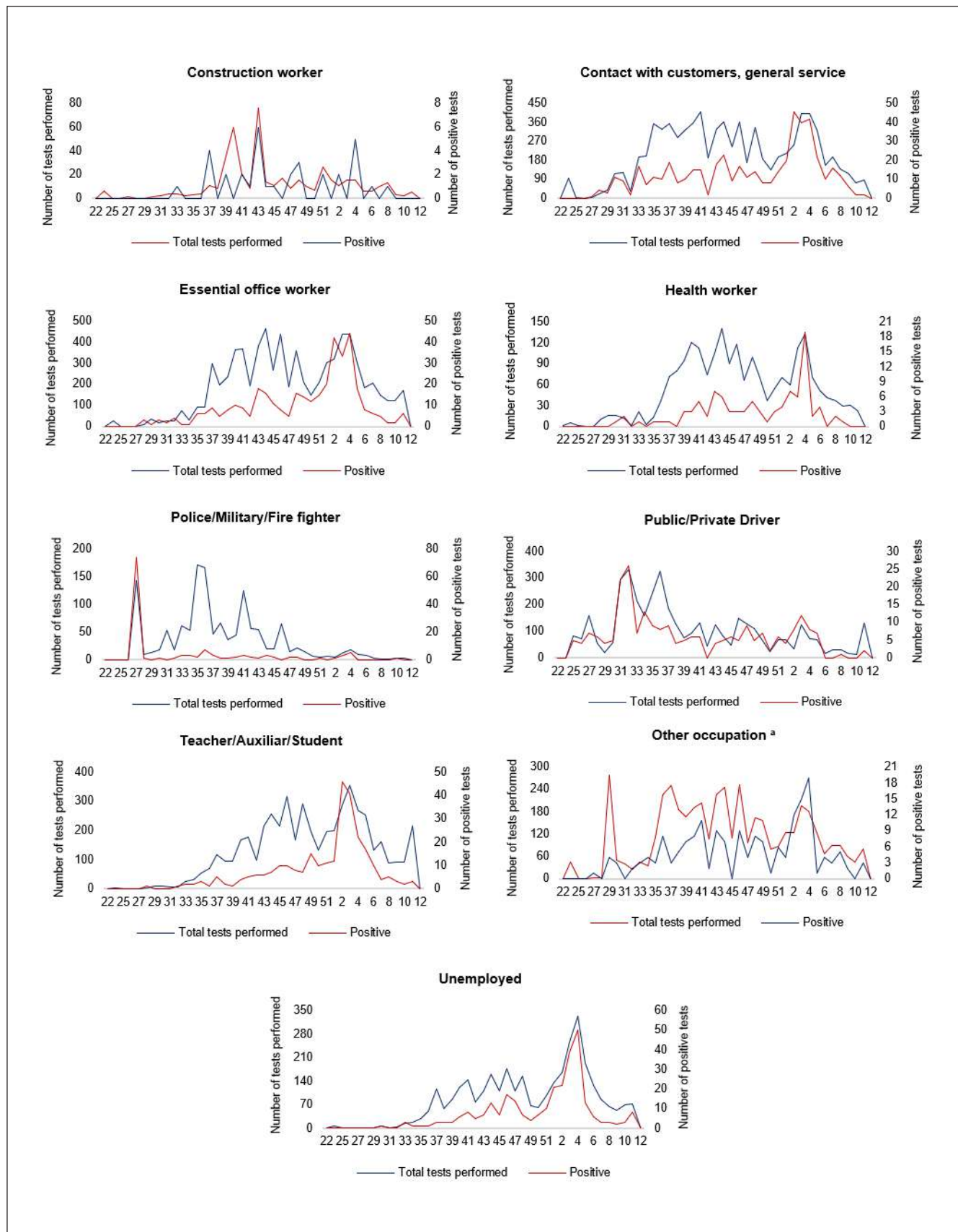


Figure 2. RT-PCR-tests performed in the CoVIDA Drive/Walk-through testing centers and positive RT-PCR tests from week 22 (May 29th, 2020) to week 12 (March 20th, 2021) by type of occupation.

a. Other occupations: actors, cooks, farmers, musicians, operators, technicians, veterinarians, among others.

Similar experiences in lower-middle-income countries such as Nigeria have used a walk-through model in addition to the traditional drive-through. A testing center recorded 1,794 visits with 78% drive-through and 22% walk-through visits. The average visit time for the drive-through was 19.2 ± 4.6 minutes and 28 ± 9.2 minutes for the walk-through¹⁴. In contrast, the COVIDA testing centers managed to shorten the turn-around time for the participants.

The drive-through systems implemented worldwide have shown an increase in the test-taking capacity up to five times compared to other conventional systems, with the delivery of results within 24 to 48 hours after sample collection^{9,12,13,15}. The CoVIDA Drive/Walk-through testing centers managed to reduce access barriers and expanded the testing capacity in Bogotá. Also, the CoVIDA Drive/Walk-through reduced waiting times that were already prolonged (4-10 days) in the city due to the sanitary crisis. These actions provided support to the city's health care system.

The CoVIDA Drive/Walk-through testing centers allowed mass testing of asymptomatic populations with a high risk of exposure to the virus, given their occupations. Likewise, the model design limited the exposure of healthcare workers and saved personal protective equipment (PPE)¹⁶. These achievements translated into fewer human resources and lesser exposure to the virus in health workers¹⁷. The use of these models reduced the burden of extensive cleaning procedures. A special room for testing in a healthcare facility would require special conditions such as air exchange, increasing turn-around time between people^{9,16}. Therefore, the Drive/Walk-through method for testing could be more effective than an emergency department or a clinic¹⁶.

CoVIDA Drive/Walk-through testing centers were the only known free strategies in the region that combined drive and walk-through models. The drive-through model guaranteed the participants isolation within their vehicles, which leads to a reduced risk of infection^{18,19}. Meanwhile, the walk-through model guaranteed a minimum of two meters distance between people. Although some authors have argued that the scheduling of walk-in participants using public transport can be a risk for the transmission of SARS-CoV-2^{18,19}, the CoVIDA walk-through testing centers performed symptoms screening before the scheduling of the test. Those with symptoms were tested at home, which could help to prevent the infection transmission. The walk-through model reduced the barriers to testing in a susceptible population that could not be tested at home due to their occupations, type of health insurance, and other social inequities or prejudices among their communities.

Finally, the changes in the overall positivity rate observed in our analyses were consistent with the positivity rate patterns reported in the city²⁰. CoVIDA was the only window informing positivity rates by occupational group, also depicted as the CoVIDA dashboard in the SALUDATA Health Observatory of Bogotá²¹. Police, military, and firefighters showed the high-

est positive rate, which could be related to several outbreaks in military settings. The second occupation with the highest positivity rate was among informal workers, which can be explained by increased mobility and contacts, which may confer a greater exposure to the virus.

In conclusion, the CoVIDA Drive/Walk-through testing centers increased the screening capacity for SARS-CoV-2 detection to support the epidemiological surveillance in Bogotá²². Low and middle-income countries can use the Drive/Walk-through model as a cost-effective and innovative solution strategy to mitigate the pandemic²³.

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Ethical disclosures

Protection of human and animal subjects. This research do not use animal nor human material.

Confidentiality of data. Not data that enable identity of participants was revealed.

Conflicts of interest. The researchers did not receive any type of sponsorship for the development of the research, different from the salaries they receive for their daily work in the entities to which they belong.

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