



Commentary

A critical narrative of Ecuador's preparedness and response to the COVID-19 pandemic

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ABSTRACT

Ecuador's National Health System has been severely overwhelmed by the COVID-19 pandemic despite public health efforts. This was primarily due to limited health emergency planning responses. Ecuador's COVID-19 mortality rate was 8.5% in early June 2020. The capital city (Quito) and Pichincha province, Guayaquil city and Guayas province, as well as Manabi, Azuay, the El Oro and Tungurahua provinces were the most severely impacted locations by the COVID-19 pandemic, resulting in thousands of positive cases. Using the World Health Organization (WHO) Operational Planning Guidelines to Support Country Strategic Preparedness and Response Plan for COVID-19 as a reference point, we highlight the urgent need to implement a proactive preparedness and response plan to address the COVID-19 pandemic, with the aim of improving Ecuador's public health system. The mitigation of COVID-19 transmission and hazard reduction is crucial in protecting the most vulnerable at-risk populations in this nation.

The novel coronavirus disease (COVID-19) was declared a global pandemic on March 11, 2020 by the World Health Organization (WHO) [1] with >147 million cases by the end of April 2021 [2,3]. By early 2021, the ten countries with the highest number of confirmed cases were the US, India, Brazil, France, Russia, Turkey, the UK, Italy, Spain, and Germany, but several Latin American countries (i.e. Argentina, Colombia, Mexico, Peru, Chile, Ecuador and Panama) were also being severely impacted by the pandemic at this time [2,3]. Indeed, the unprecedented public health crisis created by the global spread of COVID-19 presented unparalleled challenges all over Latin America.

In Ecuador, COVID-19 has severely affected not only the nation's public health system and emergency response, but has also had socioeconomic, equity and ethical dimensions. Despite the health emergency, there was a limited response from Ecuador's public health system, in addition to a slow operational capacity and strategic preparedness plan to mitigate the spread of the infection and cope with the escalating number of cases and deaths. With an overwhelmed health system, due to the high number of infected patients and delayed proactive response, COVID-19 put the health of Ecuadorians at high risk. In this commentary, we provide a brief overview of the COVID-19 emergency response to support public health and primary healthcare in Ecuador by addressing the following questions: What were the impacts of COVID-19 in Ecuador?

How effective was the COVID-19 emergency response? What were the weaknesses and issues encountered with the measures adopted? What opportunities has the COVID-19 pandemic presented? Based on the lessons learned, to date, we also provide recommendations of specific health emergency response actions to improve Ecuador's health policy in terms of preparedness capacity during the COVID-19 pandemic, which can benefit other Latin American countries, and also provide relevant insights for public health policymakers and practitioners.

What were the impacts of COVID-19 in Ecuador?

Following the first confirmed case of COVID-19 in Ecuador on February 29, 2020 [4] and the subsequent community transmission and increasing mortality during March 2020, the national borders were closed. However, at the same time, an alarming situation occurred in Ecuador's western city of Guayaquil (Guayas province) [home to ~3 million people]; a high number of deceased bodies (due to COVID-19 and other diseases) were left unattended for several days at 32 °C on the streets and sidewalks, and in homes and healthcare facilities, as the hospitals were becoming rapidly overwhelmed [5,6]. In an effort to address this health and sanitary emergency, Ecuador's government deployed a military taskforce towards the end of March [6]. Within 1

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Table 1

Specific examples of strategies within the eight pillar of the World Health Organization (WHO) COVID-19 Country Preparedness and Response Plan (CPRP) 13[14] recommended or to be reinforced in Ecuador during the COVID-19 pandemic in 2020 and 2021.

CPRP pillars	Strategic actions
(1) Country-level coordination, planning and monitoring	Developing and implementing an official National Action Response and Preparedness Plan for the Contingency of COVID-2019: <ul style="list-style-type: none"> Closure of national borders Quarantine for arriving travellers Intense testing and confirmation of cases Isolate infected people and ensure infection control Implement contact-tracing capabilities to contact all people that were in contact with an infected person and quarantine all of them Use of PPE (masks) and social distancing Monitor as to whether a decreasing number of cases is occurring over a two-week period (i.e. 14 days)
(2) Risk communication and community engagement	<ul style="list-style-type: none"> •Promoting and diffusing public messaging and health education programmes addressed to the population (e.g., practice social distancing at 2–4 m and home isolation, promoting PPE or mask use)
(3) Surveillance, rapid response teams and case investigation	<ul style="list-style-type: none"> •Ensuring that an Emergency Response Health Team was already assembled
(4) Points of entry	<ul style="list-style-type: none"> •Concerted monitoring of new COVID-19 cases and hospitalised patients and recovered individuals •Rapid public testing and implement contact tracing
(5) National laboratories	<ul style="list-style-type: none"> •Informing travelers of prevention measures •Establishing two-week quarantine for foreign citizens, international and resident arriving to Ecuador from overseas. •Setting up temporal closure of the territory borders
(6) Infection prevention and control	<ul style="list-style-type: none"> •Adopting standardised systems for molecular testing, supported by assured access to reagents and kits •Sharing genetic sequence data and virus materials according to established protocols for COVID-19 •Strengthen the availability of proper PPE to health workers (e.g., doctors, nurses, paramedics) •Ensure that healthcare facilities remain safe as a top priority •Ensure aggressive containment of virus as a top priority and intensify infection control
(7) Case management	<ul style="list-style-type: none"> •Mapping vulnerable populations and public and private health facilities, and identify alternative facilities that may be used to provide treatment •Identifying ICU capacity •Ensuring comprehensive medical, nutritional and psycho-social care for those with COVID-19
(8) Operational support and logistics	<ul style="list-style-type: none"> •Assessing the capacity of the local market to meet increased demand for medical and other essential supplies, and coordinate international requests of supplies through regional and global procurement mechanisms (e.g. PAHO, WHO) •Identifying potential major impacts on the transportation systems of health supplies, education and food transportation networks

ICU, intensive care unit; PAHO, Pan-American Health Organization; PPE, personal protective equipment.

week, around 300 to 500 or 800 bodies were collected; however, many bodies remained on the streets and in homes awaiting collection [6]. The potential transmission of COVID-19 from these deceased bodies was of great concern, as COVID-19 infections and deaths of forensic medical personnel who were in contact with COVID-19 contaminated corpses was concurrently reported in Thailand [7]. Ecuador's capital, Quito (Pichincha province), was also among the most severely impacted cities by COVID-19.

In early June 2020, Ecuador had ~40,000 confirmed cases and more than 3390 COVID-19 deaths[2,3], with a high mortality rate of 8.5%. By late April 2021, ~373,500 cases and close to 20,000 COVID-19 deaths had been recorded (i.e. a mortality rate of 5%) [2–4]. The fatality rate, however, was probably much higher as many people died of the virus without being diagnosed. In fact, during April and by early May 2020, Ecuador was becoming one of the COVID-19 epicenters in South America [5]. This trend occurred in tandem with other countries, including Colombia, Argentina, Peru and Chile, where the number of confirmed cases was also rapidly growing and only surpassed by Brazil with >14, 500,000 cases (becoming the third COVID-19 nation in the top ten and current COVID-19 epicentre in South America with >390,000 deaths by late April 2021) [2,3]. The COVID-19 pandemic impacted Ecuador's health system by compromising the public health and citizen rights in this democratic country, leaving Ecuadorians begging for appropriate healthcare, equity and social justice. The United Nation's International Human Rights Law guarantees all people have the right to the highest attainable standard of health and obliges governments to take steps to prevent threats to public health and to provide medical care to those in need [8].

How effective was the COVID-19 emergency response?

Ecuador's Minister of Health enacted the State of Sanitary Emergency in the National Health System (NHS), issued through Ministerial Agreement No. 00126-2020 on March 11, 2020, after the WHO declared

COVID-19 a global pandemic. To the best of our understanding, while a documented national action plan for COVID-19 was yet to be officially enacted by Ecuador's Ministry of Health, the National Emergency Operations Committee (Comité de Operaciones de Emergencia [COE] Nacional) was activated for the health emergency in Ecuador [4], following the declaration of COVID-19 as a pandemic by the WHO.

Based on the crisis observed in Guayaquil and Quito, as well as in Portoviejo (Manabí Province's capital), Machala (El Oro Province) and other major cities, Ecuador's preparedness and response capacity plan to counteract and mitigate this kind of pandemic was not adequate to contain COVID-19 transmission. Notwithstanding, because of the relatively low numbers of cases nationwide, with the exception of Guayas, Pichincha, Manabí, Azuay and Tungurahua provinces, Ecuador's NHS was able to prepare a more adequate response to the health crisis in other provinces.

Implementation of a phone line (Call Center 171) by Ecuador's Telecommunication Minister in late February 2020 was an important step in providing alerts to the healthcare system and communicating COVID-19 symptoms, procedures to isolate and contain infected or sick people in their homes, and providing healthcare remotely where possible. Many COVID-19 cases and other individuals with health conditions were monitored by phone and only the most severe cases received in-person medical attention. Inter-provincial transportation and vehicle traffic within cities was limited or restricted based on car license plate number selection. Ecuador's government and local governments implemented additional public health actions in an effort to communicate and educate the population about preventative measures, such as hand washing, use of facemasks and proper social distancing, while trying to maintain a functioning healthcare system.

What were the weaknesses and issues encountered with the measures adopted?

Despite the health emergency response efforts, medical personnel and

frontline health workers were in great need of personal protection equipment (PPE) to protect themselves against COVID-19. Ecuador urgently requested international support to acquire technical resources, medicine and PPE. Ecuador was assisted by the Pan-American Health Organization (PAHO), who donated PPE resources for health workers during April 2020 [9]. At the same time, several other Latin America countries, and European and Asian nations, including Spain, Italy, India, Iran, Iraq and Pakistan, were also severely impacted by COVID-19 and requesting international assistance [10–13].

An active screening system for early detection, confirmation of cases and isolation of infected individuals, in addition to contact-tracing capabilities to track people who were in contact with infected individuals was also absent during the early stages of the pandemic in Ecuador. This basic strategic response would have been a critical preventive measure for infection control and containment of the virus. If these strategies had been adopted early in the COVID-19 pandemic, as a proactive response, the number of cases and deaths would have been lower. At a later date, Ecuador's Health Ministry deployed efforts towards the implementation of a COVID-19 testing programme in affected communities and the general population, but this was too late to control the spread of COVID-19. At present, immunodiagnostic (i.e. based on host antibody detection against the virus) and molecular (e.g., polymerase chain reaction-PCR to detecting genetic material of SARS-CoV-2) tests along with seroepidemiological research and molecular screening for COVID-19 are being conducted by main universities (e.g., ESPOL Polytechnic School, Universidad Central del Ecuador, Universidad San Francisco de Quito), health medical centers/hospitals and private clinical labs in Ecuador.

The poor management and limited protocols of Ecuador's Ministry of Environment was highlighted by the lack of transparency and poor public health administration of the COVID-19 vaccination programme in January and February 2021. Insufficient vaccine supply (mainly second doses) for frontline health workers and the most-exposed populations revealed the poor implementation of the vaccine campaign, which was particularly important during this time period, which coincided with the onset of the second COVID-19 wave in early 2021. The need to recruit a military taskforce, the Red Cross, private sector and other health institutions was of paramount importance in prompting an efficient vaccination programme.

What opportunities has the COVID-19 pandemic presented?

In light of the COVID-19 health crisis in Ecuador, a specific preparedness and response plan for this country was required. The WHO emphasised the necessity to conduct a detailed gap and needs analysis to develop a COVID-19 Country Preparedness and Response Plan (CPRP), using the operational planning guidance for United Nations country teams (UNCTs) [14]. The CPRP relies on eight fundamental pillars [14] (see Table 1). These pillars can proactively be tested and adapted to Ecuador's existing NHS to combat COVID-19, and also serve as a preparedness-response framework to be applied for other infectious viral diseases. Within these pillars (Table 1), an intense rapid testing system, with confirmation and isolation of infected individuals, followed by contact-tracing to identify those who were in contact with COVID-19 positive cases and subsequently quarantine these individuals, as well as stay at home orders and social distancing, were all critical measures during the first months of the pandemic (March–April 2020) in Ecuador.

Ecuador's vaccination campaign with the Pfizer vaccine, which needs to be stored at -70°C, commenced on January 20, 2021 and is being rolled out and reaching frontline healthcare workers and the older population (≥ 65 years). However, since March 15, 2021 [15], there have been caveats in the distribution of the vaccines, regrettably shrouded by political corruption; allocation of the vaccines has been seen rolled out to undesignated people and no prioritized public sectors, disrupting the COVID-19 vaccination prioritisation guidelines. Despite the vaccination program issues, the Sinovac vaccine that can be stored in a standard refrigerator at 2–8°C was also becoming available to prioritized groups of

the population (e.g., Manabí province).

What lessons has Ecuador learned that are of value to other Latin American countries?

Ecuador, as most other Latin American countries, is still dealing with this virus and emerging COVID-19 variants, with limited effective treatments and therapy, and a vaccination programme that has yet to be improved and become available to the entire Ecuadorian population. From the guidance of the WHO-CPRP pillars, Ecuador's government was able to foster the implementation of the second pillar (i.e. Risk Communication and Community Engagement) as an important step to communicate the health risks and epidemiological status of the pandemic across the nation. Similar to other Latin American countries, Ecuador's NHS developed and continues to implement strategic communication campaigns aimed at COVID-19 prevention, including messages about the importance of hand washing, the use of facemasks and sanitisers, and social distancing. In particular, it is imperative that the widespread understanding of facemask use and its effectiveness at preventing and controlling COVID-19 transmission is promoted through public health safety and education campaigns in communities and schools [16].

For public health policymakers and practitioners in Ecuador and other Latin American countries, basic guiding principles to foster a preparedness and emergency response plans aimed to mitigate highly infectious coronavirus diseases in the face of a pandemic are summarised as follows:

- i. Implementing the immediate closure of international borders to the most exposed countries, which are serving as sources of viral spread.
- ii. Deploying an efficient rapid testing programme for virus detection and effective contact-tracing capacity for isolation of symptomatic and asymptomatic individuals (e.g. super spreaders) in airports, maritime and terrestrial international borders.
- iii. Ensuring the availability of both abundant PPE stocks for frontline healthcare workers and appropriate medication for effective medical treatment.
- iv. Empowering the population and remote communities with reliable official information and practical hygiene and sanitary measures to counteract viral dissemination.
- v. Setting up of an effective vaccination programme and vaccine distribution campaign with prioritisation guidelines for the most vulnerable populations.

Neither Ecuador nor any other country in the world were prepared for such a pandemic, despite the early warnings of emerging and reemerging infections by severe acute respiratory syndrome (SARS)-coronaviruses that have gone on for many years [17–19]. In developing nations, seroepidemiological studies, for instance, can become important tools to pre-assessing whether a given population owns antibodies against the virus [20,21] as it is known that undocumented cases of infected people (i.e., symptomatic and/or asymptomatic individuals) accelerate the spread of SARS-CoV-2 [22]. The proactive formulation of a response action plan to prevent the transmission of viral diseases along with adequate strategic preparedness [19] to improve the medical care capacity in Ecuador's health policy agenda is vital to protect the public health of Ecuadorians from highly contagious and lethal viral diseases in the long term. Given the lessons learned from the COVID-19 pandemic, Ecuador's health policy should be revisited to ensure that human health is proactively prioritised.

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Declaration of interests

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Declaration of competing interest

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References

- [1] World Health Organization, in: Rolling Updates on Coronavirus Disease (COVID-19), WHO, Geneva, Switzerland, 2020. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>. Accessed 21 March 2020.
- [2] E. Dong, H. Du, L. Gardner, An interactive web-based dashboard to track COVID-19 in real time, *Lancet Infect. Dis.* (2020) 1–2, [https://doi.org/10.1016/S1473-3099\(20\)30120-1](https://doi.org/10.1016/S1473-3099(20)30120-1).
- [3] Johns Hopkins University, in: Coronavirus COVID-19 Global Cases by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). COVID-19 Map, Coronavirus Research Center, Baltimore, Maryland, 2020. <https://coronavirus.jhu.edu/map.html>. Accessed from 9 April 2020 to 7 January 2021.
- [4] Ministerio de Salud Pública, in: Coronavirus Ecuador: Actualización de casos de coronavirus en Ecuador, Gobierno de la Republica de Ecuador, Quito, Ecuador, 2020. <https://www.salud.gob.ec/actualizacion-de-casos-de-coronavirus-en-ecuador/>. Accessed from 5 May 2020 to 15 March 2021.
- [5] A. Faiola, A.V. Herrero, Bodies lie in the streets of Guayaquil, Ecuador, emerging epicenter of the coronavirus in Latin America, *The Washington Post* (3 April 2020), https://www.washingtonpost.com/world/the-americas/coronavirus-guayaquil-ecuador-bodies-corpse-streets/2020/04/03/79c786c8-7522-11ea-ad9b-254ec99993bc_story.html. Accessed 8 April 2020.
- [6] Gallon N. "Bodies are being left in the streets in an overwhelmed Ecuadorian city," Cable News Network (CNN), (2 April 2020) <https://www.cnn.com/2020/04/03/americas/guayaquil-ecuador-overwhelmed-coronavirus-intl/index.html>). Accessed 8 April 2020.
- [7] W. Sriwijitalai, V. Wiwanitkit, COVID-19 in forensic medicine unit personnel: observation from Thailand, *J. Forensic Leg. Med.* 72 (2020) 101964.
- [8] United Nations Commission on Human Rights, in: The Siracusa Principles on the Limitation and Derogation Provisions in the International Covenant on Civil and Political Rights, vol. 28, United Nations Economic and Social Council, 1984. September 1984 E/CN.4/1985/4, <https://www.refworld.org/docid/4672bc122.html>. Accessed 16 April 2020.
- [9] Organización Panamericana de la Salud, OPS/OMS dona al Ecuador equipos de protección personal para apoyar los esfuerzos en la respuesta al COVID 19. Organización Panamericana de la Salud/Organización Mundial de la Salud (OMS), 2020. https://www.paho.org/ecu/index.php?option=com_content&view=article&id=2330:ops-oms-dona-al-ecuador-equipos-de-proteccion-personal-para-apoyar-los-esfuerzos-en-la-respuesta-al-covid-19&Itemid=360. Accessed 15 May 2020.
- [10] G. Di Lorenzo, R. Di Trolio, Coronavirus disease (COVID-19) in Italy: analysis of risk factors and proposed remedial measures, *Front. Med.* 7 (2020) 140, <https://doi.org/10.3389/fmed.2020.00140>.
- [11] B. Javed, A. Sarwer, E.B. Soto, Z.R. Mashwani, Is Pakistan's response adequate enough to stem a coronavirus (SARS-CoV-2) outbreak? *Front. Med.* (2020) <https://doi.org/10.3389/fmed.2020.00158>.
- [12] A. Kumar, K.R. Nayar, S.F. Koya, COVID-19: challenges and its consequences for rural health care in India, *Publ. Health Pract.* (2020) 100009.
- [13] E.M. Mikhael, A.A. Al-Jumaili, Can developing countries alone face corona virus? an Iraqi situation. *Publ. Health Pract.* (2020) 100004.
- [14] World Health Organization, in: COVID-19 Strategic Preparedness and Response Plan: Operational Planning Guidelines to Support Country Preparedness and Response, WHO, Geneva, Switzerland, 2020. <https://www.paho.org/en/documents/response-covid-19-outbreak-region-americas>.
- [15] Ministerio de Salud Pública, in: Plan Nacional de Vacunación Ecuador 2021: Ilegal segundo lote de vacunas Pfizer por 16.380 dosis, Gobierno de la Republica de Ecuador, Quito, Ecuador, 2021. <https://www.salud.gob.ec/plan-nacional-de-vacunacion-ecuador-2021-ilegal-segundo-lote-de-vacunas-pfizer-por-16-380-dosis/>. Accessed 15 March 2021.
- [16] S.E. Eichler, A.P. Hopperton, J.J. Alava, A. Pereira Jr., R. Ahmed, Z. Kozlakidis, et al., A Citizen science facemask experiment and educational modules to improve coronavirus safety in communities and schools, *Front. Med.* 7 (2020) 486, <https://doi.org/10.3389/fmed.2020.00486>.
- [17] V.C. Cheng, S.K. Lau, P.C. Woo, K.Y. Yuen, Severe acute respiratory syndrome coronavirus as an agent of emerging and reemerging infection, *Clin. Microbiol. Rev.* 20 (4) (2007) 660–694.
- [18] D. Quammen, *Spillover: Animal Infections and the Next Human Pandemic*, vol. 592p, W.W. Norton & Company, Inc., New York, 2012.
- [19] M.T. Osterholm, M. Olshaker, *Deadliest Enemy: Our War against Killer Germs*, vol. 352p, Little, Brown Spark, Boston, Massachusetts, 2017.
- [20] World Health Organization. Advice on the use of point-of-care immunodiagnostic tests for COVID-19. Scientific Brief, WHO: Geneva, Switzerland. (Accessed 21 March 2020).
- [21] R. Patel, E. Babady, E.S. Theel, G.A. Storch, B.A. Pinsky, K. St. George, et al., Report from the American Society for Microbiology COVID-19 International Summit, 23 March 2020: Value of diagnostic testing for SARS-CoV-2/COVID-19, *mBio* 11 (2) (2020) 1–5, <https://doi.org/10.1128/mBio.00722-20>, e00722-20.
- [22] R. Li, S. Pei, B. Chen, Y. Song, T. Zhang, et al., Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV-2), *Science* 368 (6490) (2020) 489–493, <https://doi.org/10.1126/science.abb3221>.